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# Incentives for consumers to act as tax auditors: (When) are they effective?\*

Lilith Burgstaller<sup>†</sup> Annabelle Doerr<sup>‡</sup> Sarah Necker<sup>†§</sup>

## Abstract

We study the causal effects of household tax credits on the willingness to demand legally provided services using two survey experiments with 1.974 German homeowners. We vary the type of the tax credit, the refund rate, and whether the tax reduction is made salient. All tax credits increase the willingness to pay for offers with invoice. The effectiveness is significantly higher when two attractive features are combined: consumer-friendly implementation plus high rate or the reduction is made salient. About two thirds of respondents who would use the tax credit would have demanded an offer without invoice also without the subsidy.

Keywords: Tax credit, Financial rewards for compliance, Tax evasion, Tax compliance, Third-Party Reporting, Survey experiment, Discrete Choice Experiment  
JEL Codes: H26; C93; E26; J22; O17

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# 1 Introduction

Improving tax compliance is an important policy goal in most economies. Previous research shows that taxes are less likely to be evaded if governments are able to observe transactions (e.g., Alm et al., 2009; Kleven et al., 2011, 2016; Pomeranz, 2015; Naritomi, 2019). Thus, withholding taxes and verifiable documents have been established as central instruments of tax collection. However, the incentives to report transactions to tax authorities are often weak when consumers demand products or services. While the value added tax (VAT) provides an incentive for firms to insist on an invoice in business-to-business transactions, this “self-enforcement property” does not exist in business-to-consumer transactions. To introduce incentives for third-party reporting in transactions involving households, several countries have introduced monetary incentives for consumers that demand legally provided services (Williams and Nadin, 2014).<sup>1</sup>

Since the lower price is an important determinant of the decision to demand undeclared goods or services (e.g., European Commission, 2014), the goal of these policies is to reduce the price premium for declaration. However, systematic evidence on the effect of such incentives on tax evasion is rare. The survey by Feld et al. (2012) suggests that the German household tax credit is mainly used by those who would have declared also without the incentive. Buettner et al. (2022) use individual VAT tax files of the universe of VAT taxpayers in Germany and show that the German tax credit has led to an increase in reported sales and VAT revenues. About half of the increase can be attributed to the formalization of services. Similarly, Naritomi (2019) shows that an anti tax evasion program in Brazil that includes monetary rewards for consumers has a positive effect on firms’ compliance. In contrast, Harju et al. (2021) find that household tax credits in Finland and Sweden have no meaningful effect on consumers’ tax evasion.<sup>2</sup>

The goal of our study is to examine the effect of monetary incentives on consumers’ willingness to demand legally provided services and the premium they are willing to pay for this using two survey experiments. We focus on tax credits that offer favourable tax treatment to consumer of services, as granted in several European countries (OECD, 2021). Tax credits take different forms, which may influence their effectiveness. In most countries, e.g., Germany, Italy, Belgium, and France, tax credits are claimed with the annual tax return, which requires consumers to pay the full price upfront. However, it has been acknowledged that this implementation may lead to a low take-up among households with lower incomes, who cannot afford the higher price of declared services (OECD, 2021). In addition, the procedure to obtain the tax credit may be too burdensome for some households. Therefore, Sweden has shifted to a system in which tax credits are granted at source, i.e., as an immediate price reduction. Another feature varying across countries is the rate of the refund. For example, in Germany consumers receive 20% of the labor cost as refund, while the rate is 50% in France and Sweden (OECD, 2021).

To examine the effect of the different types of tax credits, we conduct two surveys in which participants make decisions in a discrete choice experiment (DCE). Participants are asked to

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<sup>1</sup> The amounts spend on these incentives are large. For instance, the German household tax credit has a volume of about 2 billion Euro and 11.6 million cases and is one of the 20 largest subsidies (BMF, 2021).

<sup>2</sup> At a more abstract level, laboratory experiments show that different types of financial rewards can decrease income tax evasion (Alm et al., 1992; Kastlunger et al., 2011; Bazart and Pickhardt, 2011).

put themselves in a situation in which they aim to have a service, such as painting walls, to be carried out in the household for money. Our sample consists of 1.974 German homeowners, which are likely to be familiar with such decisions. They are asked to choose between different offers which vary, amongst others, the price and whether the offer includes an invoice. Since the choice scenarios consider multiple attributes, it is more difficult to infer the goal of the study. Hence, DCEs have been shown to reduce social desirability bias (e.g., Horiuchi et al., 2022).

We vary the policy scenario in which the decisions are made in a between-subject design. In Study 1, we focus on the actions that the household has to take to obtain the credit and the timing of awarding tax credits, holding the refund rate constant at 20%. In our baseline scenario, subjects are asked to assume that there is no tax credit. In the Tax Credit Via Tax Return 20% scenario, the household can claim the tax credit via the annual tax return and receives the refund of 20% of the price of the service as reduced tax payment in the subsequent year. In the Tax Credit At Source 20% treatment, the household has to inform the seller that they want to use the tax credit, who then reduces the price the household has pay by the refund. In Study 2, we investigate the role of the refund rate by adding scenarios with a 30% refund for both types of tax credits. We also examine if households are more responsive to tax credits when we display the price including the refund (e.g., as done on some Swedish websites). By comparing choices across scenarios, we identify the effect of the different features of tax credits on the willingness to pay (WTP) for an invoice and the probability to choose such an offer.

We find that even without a tax credit consumers are willing to pay a 27% higher price for an offer including an invoice. As an example, that implies that if consumers can choose between an offer without invoice of 300 Euro and an offer with invoice of up to 381 Euro, they would prefer the offer with invoice. Once the price of the offer with invoice exceeds 381 Euro however, consumers on average choose the offer without invoice. While all types of tax credits significantly increase the intention to declare, households do not react as strongly to their features as expected. When the refund rate is 20%, the premium households are willing to pay for an invoice is not significantly different between the tax credit claimed via the tax return and the one granted at source. An increase of the rate of the tax credit from 20% to 30% does not increase the willingness to pay for an invoice. When the refund rate is 30%, the tax credit granted at source is more effective than the tax credit claimed via the tax return. We conclude that the effectiveness of tax credit increases when two attractive features come together. Remarkably, the effect of displaying the final price including the tax credit is as high as the effect of increasing the rate of the tax credit by 10 ppts. This shows the effectiveness of making the price reduction more salient to consumers.

We examine why even under the most effective tax credit a substantial fraction would choose an offer that does not involve declaration. We find that some people prefer offers without invoice even though their price is higher, suggesting that in these cases other attributes of the offers, e.g., more immediate availability, drive the decision. In addition, the effectiveness of the tax credits depends on the premium that suppliers demand to issue an invoice. If the premium is too high, offers without invoice are less expensive even after accounting for the tax credit. The most often mentioned reason for why people may not use tax credits is the lower price of illegal

offers. Hence, the effectiveness of tax credits also depends on suppliers' willingness to declare.

We find that tax credits are related to substantial windfall effects, which we define as the fraction of respondents reporting that they would use the tax credit even though they would have selected an offer with invoice also without it. This applies to 62%-80% of respondents, depending on the tax credit scenario. Note that our results apply to the provision of small-scale jobs in the household, such as painting rooms. We expect that the baseline willingness to demand offers with invoice is even higher for larger jobs, for which having a guarantee is important. This may further question tax credits' effectiveness in inducing a reducing non-compliance.

We contribute to an increasing literature examining the effect of third-party information on tax evasion (e.g., Alm et al., 2009; Kleven et al., 2011, 2016; Pomeranz, 2015) by showing that consumers are to a large extent voluntarily willing to work as "tax auditors" and request invoices (Naritomi, 2019). We thus also contribute to the large literature showing that taxpayers are much more honest than predicted by the traditional model of tax evasion, due to an intrinsic motivation to comply with taxes (e.g., Luttmer and Singhal, 2014). The additional amount of third-party information collected due to the tax credit depends on its features. While the German type of tax credit (via tax return 20%) only increases the willingness to pay for an invoice by 8ppts, the Swedish type (via seller, 30%) increases the willingness to pay by 25 ppts.

To the best of our knowledge, our paper is the first attempt to examine the effect of different features of tax credits on consumers' behavior. The advantage of our experimental survey is that we are able to vary institutions, which is impossible in reality. Yet, our experiment abstracts from several reasons why households may not use tax credits. For instance, it is possible that households are not informed about the tax credit (Feld et al., 2012) or the household is not eligible (e.g., as they do not owe taxes Grönberg and Rauhanen, 2015). Considering that these factors may further prevent households' use of tax credits, we conclude that governments should carefully consider if the benefits of tax credits exceed their costs.

Our paper is structured as follows. In Section 2, we describe the general setup of the experiment. In Section 3, we describe the treatments, hypotheses, and results of Study 1. In Section 4, we describe the modifications implemented in Study 2 and the results from this survey. In Section 5, we discuss our findings and conclude.

## **2 Structure of experiment**

### **2.1 Procedure of survey**

Our samples were recruited through the provider of a German research panel (Consumerfield-work). To increase the reliability of participants' choices, we select a subject pool that is likely to have experience with the situation of wanting to hire a seller of household services. Owners of a flat or house are more likely to require household services such as renovation work than renters (Feld et al., 2012). In addition, in several countries (e.g., Sweden, Italy) households must own the unit where the work is carried out to receive the tax credit. Thus, we only allowed subjects to participate that responded in earlier surveys of the research panel that they live in an owned flat or house. The data collection took place in December 2021 (Study 1) and July 2022 (Study

2). Each respondent only participates once and those completing the survey receive 1 Euro as compensation. We use the platform Qualtrics to program and administer our questionnaires.

The flow of the questionnaire is as follows: On the welcome screen we explain that the goal of the study is to inquire how households make decisions when they demand household services, such as renovation work, for money (see Appendices A.1 and A.2 for the wording of the questionnaires in Study 1 and 2). Subjects are informed that the survey should take around 10 minutes and deals with their decision-making, their experiences, and their life situation.<sup>3</sup> We ask them to complete the survey honestly and we explain that their responses are valuable to us even if they do not have experience with demanding household services. We assure anonymity.

The survey itself consists of four parts: First, we inquire socio-demographic characteristics, namely gender, age, state of residence and type of housing. Before subjects enter the second part, we include an attention check (following, e.g., Berinsky et al., 2014). Participants that do not pass are redirected to the end of the survey. The second part consists of the discrete choice experiment, explained in Section 2.2. In this part, subjects are assigned to different treatments, consisting of the different policy scenarios, described below. In each treatment, respondents participate in the exact same discrete choice experiment. The choice experiment is followed by treatment-specific follow-up questions which aim to assess the motivation of participants' choices and have the goal to disentangle the mechanisms if and why tax credits are effective. The third part asks participants about their experience with demanding household services and the tax credit in Germany. Last, we inquire information about the household (income, decision-making within the household), the subject's time preference and risk aversion (taken from Falk et al., 2018) and attitudes towards taxation (Haerpfer et al., 2020).

## 2.2 Discrete choice experiment

To assess households' willingness to demand an invoice and to pay a premium for this, running a discrete choice experiment has several advantages. First, it has been shown that multidimensional, hypothetical choices made by survey respondents match choices in real-world situations (e.g., Hainmueller et al., 2015). The situation we design mimicks the situation that households face when they get offers for a job that needs to be done in the household. Second, choice experiments have been shown to reduce social desirability bias (e.g., Horiuchi et al., 2022). Since the choice scenarios consider multiple attributes, it is difficult for participants to infer what the goal of the study is and what researchers may want to hear. This is particularly important for our research question, as we inquire households' willingness to engage in illegal behavior.

In our discrete choice experiment, subjects are asked to put themselves in a situation in which they want to have a renovation service, such as painting walls, carried out in the household for money. We tell them that we would like to know how they would choose between two offers. A pilot study showed that subjects did not know how to choose between offers when the job was unspecified. For instance, households are less likely to choose an offer without invoice for a complex job which costs a large amount of money and for which having a guarantee is important.

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<sup>3</sup> Dropping nine individuals that took more than an hour to respond, the actual average time is 9.6 minutes.

Since evasion is more likely to occur with small-scale services (e.g., European Commission, 2014), we choose to frame the discrete choice experiment with the example of painting walls. Our results thus are likely to apply to simple, small-scale jobs (see also Doerr and Necker, 2021).

In the instructions, we inform subjects that they have to make seven choices between two offers and that offers differ in four attributes. We selected four attributes that are central in determining the decision between offers, according to discussions with individuals that have experience with hiring sellers. We ask subjects to assume that the offers are the same in all dimensions not specifically stated in the choice sets. We show them an example of a choice set.

The first attribute is whether or not the seller was recommended by an acquaintance, see Table 1. To find a seller, households often ask friends and family for their recommendation (USP Marketing Consultancy, 2019)). Since sellers work in the house, a certain amount of trust is required. A recommendation may also serve as a proxy for good quality. However, a recommendation may not always be available, for example, when the household finds a seller through an online platform, which have become increasingly important (Initiative D21, 2021).

The second attribute is the availability of a seller. Even though our framing of the decision does not suggest urgency, we expect that households consider in their decisions if the seller is available “as desired” or if the offer involves “waiting time” (see Table 1). The capacity utilization was at an all-time high before the Covid-19 crisis and is still very high. At the time of our surveys, customers had to wait 3-4 months until a firm is available (Zentralverband des Deutschen Handwerks, 2021, 2022). Due to these difficulties in finding a firm that is available, households’ willingness to hire an informal seller may increase if they are available earlier.<sup>4</sup>

The third attribute is the type of offer, which takes the values “with invoice (incl. VAT)” and “without invoice.” We intentionally stress that an offer with invoice is “incl. VAT”, to express that only this type of offer is declared to public authorities. In interactions between sellers and buyers, the wording “without invoice” is frequently used to refer to an offer that is undeclared (e.g., Doerr and Necker, 2021). The advantage is that it avoids stating that the offer is illegal, which may deter some households from choosing such an offer. The disadvantage is that we do not know how households interpret the term. To be able to assess households’ interpretation, we include a question in the follow-up survey. It shows that 75% of the sample are aware (or willing to admit) that in an offer without invoice due taxes are not paid.

The fourth attribute is the price of the offer. The prices range from 300€ to 500€. This is motivated by the prices observed in Doerr and Necker (2021), who advertised jobs for painting and laying a floor in two/four rooms. Prices increase in steps of 20€, which implies that the attribute has 11 values. The third and the fourth attribute are central for our experiment, as it allows us to estimate subjects’ willingness to pay for services with invoice (see Section 2.3).

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<sup>4</sup> While 21% of participants rate the availability of offers without invoice to be better than the one of offers with invoice, only 8% think that the availability of offers without invoice is worse, see Table A.3. However, the majority think that it is either the same (45%) or they do not know (26%).

Table 1: Attributes and Levels

<b>Attributes</b>	<b>Levels</b>					
Recommendation of seller by acquaintance	Yes No					
Availability of the seller	As desired With waiting time					
Type of offer	Without invoice With invoice incl. VAT					
Price of offer	€300	€320	€340	€360	€380	€400
	€420	€440	€460	€480	€500	



Due to the number of different attributes and levels, it is impossible to administer a full factorial design. We therefore use the software NGene to create an unlabeled, d-efficient experimental design. For this purpose, we define priors about the direction of the effects. We assume that households prefer a recommendation (“Yes”), availability of the seller “as desired”, and offers “with invoice (incl. VAT).” We expect that higher prices are less likely to be selected.

For the generation of the choice sets, we add several constraints. First, we restrict prices of offers without invoice to range between €225 and €330, and prices of offers with invoice to range between €270 and €375. We introduce this constraint as prices with invoice are generally higher than prices without invoice. However, introducing the restriction that the price of offers with invoice is necessarily higher than the price without invoice would have been unrealistic. In addition, it would have been impossible to derive independent estimates for the attributes price and type of offer. Second, we exclude combinations in which one offer is clearly dominated. Given our expectation with regard to households’ preferences regarding the four attributes, an offer is dominated when four conditions are satisfied: the seller has been recommended and is available as desired, the offer is with invoice and the price is lower than the alternative. It is also dominated if only one dimension is better and the remaining dimensions are equal in both offers. Third, in combinations where both offers have the same type of contract (with/without invoice), we require that at least one of the attributes recommendation and availability is different.

The generation of our design resulted in ten blocks of seven choice sets, i.e., 70 choice sets in total. In each choice set, subjects have to choose one of two offers. They cannot accept or reject both. Each participant was randomly assigned one block of seven pairs. Previous literature shows that respondents can complete even more choice tasks before the response quality decreases (e.g., Bansak et al., 2018). Note that subjects read our treatment texts between the instructions and before they enter their choices in the discrete choice experiment. This implies that we run the same discrete choice experiment in each treatment, which allows us to compare the willingness to choose an offer with invoice and the willingness to pay for an invoice across the different treatments, i.e., policy scenarios (see Section 2.3 for details of the analysis).

### 2.3 Econometric approach

Discrete choice experiments draw their theoretical foundation from random utility theory (McFadden, 1986), which allows us to estimate individuals’ utility from offers  $j$  and the attributes they are composed of. The utility individual  $n$  obtains from choosing alternative  $j$  is given by  $U_{nj} = v(x_{nj}) + \epsilon_{nj}$ , where  $v_{nj}$  is a function of observable attributes  $x_{nj}$ , and  $\epsilon_{nj}$  is unknown and treated as random. Individuals choose the alternative  $j$  from choice set  $t$  that gives them the highest utility. The probability that individual  $n$  prefers alternative  $j$  over all alternatives  $i$  in choice set  $t$  is described by

$$P_{ni} = Pr(\epsilon_{nj} - \epsilon_{ni} < v_{ni} - v_{nj}) \forall j \neq i. \quad (1)$$

We estimate the probability that individual  $n$  chooses offer  $i$  with a mixed logit model. This model has been developed to analyze choices individuals make when they face multiple different

choice situations. Standard models (e.g., conditional logit) assume homogeneous preferences of decision-makers. However, individuals' preferences affect all seven choices that they make, therefore their single choices cannot be treated as independent observations. Mixed logit models allow coefficients, i.e. preferences, to vary across individuals thereby incorporating unique preferences and unobservable characteristics that determine their choice behaviour. It therefore accounts for the panel structure of our data that we obtain by individuals making several decisions in the discrete choice experiment (Hole, 2007). The mixed logit choice probability that individual  $n$  chooses alternative  $i$  over alternative  $j$  is

$$P_{ni} = \int \frac{\exp(x'_{ni}\beta)}{\sum_{j=1}^J \exp(x'_{nj}\beta)} f(\beta|\theta) d\beta \quad (2)$$

where the coefficients, or preferences, for each attribute  $x_{ni}$  vary over individuals with the density function  $f(\beta|\theta)d\beta$  and  $\theta$  describes the assumed to be normal distribution of the mean and variance of individuals' coefficients. This feature distinguishes the mixed logit model from other logit models that assume that  $\beta$  is the same for all individuals.

Observing individuals making choices in multiple choice situations  $T$  between various offers  $J$ , the probability of a particular sequence of choices is given by

$$S_n = \int \prod_{t=1}^T \prod_{j=1}^J \left[ \frac{\exp(x'_{njt}\beta)}{\sum_{j=1}^J \exp(x'_{njt}\beta)} \right]^{y_{njt}} f(\beta|\theta) d\beta, \quad (3)$$

with  $y_{njt} = 1$  if the individual chooses alternative  $j$  in choice situation  $t$  and 0 otherwise. Note, that in our case, the individuals make choices in seven choice situation ( $T=7$ ) and they choose between two alternatives ( $J=2$ ). The parameters  $\beta$  can be estimated using a standard maximum likelihood model. The ratio between the parameter estimates of two attributes yields the marginal rate of substitution (MRS) between them. As we include the price of the service as one attribute  $x_p$ , the marginal rate of substitution between the attribute  $k$  and the coefficient on the price (entered as a linear variable into the model) gives the willingness to pay for attribute  $k$ ,

$$MRS = WTP_k = \frac{\delta U / \delta x_k}{\delta U / \delta x_p} = \beta_k / \beta_p. \quad (4)$$

Furthermore, we use the estimated parameters to calculate the marginal effects. Thereby, we predict by how much the probability that individual  $n$  chooses alternative  $i$  changes when the level of attribute  $x_k$  switches from 0 to 1. For the invoice attribute, the marginal effect gives the probability that alternative  $i$  is chosen when it is an offer with invoice. Using Bayes Law, we can translate this marginal effect into the probability that a selected alternative is with invoice. We estimate treatment effects by computing the differences in the WTPs between the different treatment groups in relative terms. The inference is based on the standard errors of the estimated treatment effects obtained by nonparametric bootstrapping (sampling individual observations with replacement) with 999 replications.

### 3 Study 1: Varying the design of the tax credit

#### 3.1 Treatments

In Study 1, we randomly assign participants to one of three treatments in a between-subjects design. Each treatment consists of a description of one of three different policy scenarios. The scenarios represent different implementations of tax credits that aim to incentivize households to demand legally provided services. The information about the specific tax credit is provided on a separate screen after the instructions and before participants enter the decision stage of the discrete choice experiment. To ensure that they consider the tax credit scheme in their decisions, a short description is additionally displayed above every choice set. Thus, we minimize the chance that lack of information is a possible reason for the ineffectiveness of the policy scenarios.

In our *No Tax Credit* treatment, there is no tax credit for the use of household services. Since some participants may be aware of the German tax credit scheme, we explicitly stress *“Please assume that there is no government support when you demand services in the household.”*

In our tax credit treatments, we vary the timing of awarding tax credits and the actions that the household has to take to obtain the credit. Tax credits usually only apply to labor costs, include a maximum amount that can be claimed, can only be obtained when the payment is made via bank transfer, and are only available to households that pay taxes (e.g., OECD, 2021; Harju et al., 2021). Since these features are not central for our question, we abstract from them. We focus on a refund rate of 20 percent, as in Germany. We vary the refund rate in Study 2.

In the *Tax Credit Via Tax Return 20%* treatment, we employ a tax credit that is granted to households via their annual income tax declaration, as implemented, e.g., in Belgium, France, Germany, and Italy. To obtain the tax credit, households need to claim the service in their income tax declaration. The information briefly summarizes the main features of the scheme: *“Please assume that there is government support when you commission services in the household. You can get a refund of 20 percent of the offer price if you choose an offer with invoice. For this purpose, you have to declare the service in your income tax declaration. Your tax payment then decreases by 20 percent of the price of the offer. You receive the refund as reduced tax payment usually in the following year.”* An important feature is that the tax credit entails a time lag between the payment of the service and the receipt of the refund. Households that declare their income taxes after the end of the year, will receive the refund after the tax authority has assessed the tax declaration, usually the following year.<sup>5</sup>

In the *Tax Credit At Source* treatment, we employ a tax credit that is granted to households “at source” , i.e., at the time of service consumption. Such a tax credit exists, e.g., in Sweden. The text of the treatment is as follows: *“Please assume that there is government support when you commission services in the household. You can get a refund of 20 percent of the offer price if you choose an offer with invoice. For this purpose, you have to inform the seller that you want to use the government support. The seller then decreases the price of the offer by 20 percent and handles the settlement with the tax authority. You will receive the refund immediately as*

<sup>5</sup> In Germany, 54% of taxpayers made a tax declaration in 2018 (see <https://www.destatis.de/DE/Themen/Staat/Steuern/Lohnsteuer-Einkommensteuer/im-fokus-steuererklaerung.html>).

a reduced price.” The seller deducts the amount of the tax credit from the consumer’s bill and claims the corresponding amount from the tax authority. In reality, households have to ensure that they have not yet used the maximum amount and their tax payment is high enough. However, we abstract from these details and focus on the action the household has to take to obtain the tax credit, namely informing the supplier that they want to use the subsidy.

### 3.2 Hypotheses

We examine the impact of the two tax credits on consumers’ intentions regarding tax compliance. We focus on two outcomes: the willingness to pay a price premium for an offer with invoice (in percent) and the probability to choose an offer with invoice. For this purpose, we compare behavior in the two tax credit treatments to the treatment without tax credit and to each other.

When an offer includes an invoice it is usually more expensive than an offer without invoice, e.g., as due taxes have to be paid (mainly the VAT but also seller’s income or profit taxes or social security contributions). However, offers without an invoice are related to the possibility of detection and sanctioning, may cause lying costs, and prevent households from obtaining a guarantee. Thus, holding other attributes of the offer constant, we expect that consumers are willing to pay a price premium for the declaration, i.e., the willingness to pay for an invoice is positive ( $WTP > 0$ ).<sup>6</sup> We define this premium as the ratio of the price with ( $p_I$ ) and without ( $p_{NI}$ ) invoice  $\Delta p = p_I/p_{NI}$ . In a scenario without tax credit (no t.c.), we expect consumers to choose an offer with invoice as long as the willingness to pay for an invoice exceeds the price difference between an offer with and an offer without invoice,

$$P(I = 1) = Pr(WTP_{no\ t.c.} > \frac{p_I}{p_{NI}}). \quad (5)$$

The tax credit reduces the final price of a service with invoice by the rate of the tax credit. If the rate is e.g.,  $r=20\%$ , we have  $p_{IT} = p_I * (1-0.2)$ . In other words, the price of an offer with invoice can be 25% higher ( $1/(1-0.2)$ ) to be even with the price of an offer without invoice after deducting the tax credit. Yet, it is possible that households consider hassle costs  $h$  from itemizing the deduction (Benzarti, 2020), costs related to the timing  $d$ , or lacking salience or mathematical skills prevent them to fully price in the tax credit  $\omega$  (e.g., Chetty et al., 2009; Azmat, 2019). This could imply that the perceived benefit of the refund  $\tilde{b}(r, h, d, \omega)$  is less than the actual refund rate  $r$ , with  $\frac{\delta \tilde{b}}{\delta r} > 1$  and  $\frac{\delta \tilde{b}}{\delta h}, \frac{\delta \tilde{b}}{\delta d}, \frac{\delta \tilde{b}}{\delta \omega} < 1$ . However, it is also possible that taxpayers perceive the tax credit as a signal from the government that the non-declaration of services is unacceptable (e.g., Swedish Tax Agency, 2011; Doerr and Necker, 2021). This could increase lying costs  $l$  and we would have  $\tilde{b}(r, h, d, \omega, l)$  with  $\frac{\delta \tilde{b}}{\delta l} > 1$ . We expect that consumers prefer an offer with invoice as long as the premium for an invoice is smaller than the willingness to pay without tax credit  $WTP_{no\ t.c.}$  times the perceived benefit of the tax credit,

<sup>6</sup> It might be that consumers are willing to pay a premium equal to the VAT. Since this is 19% in Germany, the WTP might increase by a factor of 1.19. However, consumers may consider that also profit taxes and social security contributions have to be paid. The WTP might also be higher if people factor in, e.g., the guarantee.

$$P(I = 1) = Pr(WTP_{\text{no t.c.}} * \frac{1}{(1 - \tilde{b})} > \frac{p_I}{p_{NI}}) = Pr(WTP_{\text{with t.c.}} > \frac{p_I}{p_{NI}}). \quad (6)$$

If the perceived benefit of the rate is equal to the refund rate  $\tilde{b} = r$ , and assuming that marginal utility is constant, the WTP should increase by the factor 1.25 when a tax credit of 20% is available.<sup>7</sup> Yet, if  $\tilde{b} \neq r$ , we have  $\tilde{b} < r$  and the WTP increases by less than 1.25. If the tax credits increase lying costs, the WTP could increase by more than 1.25.

In our experiment, we vary the timing of awarding tax credits and the actions that the household has to take to obtain the tax credits. These details may cause differences in the effects of the two tax credits and allow us to assess the importance of costs related to obtaining the tax credits. For two reasons, we hypothesize that the tax credit granted at source is perceived as more valuable than the tax credit claimed via the tax return, i.e.,  $\tilde{b}_{\text{at source}} > \tilde{b}_{\text{tax return}}$ .

First, the tax credit claimed via the tax return should be related to a lower  $\tilde{b}$  due to the time delay with which the refund is received. Liquidity constraint individuals may not be able to afford the higher prices of offers with invoice. Individuals without liquidity constraints may discount the price reduction obtained via the tax return. Since the price reduction is immediately received under the tax credit granted at source, we expect that  $d_{\text{at source}} < d_{\text{tax return}}$ .

Second, when the tax credit is obtained via the tax return, households have to remember to report the amounts, keep the invoice, and enter the information in their tax declaration. Although the procedure is intentionally kept simple (e.g., German households do not even have to submit invoices), it may cause hassle costs from itemizing. Previous literature shows that the compliance costs of taxation are large and taxpayers frequently leave “money on the table” (e.g., Benzarti, 2020). Since obtaining the tax credit granted at source is less demanding, as the seller handles the settlement with the tax authority, we expect that  $h_{\text{at source}} < h_{\text{tax return}}$ .

### 3.3 Sample characteristics

In Study 1, our sample consists of 670 individuals. To assess the representativeness of our sample with regard to the population of homeowners in Germany, we compare the characteristics of respondents in our sample to the ones in the most recent wave of the German Socio-Economic Panel (SOEP), as shown in Table 2. Our sample is very similar to the SOEP homeowner sample of 2019 in terms of age, and regional composition. The distribution of incomes also largely resembles the distribution in the sample of German homeowners. However, we find non-negligible differences in the distribution of educational degrees. Respondents with a low education are overrepresented in our sample, implying that the other categories are underrepresented.

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<sup>7</sup> Note that it is impossible to obtain the increase of the WTP in percent ( $\frac{WTP_{\text{with t.c.}} - WTP_{\text{no t.c.}}}{WTP_{\text{no t.c.}}}$ ) by subtracting one from the ratio, as the base =  $WTP_{\text{no t.c.}}$  has to be considered. For example, those who were not willing to pay a premium at all without tax credit ( $WTP_{\text{no t.c.}=1}$ ), should be willing to pay a premium of 25% with tax credit ( $WTP_{\text{with t.c.}} = 1.25$ ). However, those who were willing to pay a premium of 25% without a tax credit ( $WTP_{\text{no t.c.}} = 1.25$ ) should be willing to pay a premium of 56,25% with tax credit ( $WTP_{\text{with t.c.}} = 1.5625$ ).

Table 2: Summary statistics of the experimental sample and representativeness

	Experimental sample		German homeowner	
	Mean (1)	SD (2)	Mean (3)	SD (4)
Age in years	54.24	(12.68)	54.68	(17.628)
Female	0.528	(0.500)	0.501	(0.500)
East-Germany	0.136	(0.343)	0.147	(0.364)
Education				
Secondary schooling	0.301	(0.459)	0.109	(0.313)
Post-secondary training	0.503	(0.500)	0.613	(0.487)
Academic degree	0.196	(0.397)	0.260	(0.439)
Household income (net)				
<= 2,000 €	0.221	(0.400)	0.249	(0.432)
2,001 € – 3,000 €	0.289	(0.439)	0.246	(0.431)
3,001 € – 4,000 €	0.244	(0.415)	0.216	(0.412)
4,001 € – 5,000 €	0.150	(0.343)	0.145	(0.349)
>= 5,001 €	0.096	(0.386)	0.148	(0.355)
Num. of observations	670		16.661	

Note: Columns (3) - (4) are based on the SOEP from 2019 (v36), homeowners are identified with the respective SOEP question, we include all adult individuals living in Germany. Estimates are computed using weights to adjust for non-response in the SOEP. 9.6% of subjects did not answer the income question in our sample, this fraction amounts to 6.64% in the SOEP homeowner sample.

A large fraction of our participants indeed reports to have experience with decisions and tasks relevant for our study. About two-thirds report that they have purchased household services in the last three years. Four of five participants report to be aware of the German household tax credit, 70% of which say that they have used it in the past (see Table A.2).

Table A.1 shows that the characteristics of our sample are largely balanced across treatments.

### **3.4 Results of Study 1**

#### **3.4.1 Average preferences and willingness to pay**

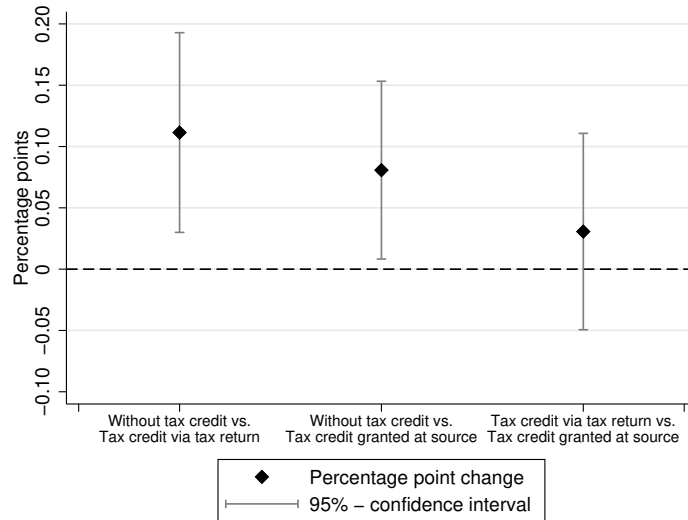
We start analyzing the choice experiment using mixed logistic regressions. We regress the four attributes of each offer in a choice set on a dummy variable indicating if the respective offer was selected. Three of the four attributes are dummy variables. The fourth attribute, the price, is included as logarithm, which allows us to interpret the willingness to pay in percent. As each policy scenario (treatment) is administered as an own discrete choice experiment, we run separate regressions for each treatment group and derive treatment-specific coefficients, marginal effects, and willingness to pay for each attribute, as shown in Table 3.

Table 3: Mixed logit estimates, marginal effects, and willingness to pay

	No tax credit			Tax credit via tax return			Tax credit at source		
	(1) Coeff.	(2) ME	(3) WTP	(4) Coeff.	(5) ME	(6) WTP	(7) Coeff.	(8) ME	(9) WTP
With invoice	2.959 (0.329)	0.343 (0.055)	0.265 (0.031)	4.278 (0.374)	0.477 (0.069)	0.377 (0.030)	4.234 (0.405)	0.454 (0.068)	0.346 (0.030)
Recommended	0.775 (0.174)	0.072 (0.020)	0.069 (0.019)	1.232 (0.190)	0.110 (0.024)	0.108 (0.021)	0.482 (0.152)	0.042 (0.017)	0.039 (0.016)
Available	1.352 (0.172)	0.129 (0.023)	0.121 (0.020)	0.792 (0.145)	0.073 (0.018)	0.070 (0.015)	1.119 (0.162)	0.098 (0.022)	0.091 (0.015)
Log Price	-11.159 (0.935)	-0.010 -	-	-11.359 (0.926)	-0.009 -	-	-12.239 (1.018)	-0.009 -	-
Offers	3,136			3,150			3,094		
Decisions	1,568			1,575			1,547		
Respondents	224			225			221		

Note: Estimates from mixed logit models for each treatment. Omitted categories are “no recommendation”, “Available with waiting time”, and offer “without invoice” respectively. The price is included as log. Marginal effects (ME) are calculated as the difference in the probability that an offer is chosen if the attributes value changes from 0 to 1 for the binary coded attributes. The willingness to pay (WTP) is the marginal rate of substitution between the binary attributes and the price.. It is calculated by dividing the coefficient of each attribute by the coefficient of the log price. Since the price enters the model as logarithm, the WTP can be interpreted in percent. Standard errors are obtained by bootstrapping with 999 replications.

Figure 1: Treatment differences in WTP for invoice



Note – The points show the treatment effects calculated as difference between the probabilities to choose an invoice offer and the WTPs for an invoice between the treatment groups with tax credits and the baseline scenario as well between the two tax credits. The treatment effects are shown in percentage points. Standard errors are obtained by bootstrapping with 999 replications.



All coefficients are highly significant in all treatment groups, and the signs of the coefficients are consistent with our expectations. While the absolute values of the coefficients do not have a meaningful interpretation, they can be used to assess the importance of the attributes within or across models (Hauber et al., 2016). An invoice, a recommendation by an acquaintance, and the availability of the seller as desired have significant and positive effects on the evaluation of offers. As expected, the coefficients on the price are negative as consumers prefer lower prices holding the other attributes constant. Compared to the other binary attributes, whether or not the offer includes an invoice is the most important determinant of respondents' decisions.

We use these estimates to compare behavior across our three policy scenarios. Without a tax credit, the probability that a consumer chooses an offer increases by 34 percentage points (ppts) when it includes an invoice. The likelihood is 48 (via tax return) and 45 (granted at source) ppts higher when consumers have the possibility to claim a tax credit. The same pattern is observed regarding the willingness to pay a premium for an invoice. Without a tax credit, consumers are willing to pay a premium of on average 27%. When a tax credit is available, the WTP increases to 38% when it is granted via the tax return and to 35% when it is granted at source.

To examine if the WTP for an invoice significantly vary across treatments, we calculate the differences across treatments. As shown in Figure 1, compared to the scenario without a tax credit, a tax credit via tax return increases the WTP by 11 percentage points, while this increase amounts to 8 percentage points for a tax credit granted at source. Both differences are significant. As outlined in Section 2.3, we would expect that the WTP increases by the factor 1.25 if individuals ignore costs related to obtaining the tax credit and the tax credit is not perceived as a governmental signal for compliance. Since the WTP in the baseline treatment without tax credit is 27% this would imply that individuals would be willing to pay a premium of 58% ( $1.27 \cdot 1.25$ ) when a tax credit exists (increase by 31.6 percentage points). Hence, the observed increases are about or even less than one third of what one would expect if individuals would fully factor in the tax credit. There is no significant difference in the WTP between the two types of tax credit, suggesting that the timing of the refund and the effort to claim it do not influence behavior towards tax credits. The changes in the WTP are reflected in similar changes of the probability to choose an offer with invoice (see Figure A.1 in the Appendix).

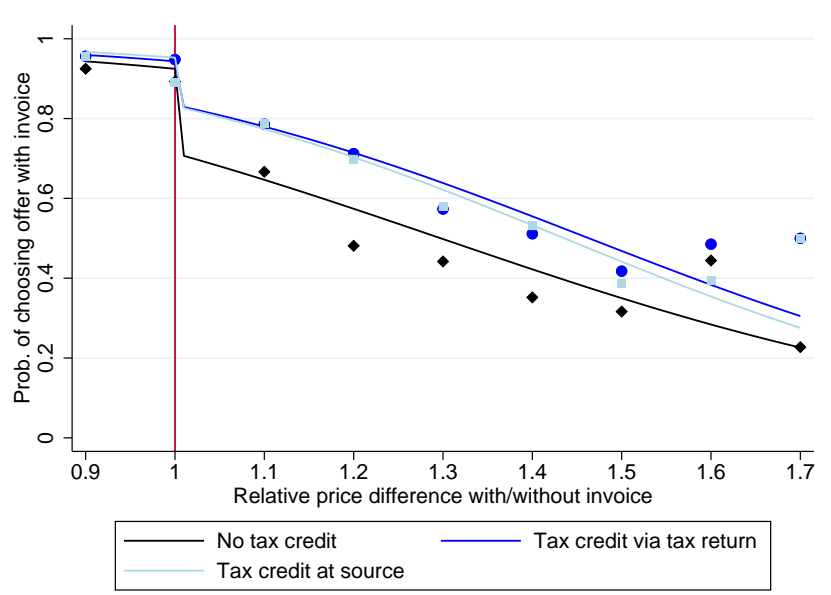
### **3.4.2 Probability of choosing an invoice across price premia**

In Section 3.4.1, the results are averaged over all price differences between the two offers of a choice set. However, the effects of the tax credits might vary with the price premium that consumers have to pay for an invoice. To analyze the effects over the distribution of price premia, we collapse the data to one observation per choice set. We restrict our analysis to the 64 of the 70 choice sets where participants choose between one offer with invoice and one offer without invoice. For each choice set, we construct a dummy variable which is equal to one if the selected offer includes an invoice and one variable indicating the price premium for an invoice.

In Figure 2, we provide a nonparametric and parametric summary of the data over different price premia. First, we plot the raw fraction of choice sets in which respondents choose the

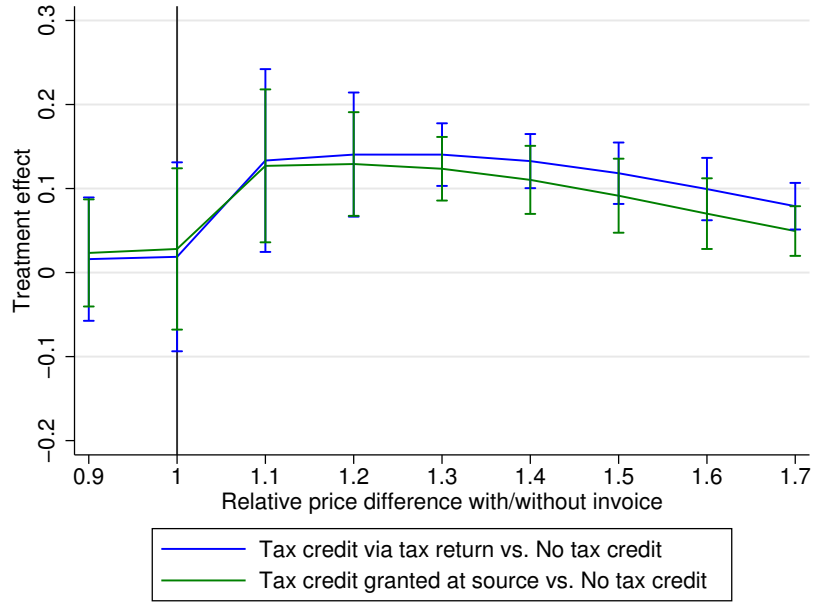
offer with invoice against the price ratio  $p_I/p_{NI}$  of the offer with and without invoice for each treatment group. Second, we add the logit maximum likelihood fits for each treatment group. We include a dummy for choice tasks in which the relative price difference is smaller or equal to one to account for the shift in probabilities in the raw data in this region. These curves can be interpreted as the cumulative density functions of the treatment-specific WTP distributions.

Figure 2: Probability of choosing an offer with invoice over distribution of price premiums



Note: The points show the fraction of choices in which the respondents chose the service offer with invoice at each price premium for an invoice offer by treatment group. It is based on 4,290 choices made by the respondents (1,434 choices in the baseline scenario, 1,440 choices in the scenario with tax credit via tax return, and 1,416 choices in the scenario with a tax credit granted at source). The price premiums are calculated as ratios between offer with invoice and offer without invoice. The maximum likelihood fits are estimated with logistic regression on the choice task level for each treatment group.

Figure 3: Treatment effects over distribution of price premiums



Note: The blue line shows the difference in the probability to choose an offer with invoice between the treatment group without tax credit and the group that was assigned to the scenario of a tax credit via tax return. It is based on 4,290 choices made by the respondents (1,434 choices in the baseline scenario, 1,440 choices in the scenario with tax credit via tax return, and 1,416 choices in the scenario with a tax credit granted at source). The green line shows the difference between the no tax credit treatment and the tax credit granted at source. Both differences are calculated as difference in the cumulative distributions of the treatment groups at different price premiums. The vertical lines present the 95% confidence interval at different price premiums. The standard errors used to calculate the confidence intervals are bootstrapped with 499 replications (sampling with replacement).

In all policy scenarios, we find a clear negative relationship between the price premium for an offer with invoice and the probability that this kind of offer is chosen. This is plausible as the fraction of the premium for invoice covered by the tax credit decreases when the price difference increases. Interestingly, without tax credit, in 9% of the decisions, respondents choose an offer without invoice although the price with invoice is lower. With a tax credit the corresponding numbers are 5% (via tax return) and 8% (granted at source). An explanation for this finding is that some participants make decisions based on the other attributes of the offers (see Table 3) or favor offers without invoice for other reasons not captured by our choice experiment.

To examine the differences across policy scenarios, we calculate the differences in the cumulative density functions across baseline and each of the two tax credits. As shown in Figure 3, when the price premium for an offer with invoice is positive, both types of tax credits significantly increase the probability that consumers choose the offer with invoice. The treatment effects amount to 12-14 percentage points for price ratios of 1.1 to 1.3. For higher price premia the treatment effects are still significantly positive but lower. Tax credits do not shift the behavior of those choosing evasion when the price ratio is less than or equal to one.

### 3.5 Possible mechanisms

We find that, in contrast to our expectations, the two types of tax credits have the same effect. The tax credits increase the demand for an invoice only by a small extent. We assess possible explanations for these findings using our post-experimental survey. First, we inquire to what extent the existence of tax credits changes the perception of the financial attractiveness of offers without invoice relative to offers with invoice and the moral justifiability to accept an offer without invoice. We ask participants in all three policy scenarios to think about the situation in which they just made decisions and to assess their agreement with two statements inquiring financial attractiveness and justifiability on a scale from “fully disagree” to “fully agree.”

Figure 4 (a) shows that both types of tax credits lead to a decrease of the financial attractiveness of offers without invoice. Whereas 72% agree that offers without invoice are more attractive than offers with invoice in the scenario without tax credit, this fraction decreases to 48% when the tax credit is claimed via the tax return and 45% when the tax credit is granted at source. According to Kolmogorov-Smirnov tests, the distribution is statistically different between the treatments with and without tax credit but not across the treatments with tax credits. In contrast, Figure 4 (b) shows that tax credits do not affect the justifiability of accepting an offer without invoice (no differences according to Kolmogorov-Smirnov tests). Interestingly, across all three policy scenarios with about 45% the largest fraction thinks that in the decision-making situation we sketch in the experiment it is justifiable to accept an offer without invoice.

To examine to what extent the two varied features of the tax credits - 1) timing of awarding tax credits, 2) the actions households have to take - influence the perceived attractiveness of them, we ask participants in hypothetical scenarios how their behavior would change if one of the features would change. We ask half of the subjects assigned to the tax credit via tax return treatment how their behavior would change if they received the government funding not as reduced tax payment but as a price reduction immediately. 31% report that this would not change their behavior, 64% say that their willingness to choose an offer with invoice would increase. The other half of subjects are asked how their behavior would change if they did not have to report the transaction in their tax return but have to ask the seller. While 44% are indifferent to this change, 50% report that this would increase their willingness to choose an offer with invoice. About 5% each say that the changes would decrease their willingness to choose an offer with invoice. Hence, the tax credit granted at source tends to be perceived as more attractive primarily as the price reduction is received earlier. We obtain similar results among the subjects in the tax credit granted at source, see Figure A.2.<sup>8</sup>

We also ask participants in the no tax credit treatment to assess their change of behavior when the government would introduce a tax credit claimed via tax return or granted at source (participants randomly assigned to one condition). As shown in Figure A.3, in both conditions, about a quarter say that this would not affect their willingness to choose an offer with invoice. The fraction reporting that their willingness would increase is similar in both conditions.

One could argue that our results are affected by participants' familiarity with the German tax credit. We examine if participants reporting to know the German tax credit (80%) behave differently than those who claim to have no knowledge about it, see Figure A.4a. We find that those who know the German tax credit have a higher WTP in the scenario without tax credit, which indicates that knowledge of the tax credit reflects higher tax morale (selection effects). The pattern that the tax credit granted at source is slightly preferred over the tax credit claimed via the tax return is mainly observed among those who do not know the tax credit, suggesting that this pattern cannot be explained by familiarity with the German tax system.<sup>9</sup>

## 4 Study 2: Varying the rate of tax credits and displaying the final price

### 4.1 Treatments, hypotheses, and sample of Study 2

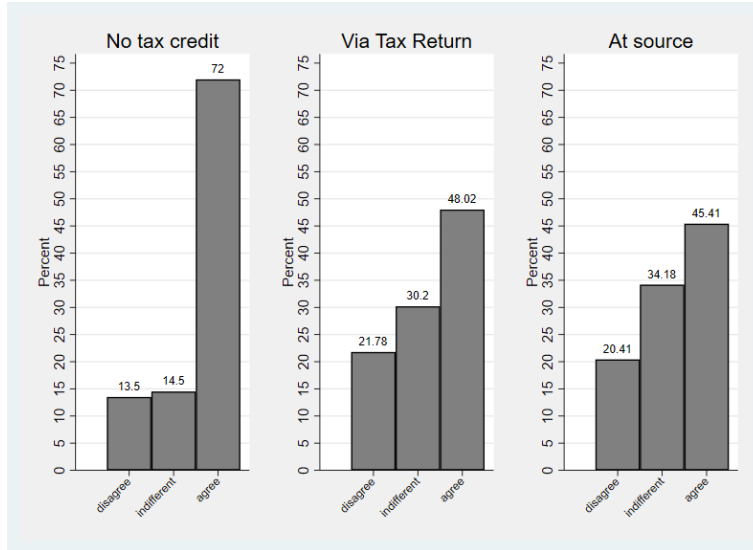
With Study 2 we pursue two main goals. First, we aim to replicate Study 1 to test whether our results hold with a different sample at a later time. Therefore, the design of the discrete choice experiment and the first three treatments are identical to that of Study 1 (see Section 2.2). Second, we include three additional tax credits into the experimental design to examine the effect of the refund rate and of displaying the final price including the tax credit.

<sup>8</sup> We also examine subjects' perception of the German tax credit. Only 13.5% who know the German tax credit but have not used it report that the deduction is too burdensome and 6% say that the refund is received too late, see Table A.2.

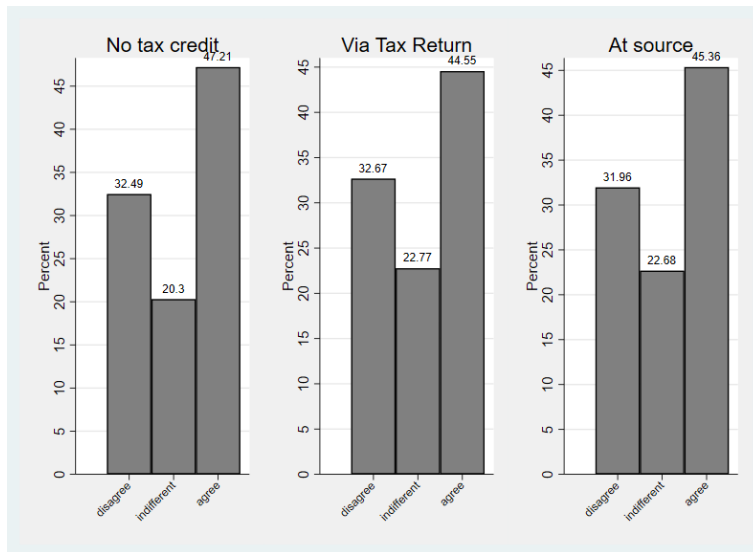
<sup>9</sup> In Section A.4 in the Appendix, we examine the heterogeneity of our effects with regard to subjects' socio-economic status and prudence. Our findings suggest that the tendency that the tax credit via tax return is slightly but insignificantly higher is driven by individuals with low socio-economic status and high prudence.

Figure 4: Financial attractiveness vs. justifiability

(a) Offer without invoice financially more attractive?



(b) Accepting offer without invoice justifiable?



Note: Justifiability based on 593, attractiveness based on 598 observations (64 subjects participating after the launch of the experiment received a slightly different wording which seems to have caused confusion, 1-2% report that they “Do not know.” To simplify the exposition, we report the fractions of those who agree (values 1-3), are indifferent (value 4), and disagree (values 5-7).

The three new treatments are as follows. In the *Tax Credit Via Tax Return 30%* and the *Tax Credit At Source 30%* treatment, we simply modify the refund rate of the tax credit to 30% (instead of 20%). The *Tax Credit At Source 20% + Price Display* treatment, is designed exactly as the *Tax Credit At Source 20%* treatment, but participants are informed about the final price of the offer, that is after deducting the tax credit’s value. We report this information in the table describing the attributes of the offer, for every offer that includes an invoice. For offers without an invoice, the cell of the new table row is left blank. We do not modify the description of how the tax credit works (see Section 3.1). We only implement this treatment for the tax credit granted as source, as only in this design the final price to be paid for the service actually decreases. Some websites in Sweden in fact display the price (e.g., <https://www.hemfrid.se/en>)

We expect that a higher refund rate increases the attractiveness of offers with invoice, as a larger fraction of the price is borne by the state for all those who use the tax credit. This effect should be the same for both types of tax credits. Displaying the final price including the tax credit clarifies the financial benefit for those who have difficulties calculating it or are unwilling to make the effort. It has been shown that individuals underreact to taxes and tax credits that are not salient (e.g., Chetty et al., 2009; Azmat, 2019). By displaying the price we exclude lacking mathematical skills or salience as a reason for the non-take up of the tax credit. We expect that the WTP for an invoice increases compared to the treatment without price display.

The survey took place in July 2022. The sample consists of 1.304 German homeowners. Individuals that already participated in Study 1 were not allowed to participate. The socio-demographic characteristics of our sample are fairly similar to the population of German homeowners in terms of age and gender (see Table A.4). As in Study 1, we again find some deviations from the homeowner population in 2019 regarding regarding income and education.

## 4.2 Results from Study 2

We use the responses of Study 2, first, to replicate our results from Study 1. Table A.5 in the Appendix shows that the mixed logit estimates, marginal effects, and willingness to pay are very similar to the ones reported in Table 3. Without a tax credit, consumers are willing to pay a premium of 27% for an offer with invoice. The premium amounts to 35 % in the *Tax Credit Via Tax Return 20%* treatment and 41% in the *Tax Credit At Source 20%* treatment. This amounts to treatment effects of 8ppts and 14 ppts, as shown in Table 4. The effect of the *Tax Credit At Source* on the WTP is larger than the effect of the *Tax Credit Via Tax Return* which is in line with our theoretical expectations. While this deviates from the findings of Study 1, the difference between the effects lacks statistical significance, in line with the results of Study 1.



Table 4: Comparison of WTP across treatments

Comparison	Difference in WTP (ppts)	p-value
(1) No TC vs TC Via Tax Return 20%	0.082	0.048
(2) No TC vs TC At Source 20%	0.140	0.004
(3) No TC vs TC Via Tax Return 30%	0.110	0.017
(4) No TC vs TC At Source 30%	0.249	0.000
(5) No TC vs TC At Source 20% Price Display	0.222	0.000
(6) TC Via Tax Return 20% vs TC At Source 20%	0.059	0.119
(7) TC Via Tax Return 30% vs TC At Source 30%	0.138	0.008
(8) TC Via Tax Return 20% vs TC Via Tax Return 30%	0.029	0.485
(9) TC At Source 20% vs TC At Source 30%	0.108	0.060
(10) TC At Source 20% vs TC At Source 20% Price Display	0.082	0.041
(11) TC At Source 30% vs TC At Source 20% Price Display	0.026	0.634

Note: Estimates from comparisons of WTP coefficients displayed in Table A.5 and Table 5. The standard errors used to calculate the confidence intervals are bootstrapped with 999 replications (sampling with replacement).

Second, we examine the results from the new treatments. We present coefficients, marginal effects, and willingness to pay estimates in Table 5. In contrast to our results on tax credits with a refund rate of 20%, we find that households respond to tax credits in the expected way when the refund rate is 30%. The premia consumers are willing to pay to receive an invoice are 38% with a *Tax Credit Via Tax Return 30%* and 52% with a *Tax Credit At Source 30%*. In Table 4, we investigate if the WTP in the two tax credit treatments is significantly different from the baseline WTP (see Table 4, (3)-(4)) and if they are significantly different from each other (see Table 4, (7)). The *Tax Credit At Source 30%* is significantly more effective in increasing the WTP for an invoice than the *Tax Credit Via Tax Return 30%* (+14ppts). This finding suggests that when two attractive features of a tax credit are combined (claimed at source + higher rate), the attractiveness of tax credits increases significantly. As shown in Table 4 (8, 9), increasing the rate from 20% to 30% does not have a significant impact in any of the two tax credits.

Table 5: Extension: Mixed logit estimates, marginal effects, and willingness to pay

	Tax Credit via Tax Return 30 %			Tax Credit At Source 30 %			Tax Credit At Source 20% + Price Display		
	(1) Coeff.	(2) ME	(3) WTP	(4) Coeff.	(5) ME	(6) WTP	(7) Coeff.	(8) ME	(9) WTP
With invoice	3.512 (0.345)	0.429 (0.030)	0.381 (0.039)	4.688 (0.392)	0.558 (0.031)	0.520 (0.050)	4.880 (0.400)	0.587 (0.029)	0.493 (0.032)
Recommended	0.464 (0.144)	0.044 (0.013)	0.050 (0.016)	0.953 (0.173)	0.082 (0.018)	0.106 (0.022)	0.594 (0.151)	0.052 (0.015)	0.060 (0.017)
Available	0.924 (0.145)	0.088 (0.014)	0.100 (0.016)	0.659 (0.140)	0.058 (0.014)	0.073 (0.022)	0.723 (0.141)	0.064 (0.013)	0.073 (0.015)
Log Price	-9.216 (0.803)	-0.008 -	- -	-9.024 (0.843)	-0.007 -	- -	-9.890 (0.873)	-0.007 -	- -
Offers	3,024			3,024			3,038		
Decisions	1,512			1,512			1,519		
Respondents	216			216			217		

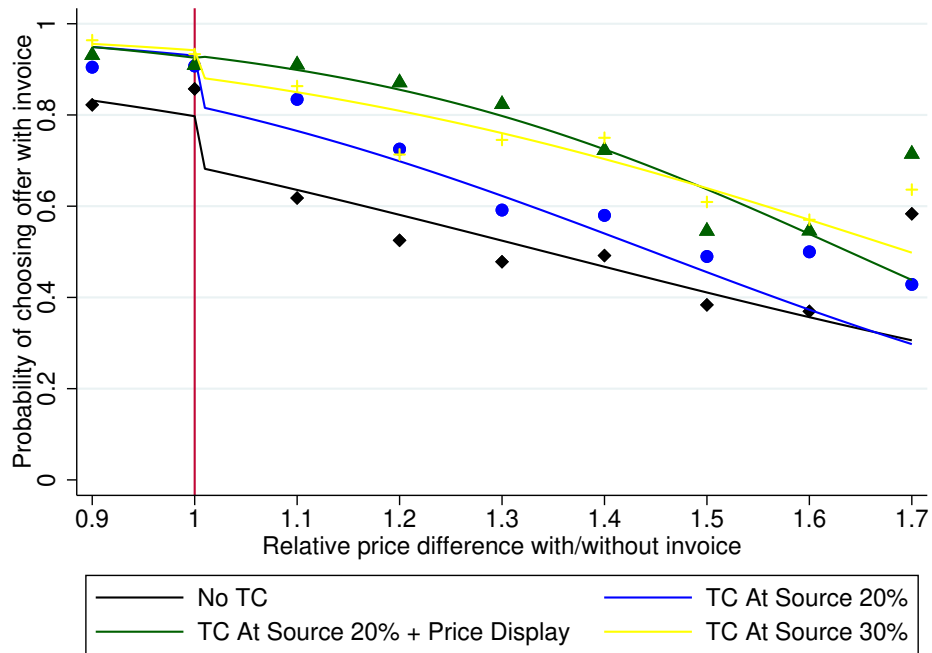
Note: Estimates from mixed logit models for each treatment. Omitted categories are “no recommendation”, “Available with waiting time”, and offer “without invoice” respectively. The price is included as log. Marginal effects (ME) are calculated as the difference in the probability that an offer is chosen if the attributes value changes from 0 to 1 for the binary coded attributes. The willingness to pay (WTP) is the marginal rate of substitution between the binary attributes and the price. It is calculated by dividing the coefficient of each attribute by the coefficient of the log price. Since the price enters the model as logarithm, the WTP can be interpreted in percent. Standard errors are obtained by bootstrapping with 999 replications.

Table 5 (9) shows that when the final price of the offer including the tax credit is displayed to consumers, the premium they are willing to pay is 49%. This is a significant increase of 8 ppts compared to the same tax credit of 20% when we do not display the final price (see Table 4, 10). Most remarkable is that the WTP is not statistically different from the one in the *Tax Credit At Source 30%*. This implies that governments can achieve the same effect, when they provide a ten ppts lower tax refund and ensure that households understand the financial benefit.

As in Study 1, we calculate how much higher the price of an offer with invoice can be to be even with an offer without invoice when the household uses the tax credit, assuming that there are no costs related to using the tax credit. The price of an offer with invoice can be 42.9% higher ( $1/(1-0.3)$ ) when the refund rate is 30%. Considering that the WTP for an invoice is 0.27 without tax credit, this means that we would observe an increase of the WTP for an invoice of 81% ( $1.27*1.429$ ). We compare these numbers to the actual increases of the WTP for an invoice. For the *Tax Credit Via Tax Return 30%* the increase in the WTP for an invoice is only 19% of the financial value of the tax credit. This fraction is 44% for the *Tax Credit At Source 30%* and 66% of the financial value under the *Tax Credit At Source 20% + Price Display*. Hence, reducing barriers such as hassle and calculation costs leads to a higher valuation of the tax credit.

In Figure 5, we consider the probabilities to choose an offer with invoice over the relative price difference. For the sake of readability, we focus on the most effective tax credits, i.e., all tax credits at source and compare them to the baseline without tax credits. The results are very similar as in Study 1. They show that the probability to choose an offer with invoice decreases with the price premium across all tax credit scenarios. Most remarkably, we do not observe the drop in the probability to choose an offer with invoice if the relative price difference exceeds one in the treatment with a tax credit that makes the price reduction salient.

Figure 5: Probability of choosing an offer with invoice over distribution of price premia



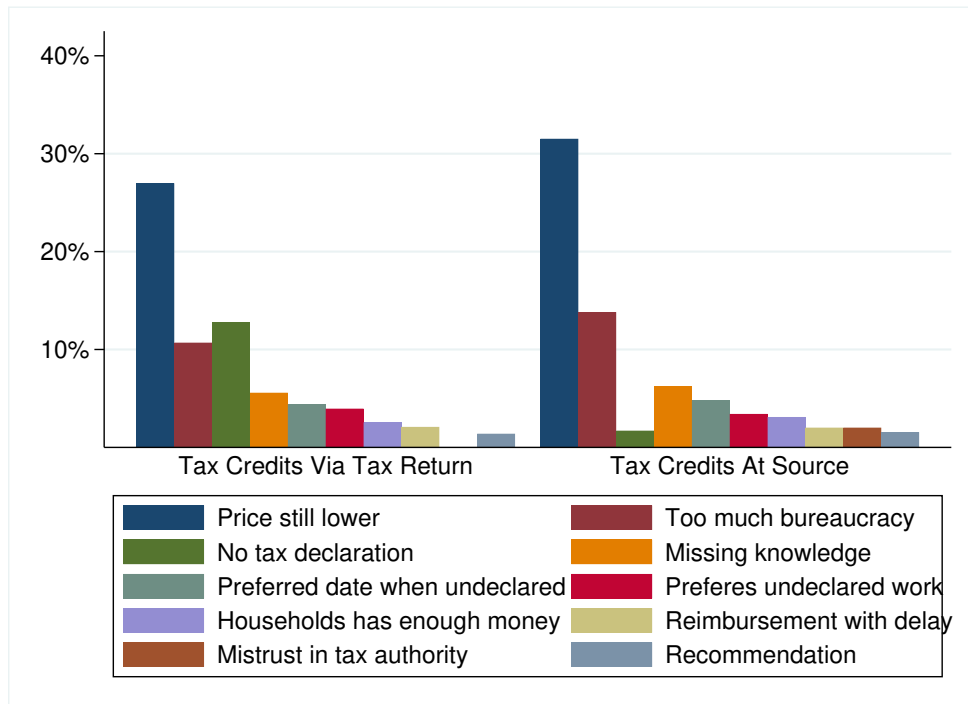
Note: The points show the fraction of choices in which the respondents chose the service offer with invoice at each price premium for an invoice offer by treatment group. The price premiums are calculated as ratios between an offer with invoice and an offer without invoice. The maximum likelihood fits are estimated with logistic regression on the choice task level for each treatment group.

### 4.3 Possible mechanisms

To better understand possible reasons why households may not use tax credits, we included an open-ended text question in the post-experimental survey of Study 2, in which we ask participants to describe why someone may not use the tax credit. To code their answers, we use a dictionary approach. First, two coders independently identify topics that respondents mention and selected keywords for every category. They identify ten different topics. Second, we use an automated approach. When respondents mention a keyword, their answer is categorized as belonging to the respective category. It is possible that they mention multiple reasons.

In Figure 6, we show the fraction with which the respective reasons were mentioned across the two types of tax credits, not considering the refund rate or price display. Under both types of tax credits, with about 30% the most often mentioned reason is that offers without invoice are still cheaper than offers with invoice even if a tax credit is available. Slightly more than 10% associate bureaucratic costs with the tax credits irrespective of whether they are in the scenario with a tax credit via tax return or at source. We find a significant difference between the two types of tax credits in the fraction of participants that mentions not doing a tax declaration as a potential reason. While 13% of participants in treatments with a tax credit via tax return view this as a potential concern, this fraction is only 2% when there was a tax credit at source. Few participants mention other reasons such as lacking knowledge of the tax credit, timing of the service provision, or that the refund is paid out with time delay (see Figure 6).

Figure 6: Reasons for not using the tax credits



Note: The bars show the share of participants that mentioned a reason of the respective category. Participants in the respective treatments were collapsed into one group.

To find out more about why the tax credit granted at source is not substantially more successful in shifting behavior than the tax credit claimed via the tax return, we ask participants in both scenarios whether they think certain reasons could prevent households to use the tax credit. As shown in Figure A.5, we find that under the tax credit granted at source participants are more likely to be concerned that the seller could withdraw the offer when consumers want to claim the tax credit, that the seller has more work, and that the seller could increase the price. We conclude that although the tax credit granted at source is likely to be advantageous in several aspects, households may worry about certain characteristics of the tax credit at source.

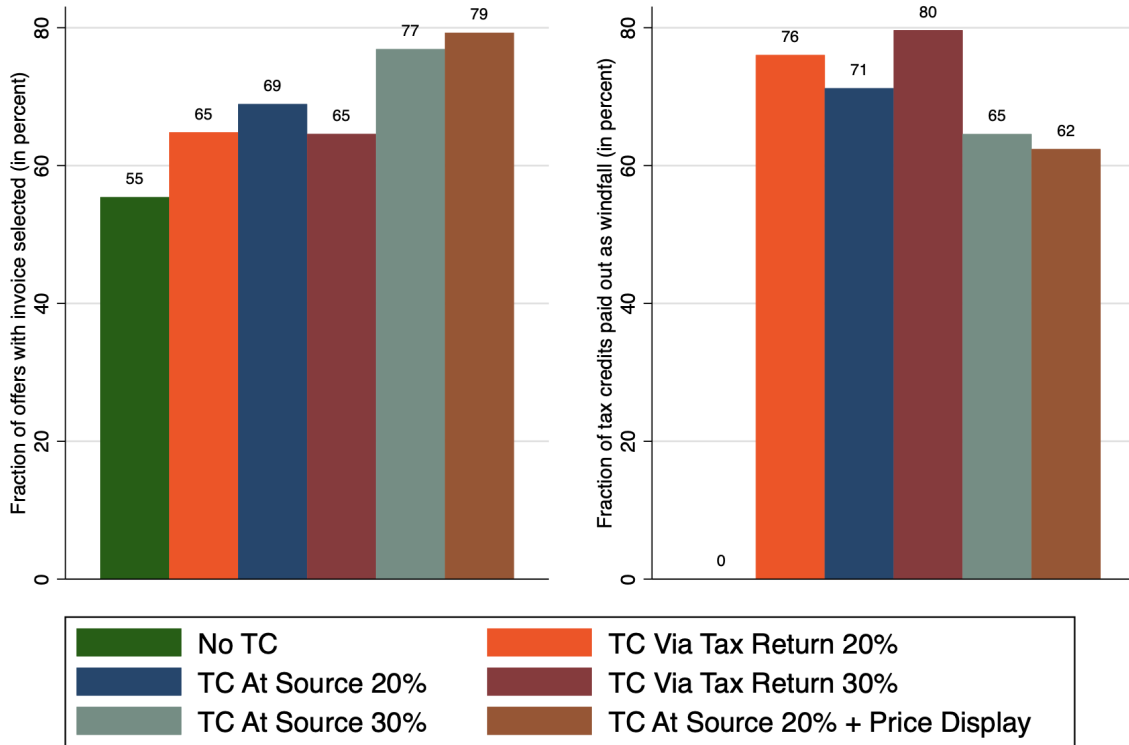
#### 4.4 Windfall effects

We observe that even when no tax credit is in place, 55% of offers chosen are with invoice (see left hand side of Figure 7). Although this fraction increases in the treatments with tax credits, this implies that the subsidy is associated with windfall effects, defined as the fraction of households that claim the tax credit even though they would have selected an offer with invoice also without it. A simple approach to estimate this fraction is to compare the fraction of those who choose an offer with invoice without a tax credit to the fraction who have done so with the tax credit. For example, in the tax credit via tax return 20%, this would imply that 85% ( $55\%/65\%$ ) of participants use the tax credit as windfall income. A possible objection is that we do not know if all subjects choosing an offer with invoice actually would have claimed the tax credit.

To obtain a more precise estimate, we ask participants choosing an offer with invoice whether they would actually claim the tax credit for this offer in the post-experimental survey of Study 2. To derive a conservative measure of windfall effects, we code individuals indicating not to be sure whether they would actually claim the tax credit as response no. The fraction that reports that they would not use the tax credit (or do not know) varies between 9% and 15% (see Figure A.6). We assume that those who report they would not use the tax credit belong to the group that also would have asked for an invoice without tax credit. We subtract this fraction from the simple estimate of windfall effects (e.g., tax credit via tax return 20%:  $85\% - (13\%/65\%) = 76\%$ ).



Figure 7: Fraction of offers paid out as windfall income



Note: We derive the fraction of offers with invoice selected from the discrete choice experiment. Whether individuals would actually use the tax credit is based on a post-experimental question.

As shown in the right hand side of Figure 7, windfall effects are considerable. Under the two tax credits via the tax return, 76 and 80% of participants would have requested an invoice also without them. Under the tax credits at source with a rate of 20% and price display or with a rate of 30%, we find that the windfall effects are the lowest. This is plausible as a larger fraction is motivated to choose an offer with invoice due to this tax credit. However, still 62% and 65% of participants would use the tax credit without having to change their behavior.

## 5 Discussion and conclusion

Several countries aim to increase the fraction of declared household services by introducing monetary incentives for consumers that demand an invoice. It is important to understand if and when these instruments are effective in combating tax evasion. We focus on household tax credits and examine if they are able to induce households to demand legally provided services.

Our study yields two main conclusions and policy implications. First, our results show that households have a higher willingness to pay for offers with invoice when any kind of tax credit exists. Although this suggests that tax credits are effective in reducing the demand for illegally provided services, it has to be considered that the willingness to demand legally provided services is already substantial when no tax credit is in place. Relative to this baseline probability, the increase in tax compliance is modest. Moreover, tax credits are related to considerable windfall effects. Our results suggest that about two out of three respondents would claim the tax credit even though they also would have selected an offer with invoice without the subsidy. Note that our results apply to the provision of small-scale jobs in the household, such as painting rooms. We expect that the baseline willingness to demand offers with invoice is even higher for larger jobs, for which having a guarantee is important. This may further question tax credits' effectiveness in inducing a change of behavior, at least regarding the declaration of the work.<sup>10</sup> Due to the substantial windfall effects, governments that want to use household tax credits should make sure that they design the instrument in a way that is most (cost)-effective.

In this regard, second, we find that households respond to the design of the tax credits, but only when different attractive features come together. In contrast to our expectations, we find a significant difference between the two tax credits only when the rate of the tax credit is 30% but not when it is 20%. An increase of the refund rate from 20% to 30% does not yield a significant increase. Most remarkably, displaying the price including the reduction yields the same effect as increasing the refund rate from 20% to 30%. This suggests that compliance costs, such as the bureaucratic burden to receive the refund, are important. The gap between the willingness to pay for an invoice and the financial value of the tax credit is lower when the tax credit is more "consumer-friendly." Hence, even though the procedure to obtain tax credit that can be claimed via the tax return has been kept simple, household seem to associate higher costs with them.

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<sup>10</sup> An important question is if tax credits are effective in creating employment by increasing the consumption of household services. Buettner et al. (2022) show that the German tax credit has led to an increase in reported sales and VAT revenues, about half of which is caused by market expansion. In contrast, studies that examine the effect of the reduction of the VAT rate for labor-intensive services find that the consumption of services or employment in the industries is largely unchanged (e.g., Kosonen, 2015; Benzarti et al., 2020).

We conclude that if governments want to use tax credits, they should focus on an implementation which allows households to easily understand the financial benefit rather than trying to improve the attractiveness by increasing the rate of the refund. A possibility to implement this would be to require sellers to also state the price including the reduction in their offers.

An important question is why a substantial fraction of individuals are hesitant to use the tax credit. Our choice experiment suggests that some individuals have a strong preference for offers without invoice. We find that about 10% prefer the offer without invoice even when the price of the offer with invoice is lower. Considering that offers with and without invoice differ in multiple dimensions, these households seem to value certain features of offers without invoice. Another reason for the incomplete take-up is that tax credits do not seem to decrease the justifiability of evasion, which has been discussed as another motivation for the introduction of tax credits.

A potential concern with our study is that our results are subject to social desirability bias, which would imply that the estimated probability that participants ask for an invoice is higher as in reality. However, choice experiments have been shown to reduce social desirability bias (e.g., Horiuchi et al., 2022). Since the choice scenarios consider multiple attributes, it is difficult for participants to infer what the goal of the study is and what researchers may want to hear. In addition, unless social desirability bias is related to the existence of a tax credit in the treatments, this should mostly imply a level effect and not have an impact on our treatment effects.

Another concern is that participants of our experiment are less sensitive regarding the timing of awarding refunds, as the price to be paid and the refund are hypothetical. However, previous literature shows that non-incentivized investigations of time preferences perform equally well as incentivized ones (e.g., Brañas-Garza et al., 2020). One could also argue that our results are affected by participants' familiarity with the German tax credit. If Germans that are familiar with the tax credit claimed via the tax return favor this implementation, we would overestimate the effectiveness of this tax credit. However, we can rule out that familiarity with the German system causes participants to favor the tax credit claimed via the tax return. Another possible objection to our results is that in the treatment in which the tax credit is granted at source, participants mistakenly assume that the prices shown already contain the price reduction in the treatment that do not include an information about the final price. However, the finding that the financial attractiveness of offers without invoice is similar in both tax credit treatments suggest that misunderstanding is not an issue. In addition, if participants would think that the price includes the price reduction in the at source treatment, we should not find a difference in behavior between the no tax credit and the tax credit at source treatment and between the treatment where the price reduction is made salient and the treatment where it is no.

Our experiment abstracts from several reasons why households may not use tax credits. Assuming that participants read our treatment texts (shown before every decision), we eliminated, e.g., lack of information (Feld et al., 2012) or of eligibility to use the subsidy (e.g., as households do not owe taxes, Grönberg and Rauhanen, 2015) as possible reasons for the ineffectiveness. We also disregard that tax credits usually only apply to labor costs and include a maximum amount. These factors are likely to decrease the effectiveness of tax credits. Hence, in current times with high pressure on public funds, governments should carefully weigh the benefits and

costs of tax credits, and bear in mind that they are associated with considerable windfall effects.

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## Appendix

### A.1 Questionnaire - Study 1

#### PRE-EXPERIMENTAL SURVEY

**What gender are you?**

Female  Male  Diverse  Do not know / No answer

**How old are you?**

.....

**What is your highest educational background?**

None  Primary school  Secondary school  Highschool  Apprenticeship  College degree  
 Master  Post-graduate degree  Do not know / No answer

**What kind of housing do you live in?**

Sublet apartment  Rented flat  Rented house  Own flat  Own house  Caravan  Other  Do not know / No answer

**What state do you live in?**

Bavaria  Baden-Wuerttemberg  Berlin  Brandenburg  Bremen  Hamburg  Hessen  Meckelburg-Western Pomerania  Lower Saxony  Northrhine-Westfalia  Rhineland-Palatinate  
 Saarland  Saxony  Saxony-Anhalt  Schleswig-Holstein  Thuringa  No answer

**Recent research shows that decision-making processes depend on the circumstances. Specifically, we are interested in whether you take the time to read this question; if you do not, the results may not tell us very much about actual behavior. To show that you have read this question, please click "None of the above".**

Interested  Desperate  Excited  Angry  Strong  Guilty  Fearful  Aggressive  Enthusiastic  Proud  Irritable  Alert  Ashamed  Inspired  Nervous  Determined  Attentive  Hectic  Active  Worried  None of the above

#### **Part 1: Your decision-making behavior**

Please put yourself in a situation in which you want to have a service done in your household, such as painting walls. We would like to know how you would choose between several offers.

We will now show you seven decision-making situations in which you can each choose between two offers. Please look at the offers carefully and choose the one you would prefer.

The offers vary in four characteristics:

Recommended by acquaintance: Yes, No

Availability of seller: As requested, at a later time

Condition of offer: Without invoice, with invoice including VAT

Price of offer: 300€, 320€, 340€, 360€, 380€, 400€, 420€, 440€, 460€, 480€, 500€

Please assume that all characteristics not described are the same in all offers.

This is an example of a decision situation:

	Offer A	Offer B
Recommended by acquaintance	No	Yes
Availability of provider	At a later time	As requested
Condition of offer	With invoice incl. VAT	Without invoice
Price of offer	500 €	420 €

	Offer A	Offer B
Which offer would you choose?	<input type="radio"/>	<input type="radio"/>

[Displayed to participants in *No tax credit* treatment]

**Important note:**

Please assume that there is no government support if you commission household services.

[Displayed to participants in *Tax credit via tax return* treatment]

**Important note:**

Please assume that there is government support when you commission services in the household. You can get a refund of 20 percent of the offer price if you choose an offer with invoice. For this purpose, you have to declare the service in your income tax declaration. Your tax payment then decreases by 20 percent of the price of the offer. You receive the refund as reduced tax payment usually in the following year.

[Displayed to participants in *Tax credit at source* treatment]

**Important note:**

Please assume that there is government support when you commission services in the household. You can get a refund of 20 percent of the offer price if you choose an offer with invoice. For this purpose, you have to inform the seller that you want to use the government support. The seller then decreases the price of the offer by 20 percent and handles the settlement with the tax authority. You will receive the refund immediately as a reduced price.



\*\*\*\*\*

DISCRETE CHOICE EXPERIMENT

\*\*\*\*\*

POST-EXPERIMENTAL SURVEY

Please think of the decision-making situations you have just been in.

Please indicate how strongly you agree with the following two statements.

**Offers without invoice are financially more attractive than offers with invoice.**

Fully disagree  Disagree  Rather disagree  Neither agree nor disagree  Rather agree  Agree  Fully agree  Do not know / No answer

**It is justifiable to accept an offer without invoice.**

Fully disagree  Disagree  Rather disagree  Neither agree nor disagree  Rather agree  Agree  Fully agree  Do not know / No answer

[Displayed to participants in *tax credit via tax return* and *tax credit at source* treatments]

**Have you considered the possibility of receiving the tax credit when making your decisions?**

Yes  No

[Displayed to participants in *No tax credit* treatment – Group One]

**Please assume that there is a tax credit when you demand services in the household. You can receive 20 percent of the price of the offer when you choose an offer with invoice. For this, you have to declare the service in your income tax declaration. Your tax payment then decreases by 20 percent of the price of the offer. You receive the reimbursement as reduced tax payment in most cases in the following year. How would this change your willingness to choose an offer with invoice in the decision-making situation? Your willingness would ...**

Decrease sharply  Decrease  Rather decrease  Remain unchanged  
 Rather increase  Increase  Increase sharply  
 Don't know / No answer

[Displayed to participants in *No tax credit* treatment – Group Two]

**Please assume that there is a tax credit when you demand services in the house-**

**hold. You can receive 20 percent of the price of the offer when you choose an offer with invoice. For this, you have to inform the supplier that you want to use the tax credit. The supplier then decreases the price of the offer by 20 percent and handles the billing with the tax authority. You receive the tax credit as a reduced price immediately.**

**How would this change your willingness to choose an offer with an invoice in the decision-making situation? Your willingness would ...**

- Decrease sharply
- Decrease
- Rather decrease
- Remain unchanged
- Rather increase
- Increase
- Increase sharply
- Don't know / No answer

[Displayed to participants in *Tax credit via tax return* treatment – Group One]

**Assume that the tax credit is different. You do not receive the tax credit as a reduced tax payment in most cases in the following year, but immediately as a price reduction.**

**How would this change your willingness to choose an offer with invoice in decision-making situations? Your willingness would...**

- Decrease sharply
- Decrease
- Rather decrease
- Remain unchanged
- Rather increase
- Increase
- Increase sharply
- Don't know / No answer

[Displayed to participants in *Tax credit via tax return* treatment – Group Two]

**Assume that the tax credit is different. To claim it, you do not have to declare the service in your income tax return, but simply inform the seller that you are claiming it. The seller then handles the billing with the tax authority.**

**How would this change your willingness to choose an offer with invoice in the decision-making situations? Your willingness would...**

- Decrease sharply
- Decrease
- Rather decrease
- Remain unchanged
- Rather increase
- Increase
- Increase sharply
- Don't know / No answer

[Displayed to participants in *Tax credit at source* treatment – Group One]

**Assume that the tax credit is different. You do not receive the tax credit as a price reduction immediately but as a reduced tax payment via your income tax return, in most cases in the following year.**

**How would this change your willingness to choose an offer with invoice in the decision-making situations? Your willingness would...**

- Decrease sharply
- Decrease
- Rather decrease
- Remain unchanged

- Rather increase  Increase  Increase sharply  
 Don't know / No answer

[Displayed to participants in *Tax credit at source* treatment – Group Two]

**Assume that the tax credit is different. You do not receive the tax credit as a price reduction immediately but as a reduced tax payment via your income tax return, in most cases in the following year. In order to claim it, you do not have to inform the seller who handles the billing with the tax authority that you are claiming the tax credit, but instead declare this yourself on your income tax return.**

**How would this change your willingness to choose an offer with invoice in the decision-making situations? Your willingness would...**

- Decrease sharply  Decrease  Rather decrease  Remain unchanged  
 Rather increase  Increase  Increase sharply  
 Don't know / No answer

## **Part 2: Your Experience**

**Which of the following services have you paid for in your household in the past three years?**

**Please indicate any services that were not performed by a member of the household. You can choose multiple answers.**

- No service used  Renovation, maintenance or modernization of the house  Repair of household items  Gardening  IT services (e.g. Computer / smartphone)  Housekeeping (e.g. Cleaning, washing, shopping)  Childcare ("babysitter", not daycare)  Tutoring  Other, namely: .....  Don't know / No answer

**In Germany, since 2006 it is possible to deduct household services and services for renovation, maintenance or modernization measures from the income tax (Section 35a EStG). Are you informed about this possibility?**

- Yes  No  Don't know / No answer

[Displayed to participants that indicated "Yes" in the previous question]

**Have you ever used the option of deducting household services and services for renovation, maintenance or modernization measures from income tax?**

- Yes  No  Don't know / No answer

[Displayed to participants that indicated "No" in the previous question]

**Why have you not yet used the option of deducting household services and services for renovation, maintenance or modernization measures from income tax? You can choose multiple answers.**

Requested services are not deductible  Income tax due too low to deduct services  It is too much effort to claim it in the tax return  Reimbursement via tax return is too late for me  Requested services without invoice  Other, namely: .....  Don't know / No answer

**We would like to know which properties you would assign to offers without invoice versus offers with invoice in general.**

**In the case of offers without an invoice, the availability of the seller is generally ...**

Better  Equally good  Worse  Don't know / No answer

**The price of services without invoice is generally ...**

Lower  Equally high  Higher  Don't know / No answer

**The quality of services without invoice is generally ...**

Better  Equally good  Worse  Don't know / No answer

**The willingness of the seller to provide a warranty for services without invoice is generally ...**

Higher  Equally high  Lower  Don't know / No answer

**The reliability of the seller for services without invoice is generally ...**

Better  Equally good  Worse  Don't know / No answer

**A service is performed without invoice. Please indicate which of the following statements you think are correct. You can choose from several possible answers.**

The seller has less administrative effort  The seller requires a cash payment  The seller does not pay any sales tax to the tax authority  The seller does not pay any other taxes and social security contributions  Don't know / No answer

### **Part 3: Your life situation**

**If you add up all income: What is the monthly net household income of all household members?**

**Please enter the monthly net amount, i.e. after deducting taxes and social security contributions. Please include regular payments such as pensions, housing benefit, child benefit, BaföG, alimony payments, etc.!**

**If not exactly known: Please estimate the monthly amount.**

Less than 1,000 €  1,001 € to 2,000 €  2,001 € to 3,000 €  3,001 € to 4,000 €

4,001 € to 5,000 €  5,001 € to 7,000 €  7,001 € to 9,000 €  More than 9,000 €   
Don't know / No answer

**Who usually makes the financial decisions in your household?**

You alone  You and another person in your household together  Another person in your household  Don't know / No answer

**Who does your tax return?**

You alone  You and someone else  Someone else for you (e.g., partner, tax advisor)   
Don't know / No answer

**In general, are you a risk-taking person or are you trying to avoid risk?**

**Please rate this on a scale from 0 to 10, on which the value 0 means "not at all willing to take risks" and the value 10 means "very willing to take risks".**

0 Not at all willing to take risks  1  2  3  4  5  6  7  8  9  10 Very willing to take risks

**How do you feel about the following statement: It is a civil duty to pay taxes.**

**Please rate this on a scale from 0 to 10, on which the value 0 means "Fully disagree" and the value 10 means "Fully agree".**

0 Fully disagree  1  2  3  4  5  6  7  8  9  10 Fully agree

## A.2 Questionnaire - Study 2

### PRE-EXPERIMENTAL SURVEY

**What gender are you?**

Female  Male  Diverse  Do not know / No answer

**How old are you?**

.....

**What is your highest educational background?**

None  Primary school  Secondary school  Highschool  Apprenticeship  College degree  
 Master  Post-graduate degree  Do not know / No answer

**What kind of housing do you live in?**

Sublet apartment  Rented flat  Rented house  Own flat  Own house  Caravan  Other  Do not know / No answer

**What state do you live in?**

Bavaria  Baden-Wuerttemberg  Berlin  Brandenburg  Bremen  Hamburg  Hessen  Meckelburg-Western Pomerania  Lower Saxony  Northrhine-Westfalia  Rhineland-Palatinate  
 Saarland  Saxony  Saxony-Anhalt  Schleswig-Holstein  Thuringa  No answer

**Recent research shows that decision-making processes depend on the circumstances. Specifically, we are interested in whether you take the time to read this question; if you do not, the results may not tell us very much about actual behavior. To show that you have read this question, please click "None of the above".**

Interested  Desperate  Excited  Angry  Strong  Guilty  Fearful  Aggressive  Enthusiastic  Proud  Irritable  Alert  Ashamed  Inspired  Nervous  Determined  Attentive  Hectic  Active  Worried  None of the above

\*\*\*\*\*

**Part 1: Your decision-making behavior** Please put yourself in a situation in which you want to have a service done in your household, such as painting walls. We would like to know how you would choose between several offers.

We will now show you seven decision-making situations in which you can each choose between two offers. Please look at the offers carefully and choose the one you would prefer.

The offers vary in four dimensions:

Recommended by acquaintance: Yes, No

Availability of provider: As requested, at a later time

Condition of offer: Without invoice, with invoice including VAT

Price of offer: 300€, 320€, 340€, 360€, 380€, 400€, 420€, 440€, 460€, 480€, 500€

Please assume that all characteristics not described are the same in all offers.

This is an example of a decision situation:

	Offer A	Offer B
<b>Recommended by acquaintance</b>	No	Yes
<b>Availability of provider</b>	At a later time	As requested
<b>Condition of offer</b>	With invoice incl. VAT	Without invoice
<b>Price of offer</b>	500 €	420 €

	Offer A	Offer B
<b>Which offer would you choose?</b>	<input type="radio"/>	<input type="radio"/>

[Displayed to participants in *No tax credit* treatment]

**Important note:**

Please assume that there is no tax credit if you commission household services.

[Displayed to participants in *Tax credit via tax return 20%* treatment]

**Important note:**

Please assume that there is government support when you commission services in the household.

You can get a refund of 20 percent of the offer price if you choose an offer with invoice.

For this purpose, you have to declare the service in your income tax declaration. Your tax payment then decreases by 20 percent of the price of the offer. You receive the refund as reduced tax payment usually in the following year.

[Displayed to participants in *Tax credit at source 20%* treatment]

**Important note:**

Please assume that there is government support when you commission services in the household.

You can get a refund of 20 percent of the offer price if you choose an offer with invoice.

For this purpose, you have to inform the seller that you want to use the government support.

The seller then decreases the price of the offer by 20 percent and handles the settlement with the tax authority. You will receive the refund immediately as a reduced price.

[Displayed to participants in *Tax credit via tax return 30%* treatment]

**Important note:**

Please assume that there is government support when you commission services in the household.

You can get a refund of 30 percent of the offer price if you choose an offer with invoice.

For this purpose, you have to declare the service in your income tax declaration. Your tax payment then decreases by 30 percent of the price of the offer. You receive the refund as reduced tax payment usually in the following year.

[Displayed to participants in *Tax credit at source 30% treatment*]

**Important note:**

Please assume that there is government support when you commission services in the household. You can get a refund of 30 percent of the offer price if you choose an offer with invoice. For this purpose, you have to inform the seller that you want to use the government support. The seller then decreases the price of the offer by 30 percent and handles the settlement with the tax authority. You will receive the refund immediately as a reduced price.

[Displayed to participants in *Tax credit at source 20% + price display treatment*]

**Important note:**

Please assume that there is government support when you commission services in the household. You can get a refund of 20 percent of the offer price if you choose an offer with invoice. For this purpose, you have to inform the seller that you want to use the government support. The seller then decreases the price of the offer by 20 percent and handles the settlement with the tax authority. You will receive the refund immediately as a reduced price.

\*\*\*\*\*

DISCRETE CHOICE EXPERIMENT

\*\*\*\*\*

PO

Thank you very much for your decisions. We would now like to know why you have made these decisions.

[Displayed to participants if an offer without invoice that is more expensive than an offer with invoice was chosen in one choiceset (offer x)]

**Please think again about the decision situations.**

**In this scenario, you have just chosen offer x. We would like to know why you made this decision. Please explain your decision below.**

[Choiceset displayed]

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[Displayed if participant chose the offer with invoice in a randomly chosen choiceset.]

**You have chosen offer A/B in the decision below.**

[Choiceset displayed]

**Would you claim the government support for this offer by informing the seller about it and let him / her handle the settlement with the tax authorities?**

O Yes O No O Don't know/ No answer

[Displayed if participant answers "Yes" to the above question.]

**In this case, would you also opt for the offer with invoice if there were no government support?**

O Yes O No O Don't know/ No answer

[One of the follow options displayed if in a treatment without tax credit]

**Option 1:**

You have chosen offer x in the decision below.

Imagine if there was government support when you hire services in the household. You can claim 20 percent of the offer price if you choose an offer with invoice. For that, you must report the service on your income tax return. This will reduce your tax payment by 20 percent of the offer price. You will therefore receive the refund as a reduced tax payment usually in the following year.

[Offer displayed]

Would you claim government support for this service and report the service on your tax return?

**Option 2:**

You have chosen offer x in the decision below.

Imagine if there was a government support when you hire home services. You can be reimbursed 20 percent of the offer price if you choose an offer with invoice. To do this, you must tell the seller that you want to claim the government support. The seller will then reduce the offer price by 20 percent and handle the invoice with the tax office. You will therefore receive the refund as a reduced price immediately.

[Offer displayed]

Would you claim of the government support for this offer by informing the seeker about it and let her / him settle the invoicing with the tax authority?

[Displayed if in a treatment with tax credit]

**Please think about the decision-making situations you have just been in.**

**Please describe the government support for offers with invoice in your own words.**

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**What reasons could there be for someone not claiming the government support?**

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[If in a treatment with a tax credit via the tax return]

**How might the government support affect the interaction and contracting with the seller? Please tick all items that apply in your opinion.**

**The customer fears that the seller will withdraw his/her offer if he/she wishes to claim the government support.**

Do not Agree at all  Do not agree  Rather not agree  Rather agree  Agree  Fully agree  Don't know/ No answer

**The customer fears that the seller will increase the price if he/she wants to claim the government support.**

Do not Agree at all  Do not agree  Rather not agree  Rather agree  Agree  Fully agree  Don't know/ No answer

**The customer fears that the seller will have more work if he/she claims the government support.**

Do not Agree at all  Do not agree  Rather not agree  Rather agree  Agree  Fully agree  Don't know/ No answer

[If in a treatment with a tax credit at source]

**How might the government support affect provider interaction and contracting? Please tick all that apply in your opinion.**

**The customer finds it uncomfortable to ask the seller for the government support.**

Do not Agree at all  Do not agree  Rather not agree  Rather agree  Agree  Fully agree  Don't know/ No answer

**The customer fears that the seller will withdraw his/her offer if he/she wishes**

**to claim the government support.**

Do not Agree at all  Do not agree  Rather not agree  Rather agree  Agree  Fully agree  Don't know/ No answer

**How might the government support affect the interaction and contracting with the seller? Please tick all items that apply in your opinion.**

**The customer fears that the seller will withdraw his/her offer if he/she wishes to claim the government support.**

Do not Agree at all  Do not agree  Rather not agree  Rather agree  Agree  Fully agree  Don't know/ No answer

**The customer fears that the seller will increase the price if he/she wants to claim the government support.**

Do not Agree at all  Do not agree  Rather not agree  Rather agree  Agree  Fully agree  Don't know/ No answer

**The customer fears that the seller will have more work if he/she claims the government support.**

Do not Agree at all  Do not agree  Rather not agree  Rather agree  Agree  Fully agree  Don't know/ No answer

## **Part 2: Your experience**

**Which of the following services have you had performed for pay in your household in the last three years?**

Please indicate any services that were not performed by a member of the household. You can select multiple answers.

- No service used
- Renovation, maintenance or modernization of the apartment
- Repair of household items
- Gardening
- IT services (e.g. computer/smartphone)
- Household help (e.g. cleaning, washing, shopping)
- Childcare ("babysitter", not KiTa)
- Tutoring
- Other: \_\_\_\_\_

Don't know/ No answer

**Is there a government support for household-related services in Germany?**

Yes  No  Don't know/ No answer

[Displayed if participant answered "yes".]

**Please describe in your own words how the government support for household-related services is structured in Germany.**

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**Have you ever used the option of deducting household services and services for renovation, maintenance or modernization measures from your income tax?**

Yes  No  Don't know/ No answer

**A service is performed without invoice. Please indicate which of the following statements you think are correct. You can choose multiple answers.**

- The provider has less administrative effort.
- The provider requires a cash payment.
- The supplier does not pay sales tax due to the tax office.
- The provider does not pay other taxes and social security contributions due.
- Don't know/ No answer

### **Part 3: Your life situation**

**What is your current employment status?**

Full-time employed  Part-time employed  Apprenticeship  Marginally employed  Partial retirement  Marginally employed  Unemployed  Don't know / No answer

**If you add up all income: What is the monthly net household income of all household members? Please enter the monthly net amount, i.e. after deducting taxes and social security contributions. Please include regular payments such as pensions, housing benefit, child benefit, BaföG, alimony payments, etc.!**

**If not exactly known: Please estimate the monthly amount.**

Less than 1,000 €  1,001 € to 2,000 €  2,001 € to 3,000 €  3,001 € to 4,000 €  4,001 € to 5,000 €  5,001 € to 7,000 €  7,001 € to 9,000 €  More than 9,000 €  Don't know / No answer

**Who usually makes the financial decisions in your household?**

You alone  You and another person in your household together  Another person in your household  Don't know / No answer

**Who does your tax return?**

You alone  You and someone else  Someone else for you (e.g., partner, tax advisor)  Don't know / No answer

**In general, are you a risk-taking person or are you trying to avoid risk?**

**Please rate this on a scale from 0 to 10, on which the value 0 means "not at all willing to take risks" and the value 10 means "very willing to take risks".**

0 Not at all willing to take risks  1  2  3  4  5  6  7  8  9  10 Very willing to take risks

**How do you feel about the following statement: It is a civil duty to pay taxes.**

**Please rate this on a scale from 0 to 10, on which the value 0 means "Fully disagree" and the value 10 means "Fully agree".**

0 Fully disagree  1  2  3  4  5  6  7  8  9  10 Fully agree

### A.3 Additional results

Table A.1: Balancing of respondents' characteristics Study 1

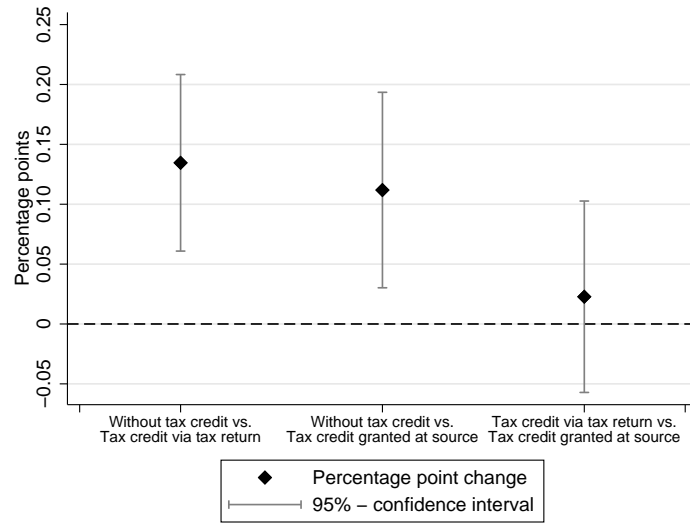
	Treatment groups			Test for equality	
	Mean values			p-values	
	No tax credit	Via tax return	At source	Via tax return	At source
Age in years	53.70	54.05	54.98	0.772	0.284
Female	0.540	0.533	0.511	0.885	0.543
East-Germany	0.125	0.138	0.145	0.689	0.542
Education					
Secondary schooling	0.314	0.317	0.271	0.945	0.327
Post-secondary training	0.484	0.496	0.529	0.813	0.343
Academic degree	0.202	0.188	0.199	0.703	0.944
Household income (net)					
<= 2,000 €	0.161	0.240	0.199	0.036	0.293
2,001 € – 3,000 €	0.268	0.249	0.267	0.647	0.983
3,001 € – 4,000 €	0.196	0.222	0.244	0.503	0.224
4,001 € – 5,000 €	0.174	0.120	0.113	0.106	0.067
>= 5,001 €	0.080	0.107	0.072	0.340	0.753
No income information	0.121	0.062	0.104	0.032	0.583
Num. of observations	224	225	221	449	445

Note: Test for equality against No tax credit treatment.

Table A.2: Experience with services and tax credits

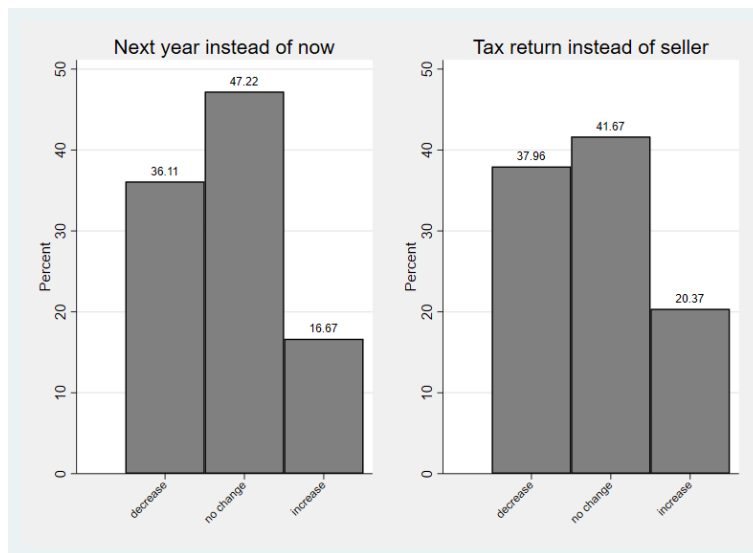
	Percent Yes
Has demanded services in past 3 yrs.	65.5
Reports to know §35a EStG	80.5
If knows §35a EStG:	
Has used §35a EStG in the past	70.5
Reasons for not having used §35a EStG	
Service demanded not deductible	14.2
Income tax too low	34.5
Deduction too burdensome	13.5
Refund too late	6.1
Service without invoice demanded	8.7
Don't know	11.5

Figure A.1: Treatment differences in probability of choosing an invoice Study 1



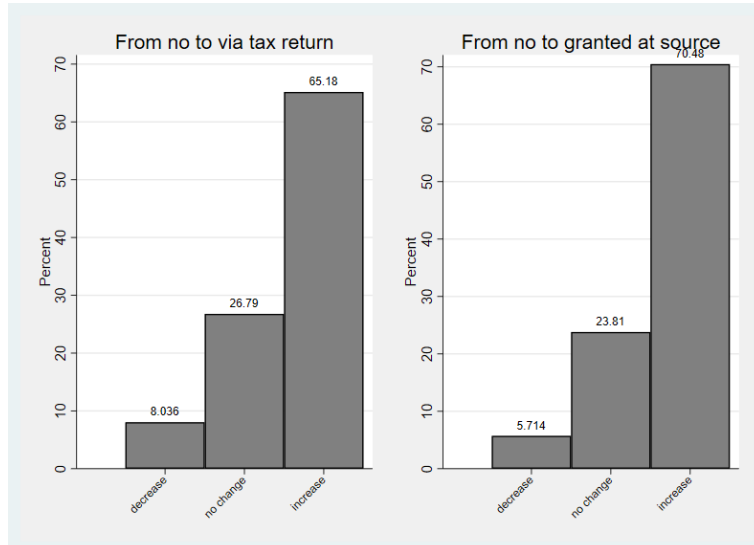
Note – The points show the treatment effects calculated as difference between the probabilities to choose an invoice offer and the WTPs for an invoice between the treatment groups with tax credits and the baseline scenario as well between the two tax credits. The treatment effects are shown in percentage points. Standard errors are obtained by bootstrapping with 499 replications.

Figure A.2: Timing vs. actions: From at source to via tax return



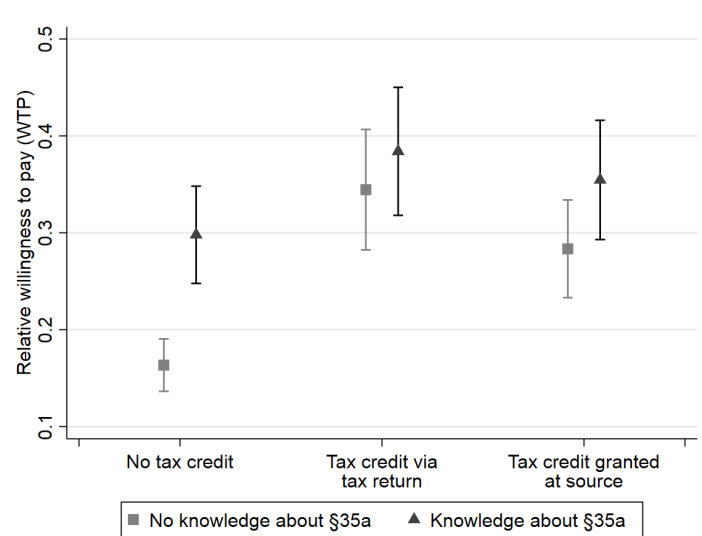
Note: Based on 110 and 111 obs. Percentages calculated ignoring 2-5% reporting that they “Do not know.” To simplify the exposition, we report the fractions of those who agree (values 1-3), are indifferent (value 4), and disagree (values 5-7).

Figure A.3: From no tax credit to tax credit



Note: Reported are answers to the question “How would this change your willingness to choose an offer with invoice?” To simplify the exposition, we report the fractions of those who agree (values 1-3), are indifferent (value 4), and disagree (values 5-7). Based on 112 and 105 obs. Percentages calculated ignoring 3-4% reporting that they “Do not know.”

Figure A.4: Heterogeneity by familiarity with German tax credit



Note: .



Table A.3: Characteristics of offers with vs. without invoice

<b>In the case of offers without an invoice...</b>				
the availability of the provider is generally...	Better	Equal	Worse	Don't know
	21.19	44.63	7.76	26.42
the price of the service is generally...	Higher	Equal	Lower	Don't know
	79.25	8.96	3.58	8.21
the quality of the service is generally...	Better	Equal	Worse	Don't know
	1.64	63.88	11.79	22.69
the seller's willingness to make improvements in the event of defects is generally...	Higher	Equal	Lower	Don't know
	2.99	19.25	59.55	18.21
the reliability of the seller is generally...	Better	Equal	Worse	Don't know
	2.99	49.1	28.21	19.7

Note: Assessment of characteristics of offers with invoice versus without invoice based on 670 observations. Shares of individuals in percent.

Table A.4: Summary statistics of Study 2

	Experimental sample		German homeowner	
	Mean (1)	SD (2)	Mean (3)	SD (4)
Age in years	53.94	(13.032)	54.68	(17.628)
Female	0.50	(0.498)	0.501	(0.500)
East-Germany	0.195	(0.396)	0.147	(0.364)
Education				
Secondary schooling	0.212	(0.409)	0.109	(0.313)
Post-secondary training	0.426	(0.495)	0.613	(0.487)
Academic degree	0.362	(0.481)	0.260	(0.439)
Household income (net)				
<= 2,000 €	0.139	(0.346)	0.249	(0.432)
2,001 € – 3,000 €	0.243	(0.429)	0.246	(0.431)
3,001 € – 4,000 €	0.225	(0.418)	0.216	(0.412)
4,001 € – 5,000 €	0.175	(0.380)	0.145	(0.349)
>= 5,001 €	0.137	(0.344)	0.148	(0.355)
Num. of observations	1.304		16.661	

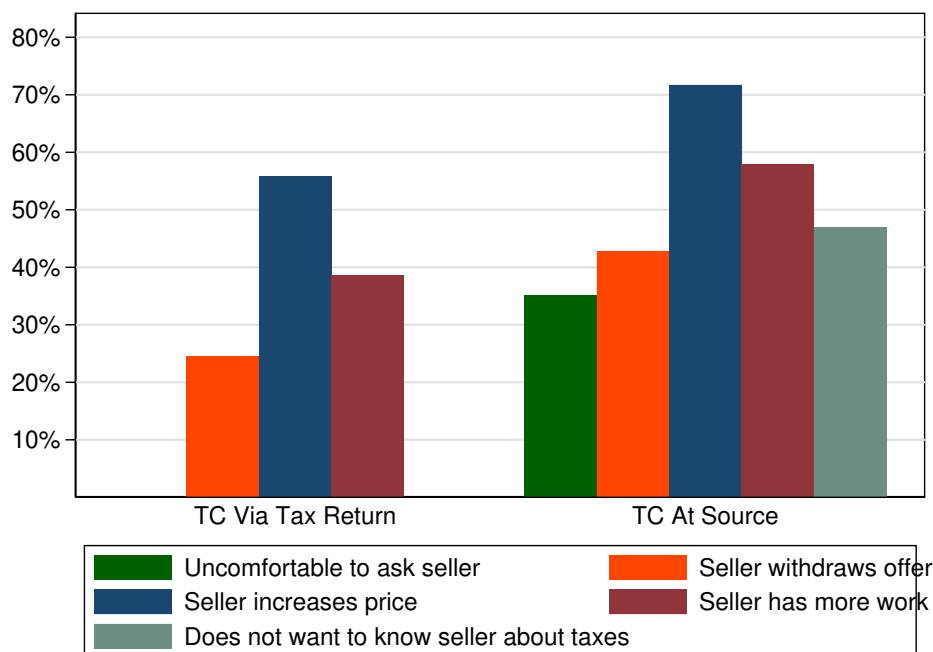
Note: Columns (3) - (4) are based on the SOEP from 2019 (v36), homeowners are identified with the respective SOEP question, we include all adult individuals living in Germany. Estimates are computed using weights to adjust for non-response in the SOEP. 9.6% of subjects did not answer the income question in our sample, this fraction amounts to 6.64% in the SOEP homeowner sample.

Table A.5: Replication results: Mixed logit estimates, marginal effects, and willingness to pay

	No Tax Credit			Tax Credit Via Tax Return 20%			Tax Credit At Source 20%		
	(1) Coeff.	(2) ME	(3) WTP	(4) Coeff.	(5) ME	(6) WTP	(7) Coeff.	(8) ME	(9) WTP
With invoice	2.610 (0.316)	0.322 (0.035)	0.271 (0.038)	3.904 (0.360)	0.446 (0.028)	0.353 (0.028)	3.090 (0.261)	0.457 (0.031)	0.411 (0.033)
Recommended	0.800 (0.170)	0.073 (0.016)	0.083 (0.019)	0.721 (0.163)	0.067 (0.017)	0.065 (0.017)	0.437 (0.122)	0.053 (0.015)	0.058 (0.017)
Available	1.088 (0.166)	0.100 (0.016)	0.113 (0.018)	1.015 (0.155)	0.096 (0.012)	0.092 (0.020)	0.543 (0.113)	0.066 (0.018)	0.072 (0.019)
Log Price	-9.630 (0.790)	-0.009 -	-	-11.072 (0.897)	-0.009 -	-	-7.515 (0.633)	-0.008 -	-
Offers	3,220			2,996			2,954		
Decisions	1,610			1,498			1,477		
Respondents	230			214			211		

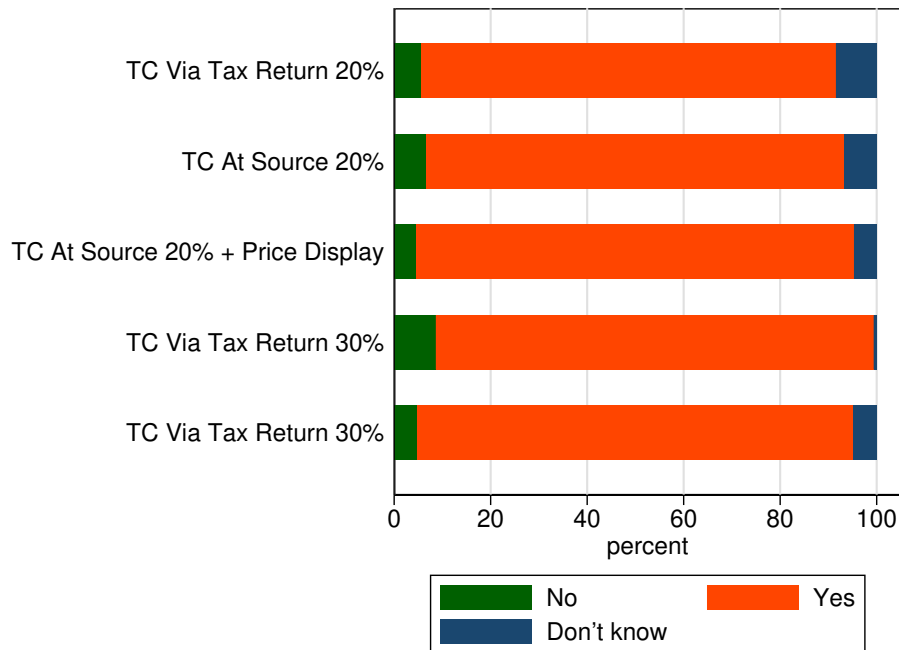
Note: Estimates from mixed logit models for each treatment. Omitted categories are “no recommendation”, “Available with waiting time”, and offer “without invoice” respectively. The price is included as log. Marginal effects (ME) are calculated as the difference in the probability that an offer is chosen if the attributes value changes from 0 to 1 for the binary coded attributes. The willingness to pay (WTP) is the marginal rate of substitution between the binary attributes and the price. It is calculated by dividing the coefficient of each attribute by the coefficient of the log price. Since the price enters the model as logarithm, the WTP can be interpreted in percent. Standard errors are obtained by bootstrapping with 999 replications.

Figure A.5: Reasons for not using the tax credits - Multiple choice question



Note: The bars show the share of participants that agreed to the statements under the respective tax credit scheme. Participants in the respective treatments were collapsed into two groups.

Figure A.6: Fraction of individuals stating that they would claim the tax credit



Note: Respondents who reported that they would choose an invoice in a randomly chosen choice set, were asked if they would use the tax credit, p' answer to the question whether they would claim the tax credit if they chose an offer with invoice in a randomly selected choice set. Possible responses were Yes, No, Do not know. the bars show the fFractions of respondents that indicate that they would actually claim the tax credit if they chose an offer with invoiceparticipants indicating the respective answers are shown.

#### A.4 Heterogeneity

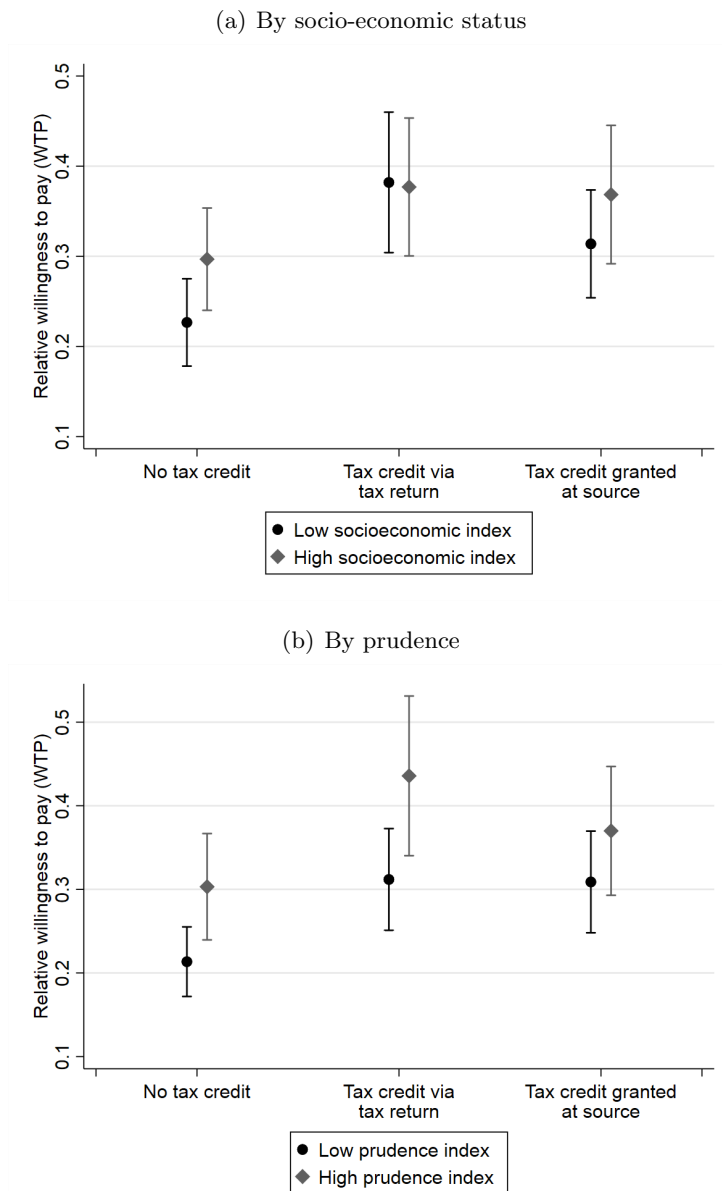
To learn more about the reasons for the established effects in Study 1, we examine how the WTP for an invoice varies with individual characteristics. We find that income and education have a similar impact on the WTP. The same holds for self-reported patience, risk aversion, and tax morale. To simplify the analysis, we combine the information of these variables into two indices using principal component analyses. First, we create an index of the socio-economic status using income and education. Individuals with a high socio-economic index value (high status) tend to have higher educational degrees and incomes compared to individuals with low socio-economic index values (low status). Second, we create an index of subjects' prudence using self-reported risk aversion, tax morale, and patience. Individuals with high prudence tend to be more patient, have higher tax morale, and are more risk averse than individuals with low prudence.

To study if the effect of the tax credits varies with the socio-economic status and prudence, we estimate the WTP for each group in each treatment. Figure A.7a shows that individuals with a high socio-economic status have a higher WTP for offers with invoice when no tax credit is in place. Their WTP increases by about 8 percentage points for both types of tax credits. In contrast, individuals with a low socio-economic status react differently to the two tax

credits. The increase in the WTP is stronger when the tax credit is claimed via the tax return (considering the lower baseline WTP). While the tax credit via tax return increases their WTP by 15 percentage points, the increase of WTP when the tax credit is granted at source is only 9 percentage points. This suggests that the finding that the effect of the tax credit via tax return is slightly but insignificantly higher is driven by individuals with low socio-economic status. To the extent that low income represent liquidity-constraints, this result conflicts with our expectation that in particular these individuals should prefer the tax credit granted at source.

Figure A.7b shows that individuals with high prudence have a higher WTP for offers with invoice in all policy scenarios. This result is plausible as high risk aversion and tax morale should prevent individuals from demanding illegally provided services. With regard to the effect of tax credits, while individuals with low prudence do not seem to differentiate between the two tax credits, highly prudent individuals value the tax credit via tax return higher than the tax credit at source. Their WTP for an offer with invoice increases by 13 percentage points when the tax credit is granted via the tax return, and by 7 percentage points when it is granted at source.

Figure A.7: WTP by socio-economic status and prudence



Note: The points show the relative WTP in the treatments by values on the socio-economic and prudence indices. Standard errors are obtained by bootstrapping with 499 replications.