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The Name Game for Contributions – Influence of Labeling and Earmarking on the Perceived Tax Burden

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Abstract

In this paper we apply conjoint analysis as an empirical method to study the influence of tax labeling and tax earmarking on the perceived tax burden. As reference for the individual behavior we use the model of a rational utility maximizer described by the economic theory. We determine a significant influence of the labeling and the earmarking of taxes. We can show that the labeling and earmarking effect can decrease the perceived tax burden for the test persons which results in a deviation from a (rational) consumption maximizing behavior. These results give important implications for tax policy regarding further reforms of the tax and contribution system.

Keywords

Tax Labeling · Tax Earmarking · Perceived Tax Burden · Behavioral Taxation · Non Rational Behavior · Conjoint Analysis · Education Allowance · Contribution System · Health Insurance

JEL Classification D03 · H20 · H51 · H52 · K34

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1. Introduction

In tax effects theory it is commonly assumed that taxpayers aim to maximize their consumption utility and with it – in a given labor supply – their net income. This assumption also implies the sub goal of taxpayers, namely to minimize their tax burden (in general: their contribution burden) in order to reach the largest possible consumption potential.

Particularly studies on the willingness to evade taxes have shown that this neoclassical assumption is not always fulfilled in reality (*Jonas, Heine, and Frey* 1999 pp. 164ff. with further references). Many taxpayers seem to attach a positive utility to taxes and further contributions, as long as these contributions are consistent with their own sense of fairness and they find the contributions reasonable. Therefore attributes of a contribution such as its labeling can influence the individual evaluation of this duty and the subjective perceived burden.

This study attempts to measure the influence of contribution labeling as well as the use of the tax revenue (appropriation or earmarking) on the perceived burden of the taxpayers through this contribution. For this purpose a conjoint analysis was conducted, in which test persons were given the opportunity to rank different combinations of contributions. The contributions available to choose from in this case included the health insurance premium, income tax payable, and a fictitious education allowance. This method was used to determine how the naming of a contribution (labeling) as well as its designated use (earmarking) affects the acceptance of this contribution in the population.

This question is of theoretical as well as political relevance. If the basic rationality assumptions used to analyze the effects of fiscal decisions are incorrect and taxpayers not only strive to maximize their net income, then this has repercussions on the decision effects of a tax as well as on the perceived distribution of the burden. From a political perspective, knowledge of the effects of labeling and earmarking of contributions could be used to identify approaches to increase the acceptance of the tax system in the population and, where applicable, to minimize tax avoidance strategies and evasion behavior on the part of taxpayers. *Congdon et al.* 2009 analyze the implications of behavioral economics for tax policy, e.g. for welfare consequences of taxation. They come to the result that the welfare consequences are ambiguous if the taxpayer's decisions are not rational. The deviation of the taxpayers behavior from the rational assumptions is also a result of our experimental study.

This article is structured as follows: In section 2 we will first present a literature review of this topic, and then subsequently in section 3 we will derive our hypotheses on the behavior of

taxpayers in the selection of a specific combination of contributions. Section 4 describes the sample, the method of the conjoint analysis, the concrete research design, and the results of the study. In section 5 we will discuss the results as well as elaborate upon possible explanations. Section 6 presents our conclusions and topics for further research.

2. Literature Review

The starting point in modern public finance of the tax earmarking discussion is *Buchanan* 1963. He analyzes the economic effects of earmarked taxes and their influence on the individual's behavior within a theoretical model, and he discloses differences between earmarking and general-fund financing under restrictive model assumptions. Based on this paper, *Goetz* 1968 develops a modified model and shows that the normative conclusions become less determinate under less restrictive assumptions. *Mc Cleary* 1991 extends the theoretical models with World Bank case studies. He comes to the result that earmarking does not work very well in real settings.

The effects of labeling and earmarking of taxes are often discussed in papers that address the incentives of tax evasion. The focus of many studies is the impact of the public use of taxpayers' money on the willingness to evade taxes. *Kolm* 1973 provides a basis in that he explicitly integrates the utility of the public goods, which were financed through taxes involved in tax evasion decisions in an evasion model. *Vogel* 1974 determines through surveys that in Sweden the willingness to evade taxes decreased when the tax payment was accompanied by a certain consideration. *Lewis* 1979 reaches similar conclusions for Great Britain. *Baldry* 1986 shows that a difference between gambling and tax evasion is the existence of 'moral costs' in the latter decision situation. Furthermore, *Spicer and Becker* 1980 come to the conclusion through experiments that the willingness to evade taxes decreases the higher the perceived tax justness and tax fairness. A model theoretical explanation for this is provided by *Cowell* 1992. *Weck-Hannemann and Pommerehne* 1989 use an econometric estimation of an evasion model based on aggregated data (difference between fiscal and non-fiscal household income statistics) for Swiss Cantons to show that tax payments tend to be viewed as fair when tax payers have the opportunity to co-determine how the tax money will be spent. In this study as well as in *Pommerehne* 1985 it is also shown that tax evasion in communities and Cantons in Switzerland occurs less frequently when the tax payers have a political right to participate. *Alm, Clelland and Schulze* 1992 come to the result, that the individuals exhibit much diversity in their behavior and the main reasons for tax

compliance are the overweighting of the low probability of audit and the taxpayers valuation of the public goods. A comprehensive explanation about the tax reporting decisions, and why they cannot be predicted accurately by conventional economic analysis can be found by *Kim, Evans and Moser 2005*.

Neuroeconomics also provides a possible explanation for the high tax compliance of test persons, which cannot be explained by the model of *homo oeconomicus*. *Harbaugh, Mayr and Burghart 2007* show that both required contributions and voluntary payments to a non-profit organization lead to similar brain activity among test persons as payments in their favor. The authors see in this observation confirmation both for the motive of pure altruism and the motive of a “warm glow of giving,” which is the benefit that the test person receives through his/her own voluntary donation.

Another body of literature attempts to measure subjective tax effects of contributions and subjective judgments of their fairness. According to *Frey and Eichenberger 1996*, the opportunity for taxpayers to participate in political tax questions is sufficient to increase tax satisfaction. *Jonas, Heine, and Frey 1999* address the psychological variables which influence tax satisfaction.

Heinemann et al. 2007 come to the conclusion that the acceptance of tax reforms does not only depend upon objective criteria but also upon the way in which these reforms are presented to taxpayers. In public finance and tax accounting literature the thesis is commonly found that the naming of a contribution may influence the subjective perceived burden (*Graumann and Fröhlich 1957*, pp. 429f.; *Franzen 2008*, pp. 75f.). *Schmölders 1960*, pp. 82f., with further references, cites examples from the German fiscal system (minor residential construction charges, fire brigade tax, *Notopfer Berlin* [Berlin sacrifice]) as well as french taxes (*fonds national, aide*). However, to our knowledge there are no studies which empirically test this thesis.

The study conducted here builds upon this line of evasion research in that the name and designated use of a contribution can influence the tax resistance beyond the subjective sense of burden. The influence that the labeling of a contribution has on the perceived burden relates to the research on tax fairness. The connection between the evidence and the presentation of tax reform is obvious: precisely this thesis should be put to the test here. The goal of this study is to empirically analyze the influence of the presentation and labeling of a contribution as well as its appropriation (earmarking) on the subjective net burden of this

contribution and thereby to either confirm or rebut the thesis regarding the influence of such provisions on tax resistance.

3. Theory

The initial hypothesis for this study is that the behavior of the test persons can be explained according to neoclassical theory, which refers back to a rationally acting decision maker who solely maximizes the utility of his/her personal consumption. The taxpayers' consumption utility potential is reduced by the amount of the contributions. On the contrary, the amount of the contributions (income tax, compulsory health insurance, and education allowance) in our model do not have any explicit influence on the consideration which taxpayers directly face, either because such direct considerations do not occur (income tax, education allowance) or because their amount is explicitly assumed to remain unchanged (health insurance coverage).

Therefore, a rationally acting maximizer of consumption utility should, when deciding between various combinations of contributions, focus solely on the criteria of the amount of the contribution and always favor the combination which (assuming constant gross pay) offers the highest possible net pay and therefore the maximum consumption potential (net income maximization).

According to this hypothesis, the name of a contribution (labeling) cannot influence the perceived burden of the taxpayers. Any potential statement of the designated use (earmarking) cannot have an influence on the perceived burden as long as it deals with a matter in which the particular contribution amount does not directly increase the consumption potential of the taxpayers.

The utility function for net income maximization is presented in the following formula:

$$U = U [N]$$

with $N = W - T - HIP - EdAl$, and $\frac{\partial U}{\partial N} > 0$ (non-saturation) and $\frac{\partial^2 U}{\partial N^2} < 0$ (diminishing marginal utility).

N represents the financial target value, in this case the net pay of the decision maker, W represents the gross pay, T the income tax, HIP the premium for compulsory health insurance, and $EdAl$ a new education allowance.

The initial hypothesis under the assumption of a rationally acting net pay maximizer is stated as follows:

H_1 : For a given gross pay amount and given consideration from the system of contributions, taxpayers will choose between combinations of contributions in such a manner as to maximize their net income and therefore their consumption utility.

Now the contra thesis to H_1 should be developed. The subjective net burden is understood below to be the subjective burden of a contribution that is relevant to taxpayers' decisions. If the contribution has non-financial advantages from the perspective of the taxpayer, then these advantages cause a drop in his/her subjective net burden of this contribution.

The subjective perceived net burden of the taxpayer and therefore also the decision between combinations of contributions could be influenced by the *labeling* of a contribution. Whereas in net income maximization every type of contribution burden should be avoided which causes a decrease in the individual consumption potential, taxpayers could in reality factor the labeling of a contribution into their net burden calculations and therefore also into their decisions, even if their own consumption potential decreases in the process.

In such a way taxpayers might be more willing to bear the tax payable imposed upon them (in other words have a lower subjective perceived net burden) if the name of the contribution convinces them of the need for and the significance of this contribution. In addition to the egoistic behavior of *homo oeconomicus*, the target function is here extended to include a limited egoistic or even an altruistic motive. A contribution labeled as a general education allowance could therefore receive wider acceptance among taxpayers than a contribution labeled as a tax, if for instance taxes are associated with wastefulness by many taxpayers. The first contra thesis to H_1 reads as follows:

H_2 : The labeling of a contribution influences the perceived net burden of this contribution and therefore the selection of taxpayers between combinations of contributions.

However, one must here consider that the pure labeling of a contribution (e.g. education allowance) does not initially reveal anything about the concrete use of this contribution. The general labeling education allowance thus does not state whether the revenues from this contribution will be used for example to fund schools, universities, or general education projects such as community colleges, libraries, or museums.

The other tested contra thesis pertains to the appropriation or earmarking of a contribution. Taxes are – in contrast to social contributions – usually not provided with appropriations (Non-Earmarking Principle, see e.g. *McCleary* 1991, p. 82). However, a non-enforceable

political "pledge" could be given for a particular allocation of funds. In this way, appropriations would be possible for social contributions as well as for taxes.

It is questionable as to whether an appropriation can increase the acceptance of a contribution (McCleary 1991, p. 85). If taxpayers consider a particular cause for which a contribution is designated especially worthwhile, then they might be willing to accept a decrease in their consumption potential in order to support this cause. A similar behavioral pattern arises-for instance, concerning the willingness to give donations to non-profit organizations or particularly worthy causes. Accordingly, wage earners could, instead of choosing the alternative which offers them the highest net income, intentionally relinquish a portion of their consumption potential in order to support an allocation of funds which they consider worthwhile, without receiving a concrete service for it in return.

In this study, the appropriation was modeled by strictly establishing the use of the education allowance. The test persons were divided into two groups, of which one group received no detailed information regarding the use of the education allowance. The other group was informed about the concrete use of this contribution: Fifty percent of the education contribution was to be dispersed to schools and vocational schools, 25% to colleges and universities, and 25% to preschool education, since it was expected that the eligibility for the financing of this cause would, in general, be viewed positively by the population.

Two different conjoint analyses were conducted, which differed based on the following points:

- In the first conjoint analysis, test persons were explicitly told that the tax revenue from the tested contribution (education allowance) was not earmarked. In this setting, solely a labeling effect was to be active, which resulted either from irrational behavior or from a "vague signal" for a possible appropriation.
- In the second conjoint analysis an earmarked education allowance was tested. In this case, a labeling effect as well as definite earmarking were present.

This approach leads to the proposition of an additional sub-hypothesis as well as a contra hypothesis to H_1 :

H_3 : The announced use of a contribution influences the perceived net burden of this contribution and therefore the selection of taxpayers between combinations of contributions.

The two influential factors studied, labeling and earmarking, are not completely free from overlap, since the name of a contribution could be understood by taxpayers as a signal for the appropriation. However, it is possible to differentiate between a contribution with “lower” appropriation (solely by labeling of the contribution) and a contribution with “higher” appropriation (by a promised use): How does a “vague signal” for a possible appropriation (e.g. solidarity surcharge) act compared to a clearly signaled earmark, which is certain upon introduction of the contribution?

4. Method

4.1 Conjoint Analysis

The testing of the above mentioned hypotheses was carried out based on two conjoint analyses. Conjoint analysis consists of a procedure which was originally developed in the field of psychology (*Luce and Tukey 1964*) and later also found wide spread use in market research (*Green and Srinivasan 1978*, pp. 103f.). In conjoint analysis, test persons are assigned the task of evaluating various *bundles of attributes* (“stimuli”) according to their preferences (CONsider JOINTly), either by explicit evaluation (*rating*) or by indicating an order of precedence based on advantageousness (*ranking*). The measured total utility of the various bundles of attributes are used to calculate part worth utilities and the relative importance of the single attributes. A conjoint analysis consists furthermore of a decompositional procedure, which generally assumes an additive relationship of the part worth utilities in regard to the total utility (*Hair et al. 2008*). The advantage of the procedure is that test persons can holistically evaluate the objects to be analyzed, such that the demands on the test persons are lower and biases due to cognitively directed over/under weighting can be avoided. In result, the conjoint analysis can be used to split up the total utility of a bundle of attributes into the part worth utilities of the individual attributes and their relative weights. Since in a conjoint analysis the test persons have to give a simultaneous evaluation of different attributes, they must consider the same trade-off effects between the individual attributes which also exist in reality.

It would also be conceivable to question the test persons directly regarding the burden of individual contributions. The majority of test persons were however not in a position to give consistent estimates of the burden which also take such trade-off effects into account. The test persons would probably tend to rate all attributes as especially important and therefore

overestimate the individual attributes in a bundle of attributes. The procedure of conjoint analysis was therefore chosen since it sets lower demands by far on the test persons.

Conjoint analysis has already been used sporadically to measure tax effects. *Milliron and Toy* 1988 adopts conjoint analysis to research influential factors with regard to tax compliance. *Hundsdoerfer and Sichtmann* 2009 investigate the influence of taxation on investment decisions with the help of conjoint analysis. *Blaufus and Ortlieb* 2009 study the influence of tax complexity on employee decisions regarding company pension plans. To our knowledge, conjoint analysis has not yet been used to measure the influence of labeling and earmarking on the subjective burden of this contribution.

4.2 Sample

The data collection took place in December 2008 and January 2009 in the form of standardized one-on-one interviews with specially trained interviewers. In addition to the conjoint analysis, further questions were asked regarding demographic attributes, the general assessment of fiscal policy, and individual knowledge of German income tax law. The survey lasted on average 20 minutes per test person.

Test persons were selected from among gainfully employed individuals, since these persons would be burdened by taxes and other contributions and therefore have experience with the German system of contributions. Gainfully employed individuals include, for purposes of this survey, all employees, public officials, and self-employed workers. Short interruptions to employment, for instance due to parental leave, maternity leave, etc. were not problematic.

The selection of test persons followed a quota schedule¹ which corresponded pro rata with the total working population in terms of the attributes gender, age, education, and income level. The corresponding frequency in the population for the year 2006 was taken from the statistical almanac for 2008 from the Federal Statistical Office in Germany, in which 37 million people comprised the working population in Germany. This was done to avoid bias from a non-representative composition of the sample since a representative random sample was not possible for financial reasons.

The conjoint analysis was conducted with a total of 542 test persons. This group was divided in two subgroups: 274 test persons (non-earmarking group) received no additional information about the appropriation of the contribution “education allowance,” whereas 268

¹ Quota samples do not strictly fulfill the requirements of a pure random selection. Nevertheless they are the most widely used procedure in marketing research and consistently yield good results in comparative studies with pure random selection (see *Green et al.* 1988, pp. 325-327).

test persons (earmarking group) received additional information regarding the concrete use of the contribution.

Compliance with the quota schedule was statistically tested. No significant difference between sample and population could be detected at the 5% level of confidence, and the sample can therefore be seen as representative in regard to the studied traits. Also between the two groups in the sample (non-earmarking group and earmarking group), no significant difference could be identified in regard to the quota schedule at the 5% level of confidence.

The sample is composed of the individual attribute traits as follows:

Attribute	Value	Frequency	Percent (sample)	Percent (population)
Gender	Male	291	53.7 %	54.8 %
	Female	251	46.3 %	45.2 %
Age	Under 20 Years	20	3.7 %	3.5 %
	20 – 29 Years	93	17.2 %	17.5 %
	30 – 39 Years	127	23.4 %	24.0 %
	40 – 49 Years	152	28 %	29.6 %
	50 – 59 Years	115	21.2 %	20.5 %
	Over 60 Years	35	6.5 %	5.1 %
	No School Leaving Certificate	11	2.0 %	2.2 %
	Lower Secondary School Leaving Certificate	152	28.0 %	31.4 %
Education ²	Secondary School Leaving Certificate	148	27.3 %	26.8 %
	University-Entrance Diploma	86	15.9 %	14.5 %
	University Degree	101	18.6 %	16.0 %
	Other	44	8.1 %	9.1 %
	Under 1,000 Euro	164	30.3 %	32.7 %
Monthly Net Income	1,000 – 2,000 Euro	253	46.7 %	44.8 %
	2,000 – 3,000 Euro	82	15.1 %	14.6 %
	Over 3,000 Euro	38	7.0 %	8.0 %
	Not Stated	5	0.9 %	---

Table 1- Distribution of Quota Attributes

4.3 Research Design and Operationalization of the Hypotheses

The research objects consist of a combination of contributions which must be paid by the test persons. The test persons were placed in a fictitious situation in which they were asked to

² Lower Secondary School equates the German „Hauptschule“, Secondary School equates the German „Realschule“ and University-Entrance Diploma equates the German „Abitur“.

rank combinations of contributions according to their preferences in determining the fiscal policy for an (unnamed) political party.³

Every possible combination assumed a constant gross pay of 3,000 Euro. This gross pay was then reduced by three different deductions. These deductions included a general income tax, a health insurance premium, and a newly introduced educational allowance. The amount of the individual traits were 700 or 740 Euro for income tax, 200 or 280 Euro for compulsory health insurance premiums, and 0 or 60 Euro for the education allowance. We explicitly advised the test persons that the health insurance premiums are independent of their actual received health insurance payments.

The net pay was also given for each stimulus to prevent arithmetic errors from distorting the test persons' results. There were a total of eight different possible combinations in the study (complete design), which were to be ranked by test persons' during the course of the analysis according to their preferences. Each stimulus received a different combination of the traits of the three attributes (income tax, compulsory health insurance, education allowance).

The individual contribution combinations of the stimuli in the complete design are presented in the following table:

Stimulus	Income Tax	Education Allowance	Premium for Compulsory Health Insurance
A	low = 700 €	no	low = 200 €
B	low = 700 €	yes (60 €)	high = 280 €
C	high = 740 €	yes (60 €)	low = 200 €
D	high = 740 €	no	high = 280 €
E	high = 740 €	no	low = 200 €
F	low = 700 €	yes (60 €)	low = 200 €
G	high = 740 €	yes (60 €)	high = 280 €
H	low = 700 €	no	high = 280 €

Table 2 – Contribution Combinations of Stimuli in Complete Design

The test persons were asked to assign the stimulus with their highest preference the lowest rank in the sequence and the stimulus with their lowest preference the highest rank. After a

³ This ranking is the most common valuation procedure after the rating scale. An overview of various procedures can be found in *Green and Srinivasan 1978*, pp. 104f.

test person had completed the sequence the interviewer once again mentioned the possibility to make changes. When the test person did not wish to make further changes, the final sequence was documented by the interviewer.

The use of the education allowance was not stipulated in the first conjoint analysis (non-earmarking). In this case explicit information was given to the test persons that tax revenue from the education allowance went into the general national budget and was not earmarked. In the second conjoint analysis (earmarking), test persons received detailed information regarding the use of the education allowance: Twenty-five percent of revenues from the education allowance were to be used for preschool education in nursery schools and day-care centers for children, 25% for improvements to colleges and universities, and 50% for improvements to schools and vocational schools.

The sequences we collected can be used to test the initial hypothesis (hypothesis H_1). Each sequence created by a test person can be compared with the rational sequence that a *homo oeconomicus* would choose in order to maximize his/her net income.

5. Results

5.1 Analysis of Ranking Behavior

The rational model of a net income maximizing *homo oeconomicus* provides a reference point for the examination of the empirically observed rank order of the preferred contribution system. This rational decision maker will always aim to minimize his/her contribution burden and therefore maximize his/her net income.

The following table shows the total contributions and the maximum attainable net income of the individual stimuli:

Stimulus	Total Contributions	Net Income
A	900 €	2,100 €
B	1,040 €	1,960 €
C	1,000 €	2,000 €
D	1,020 €	1,980 €
E	940 €	2,060 €
F	960 €	2,040 €
G	1,080 €	1,920 €
H	980 €	2,020 €

Table 3 – Total Contributions and Net Income

If one ranks the stimuli according to maximum attainable net income then it results in the following rational sequence

A>E>F>H>C>D>B>G,

since in this case the stimulus with the highest net pay is in first place and the ranking of the stimuli follows the total contributions.

In order to check how many test persons followed the example of the rational decision maker, the following table provides an overview of the number of rational sequences in the total sample.

Ranking	Number of Test Persons	Percentage of Test Persons
Rational	142	26.2 %
Other	400	73.8 %

Table 4 - Rational Sequence

From Table 4 it becomes clear that the vast majority of test persons decided against a rational sequence. This result cannot be due to arithmetic errors since for every stimulus the exact net pay (gross pay – contributions) was indicated. Thus, rational net income maximization simply required the sorting of the stimuli according to net pay. Only 26.20% (142 individuals) of the test persons ranked all of the stimuli according to the rational rank order. 73.80 % (400 individuals) instead chose another sequence. A t-Test can be used to further confirm that the

deviations from rational behavior are statistically significant. Hence, the test persons do not appear to hold to the rational guidelines of the theory when creating their sequences.

The following table shows the rank placing of the individual stimuli in the total sample:

Stimulus	N	Median	Mean	Standard Deviation
Stimulus A (L-L-L)	542	1	2.63	2.090
Stimulus B (L-H-H)	542	7	5.38	2.067
Stimulus C (H-H-L)	542	5	4.01	1.645
Stimulus D (H-L-H)	542	6	6.29	1.426
Stimulus E (H-L-L)	542	3	3.79	2.049
Stimulus F (L-H-L)	542	3	2.75	1.641
Stimulus G (H-H-H)	542	8	6.56	1.966
Stimulus H (L-L-H)	542	4	4.58	1.557

Table 5 – Average Rank Placing of the Individual Stimuli

The mean is here of particular interest. The mean indicates the average rank placing of a stimulus over the total sample. According to this average rank placing, the following sequence of stimuli results:

$$A \succ F \succ E \succ C \succ H \succ B \succ D \succ G.$$

From Table 5 it becomes apparent that:

- Stimulus A has the lowest mean and therefore on average the best rank placing. This reflects the behavior of a net income maximizer. The same is true of stimulus G, which was valued the worst both in net income maximization and on average in the sample.
- The sequence of stimuli according to the average of the test persons (mean) deviates from the sequence of stimuli in net income maximization. This leads to the assumption that the test persons do not follow the principle of net income maximization in their decision making.

The behavior of the decision maker can therefore not be explained or predicted using the assumption of a *homo oeconomicus*. Hypothesis H_1 can thus be rejected. A further step must be used to test to what extent this deviation can be explained through the labeling of the contribution “education allowance” and the contribution “health insurance premium”

(hypothesis H₂) and the earmarking of the contribution “education allowance” (hypothesis H₃).

5.2 *Influence of Labeling on the Perceived Burden*

5.2.1 Education Allowance

According to hypothesis H₂, the labeling of a contribution leads to a change in the perceived net burden of this contribution and therefore to a shift in contribution preferences. Thus, a contribution labeled as an “education allowance” should, according to hypothesis H₂, be evaluated differently by test persons than other contributions in a system of contribution combinations. In order to eliminate bias in the effect of labeling caused by the explicitly named appropriation of the education allowance (earmarking), the influence of labeling was first analyzed separately within the non-earmarking group.

Conjoint analysis makes it possible for each test person to measure the part-worth utilities of the individual attributes for his/her own sequence. The part-worth utilities were estimated with the ordinary least square method (OLS).⁴ Therefore the differences between the average of all ranks and the empirical ranks for each factor value were calculated. This difference is the part-worth utility of an individual character trait which was standardized for comparison. The part-worth utility is therefore a measure of the value that a test person attaches to an attribute trait within the total attribute bundle. In this conjoint analysis the part-worth utility represents the utility that a test person assigns to a contribution in a certain amount.

As a means of comparison, the part-worth utilities of the attributes could also be measured for a rational maximizer of consumption utility who ranks the stimuli solely according to the attainable net pay (*Hundsdoerfer and Sichtmann 2009*). In this way it can be tested whether test persons assign a systematically higher value to the attribute trait “education allowance is levied” as would be the case in the rational model. The correlation between the total utility of a stimulus and the individual part-worth utility is – as is customary in conjoint analysis – assumed to be additive. That means that the sum of the individual part-worth utilities of the attributes of a stimulus corresponds to the total utility.⁵ The following table shows the

⁴ Monotone variance analysis could be used to determine the part-worth utilities since the preference judgments of the test persons show an ordinal standard of measurement. In accordance with common procedure, the Ordinary Least Squares Method was chosen in this case, since this method has proven to be very robust in the estimation of part-worth utilities of ordinally scaled dependent variables. See *Green and Krieger 1993*, p. 478.

⁵ This conclusion is based on the assumption that the explanatory variables do not interact. See *Hair et al., 2008*.

standardized⁶ part-worth utilities and relative significance which result from the sample⁷ as well as the respective values in a rational sequence:

	Standardized Part-worth Utility (in %)		Relative Significance (in %)	
	Rational	Sample	Rational	Sample
Income Tax high	0.00	1.12	20.00	20.86
Income Tax low	20.00	19.74		
Education Allowance	0.00	12.92	33.33	40.21
No Education Allowance	33.33	27.29		
Health Insurance high	0.00	1.53	46.67	38.93
Health Insurance low	46.67	37.40		

Table 6 – Part-worth Utilities and Relative Significance (Non-Earmarking Group)

Table 6 clearly shows that particularly the part-worth utilities for the education allowance in the sample deviate from the rational part-worth utilities of a *homo oeconomicus*. These results can be interpreted as follows: Whereas the characteristic “no education allowance” of a stimulus for a rational test person accounts for 1/3 (33.33%) of the maximum total utility, for the average test person this is only 27.29%. This outcome suggests that a contribution declared to be an education allowance finds wider acceptance than an income tax.

76 of the 274 test persons in this part sample (non-earmarking group) preferred stimuli which levied the education allowance, so the part-worth utility (mean) for the attribute (“education allowance is levied”) is at 12.92% clearly greater than zero. Across all test persons the difference between part-worth utility mean of the attributes “no education allowance” and “education allowance is levied” (27.29%-12.92% = 14.37%) showed that an increase in the education allowance from 0 to 60 € would burden the test persons noticeably less than would an increase in income taxes of 40 € (difference = 19.74% - 1.12% = 18.62%).

A T-Test was also conducted for this group in order to reach a conclusion regarding the influence of labeling on the acceptance of the contribution “education allowance.” It showed a deviation of the part-worth utility for the attribute trait “education allowance is levied” from the rational value (which resulted from net income maximizing behavior) that was significant at a 1% level. Many test persons apparently include in the evaluation of the attribute

⁶ The part-worth utilities were standardized on a uniform scale of measurement and with a uniform zero-point.

⁷ Sample here refers only to the non-earmarking group.

“education allowance is levied” not only the decrease in their consumption potential, but also attach positive importance to the promotion of education.

If test persons were willing to pay the education allowance and to relinquish a portion of their net income irrespective of how high the additional expenses were, then the sequence selected by these test persons would appear as follows: F>C>B>G>A>E>H>D. Here the sequence of the test persons corresponds to the rational sequence in regard to the attributes income tax and health insurance, however the stimuli with the trait “education allowance is levied” occupy the first four places. It’s a matter of an extreme case of endorsement for the education allowance among otherwise rationally acting test persons. The following table reflects the frequency of this sequence compared to a completely rational sequence for the non-earmarking group (NE):

Ranking	Number of Test Persons (NE)	Percentage of Test Persons (NE)	Total Sample
Rational	80	29.20 %	142 (26.20%)
Pro Education Allowance	14	5.11 %	47 (8.67%)
Other	180	65.69 %	353 (65.13%)
Sum	274	100.00 %	542 (100.00%)

Table 7 – Sequences “Pro Education Allowance” with Non-Earmarking

From Table 7 it becomes evident that a total of 14 of 274 test persons selected a sequence that was rational in the sense of a *homo oeconomicus* except for the attribute “education allowance” and do not perceive the education allowance as a burden to be avoided. A binomial test can further be used to show that the number of sequences carried out in this form present no statistically random result. Therefore it can also be proven that a significant percentage of test persons intentionally chose the strategy “pro education allowance” instead of “contribution minimization” and therefore chose the contributions with additional expenses. This clearly already appears sufficient to provide a contribution with a positive description.

Hypothesis H₂ is therefore confirmed for the education allowance: The perceived net burden from a contribution is clearly dependent upon its labeling.

5.2.2 Health Insurance Premium

In addition to the previously established positive influence of the label “education allowance,” it was studied whether the description of a contribution with “health insurance premium” influenced the perceived burden in contrast to a general income tax. In order to study this aspect we divided the sample into two subgroups. We sub-divided each data set in such a manner as if the test persons had ranked each individual stimulus with an education allowance and without an education allowance. Therefore per test person two fictitious conjoint analyses each with four stimuli were generated, in which only the attributes “income tax” and “health insurance premium” were varied and the education allowance remained constant (in one case 60 Euro and in the other case 0 Euro). In this manner the effects of the labeling of the health insurance premium compared to income tax could be isolated.

The calculated part-worth utilities can be taken from the following table:

Group Allocation	Income Tax low	Income Tax high	Health Insurance low	Health Insurance high
Education Allowance	31.86%	3.32%	61.75%	3.08%
No Education Allowance	37.64%	1.60%	56.15%	4.61%
For Comparison: Net Income Maximization	33.33%	0.00%	66.67%	0.00%

Table 8 – Part-worth Utilities Separated by Groups “Education Allowance” and “No Education Allowance”

The burden from the health insurance premium is in both groups noticeably less as it would be under consumption rational net income maximization. Test persons appear to value an additional burden due to the compulsory health insurance not as strongly negative as an equivalent additional burden with income tax.⁸ Thus the term “health insurance premium” seems to be positive compared to income tax, or the test persons have – in contrast to the information that they received from us – associated a higher reward from compulsory health insurance with a higher health insurance premium.

⁸ The margin between low and high income tax is 40 Euro, which is half of the margin between the low and high health insurance premium. Accordingly, under rational net income maximization the part-worth utilities of the low income tax is half as high as for the low health insurance. For a comparison between the burden from health insurance and the income tax the part-worth utilities of the low income tax can be doubled. Then one recognizes – especially in the case without education allowance – the burden from an increase in the health insurance premium is lower than the burden from an increase in income tax.

When the test persons were confronted with an education allowance (group “education allowance”), then a high health insurance premium is a noticeably stronger burden than in the case in which no education allowance is collected. For test persons who are more strongly burdened through a higher health insurance premium than through a low one (the normal case), a difference of 4.35 percentage points results.⁹ The economic intuition behind this result is obvious: If test persons are willing to pay for an education allowance, then their inclination decreases to also “voluntarily” pay a higher health insurance premium. This result was controlled with a Wilcoxon-Mann-Whitney Test and is significant on a 10% level of confidence.

Therefore, a labeling effect can also be determined for the health insurance premium. This effect diminishes when an additional burden by means of an education allowance exists simultaneously.

5.3 Influence of Earmarking on the Perceived Burden

It was shown above that the labeling of a contribution can change its acceptance among test persons. It is doubtful whether this effect is affected when test persons are explicitly informed of the purpose for which this contribution is to be used. The additional revenue generated by this increase in contributions should be explicitly assigned a previously determined use (earmarking). As mentioned above, a subgroup of test persons were given additional information for this purpose. Test persons in this subgroup were explicitly informed of the use of the education allowance.

The following part-worth utilities resulted for the test persons who received this additional information. For the sake of comparison the rational values as well as the results of the non-earmarking group are listed:

⁹ In order to be able to subtract the part-worth utilities for the health insurance premium from one another, we excluded the test persons who had chosen a high health insurance premium over a low health insurance premium (“reversals”). For the low education allowance (N=504), one received a part-worth utility of the low health insurance premium of 60.38%, and for the high education allowance (N=517) a part-worth utility of 64.73%. The fact that the number of reversals for a low education allowance (542-504=38) is higher than for a high education allowance (542-517=25) also supports the results.

	Part-worth Utility			Relative Significance		
	Rational	Non-Earmark	Earmark	Rational	Non-Earmark	Earmark
Income Tax high	0.00 %	1.12 %	0.76 %	20.00 %	20.86 %	21.28 %
Income Tax low	20.00 %	19.74 %	20.52 %			
Education Allowance	0.00 %	12.92 %	24.54 %	33.33 %	40.21 %	41.82 %
No Education Allowance	33.33 %	27.29 %	17.28 %			
Health Insurance high	0.00 %	1.53 %	1.38 %	46.67 %	38.93 %	36.90 %
Health Insurance low	46.67 %	37.40 %	35.67 %			

Table 9 – Part-worth Utilities and Relative Significance (Earmarking Group)

In order to test whether there is a significant difference between the distribution within the earmarking and non-earmarking groups in regard to the acceptance of the education allowance, a Wilcoxon-/Mann-Whitney-U-Test was conducted. The test showed at a level of confidence less than 0.001% that there is a significant shift in the distribution function between the two groups.

In order to illustrate the exclusive effects of earmarking on the perceived burden, it will first be shown using a linear regression model, what influence the appropriation of the education allowance has on its perceived burden. As an dependent variable we used the part-worth utility of the high education allowance. We coded membership in the earmarking group with 1 and membership in the non-earmarking group with 0. The following table displays the results of the regression:

Regression Model	Coefficient	Standard Error
Constant	0.129	0.016
Earmarking	0.116	0.023

Table 10 - Regression Earmarking Effects

The evaluation of this regression yields a constant of 12.9% and a regression coefficient of 11.6%. So the appropriation leads to an average increase in the part-worth utility of an education allowance of 11.6%.¹⁰ So the subjective burden of the education allowance is

¹⁰ This values are identical to the mean of the part-worth utilities in the non-earmarking group (12.9%) and the mean in the earmarking group (12.9%+11.6%=24.5%). The values of the regression model just illustrate this values. A t-test is not meaningful because the values for the part-worth utility does not archive the appropriate assumptions for this test.

significantly lower if the test persons were informed about the specific appropriation for the tax revenue. Therefore hypothesis H₃ is confirmed: The appropriation of a contribution has an influence on the subjective burden of this contribution. The average net burden of the contribution “education allowance” decreases further if the test persons are convinced of its validity not only through the labeling of the contribution but also through its earmarking.

In our study the effect is so strong that with earmarking the education allowance no longer presents a net burden. This is shown in Table 9: The mean value of the part-worth utilities of the high education allowance is more than 7 percentage points *higher* than the mean value of the part-worth utilities of the low education allowance. Therefore the high education allowance creates on average in the “earmarking” group a higher total utility than the low education allowance.

The following table serves to clarify how many test persons in the earmarking group (E) consciously chose the high education allowance but otherwise behaved rationally.

Ranking	Number of Test Persons (E)	Percentage of Test Persons (E)	Total Sample
Rational	62	23.13 %	142 (26.20 %)
Pro Education Allowance	33	12.31 %	47 (8.67 %)
Other	173	64.55 %	353 (65.13 %)
Sum	268	100.00 %	542 (100.00%)

Table 11 - Sequence "Pro Education Allowance" with Earmarking

If one compares these results with the values in Table 7 then it also becomes clear here that in the earmarking group strikingly more test persons chose the “pro education allowance” who otherwise chose a rational sequence (12.31%). This also confirms the hypothesis that the perceived tax burden can be decreased through the earmarking of a contribution.

Hypothesis H₃ is therefore also confirmed: In addition to the labeling of a contribution, the perceived net burden of a contribution can sink further if the contribution is earmarked for a special use which appears to be seen as especially worthwhile by numerous test persons.

5.4 Influence of Individual Attributes

In order to test to what extent demographic data can explain the results, different non parametric test methods were carried out in which the dependent variable consisted of the

part-worth utility of a levied education allowance. We differed the sample in different classes regarding the education level, age, gender, and income and tested each classes against each other for differences with respect to their part-worth utility for the high education allowance. The used test methods were the Wilcoxon-Mann-Whitney-Test for two classes comparisons and the Kruskal-Wallis-Test for testing more than two classes. The following table provides an overview of the influence factors studied:

Test classes	Test method	Results
Earmarking vs. Non-Earmarking	Wilcoxon-Mann-Whitney-Test	p<0,001***; Earmark: Mean: 12.92%; 95% Konf.: 10.1-15.75%; Non-Earmark: Mean: 24.54%; 95% Konf: 21.07-28.00%
Education level (at least University-Entrance Diploma vs. Secondary School Leaving Certificate and Lower Secondary School Leaving Certificate) ¹¹	Kruskal-Wallis-Test (and pairwise Wilcoxon-Mann-Whitney-Tests)	p=0,029**
Income level (<1000; -2000; -3000; >3000)	Kruskal-Wallis-Test	not significant
Age (<=20; -30; -40; -50; -60; >60)	Kruskal-Wallis-Test	not significant
Gender	Wilcoxon-Mann-Whitney-Test	not significant

Table 12 – Explanation of the Labeling Effect with respect to individual attributes

Other than for the attribute earmarking, no significant influence of the demographic attributes on the willingness to pay the education allowance with exception of the education level can be determined. Solely the attribute “Lower Secondary School” allows the conclusion to be drawn at a 5 % level of confidence that students at a lower secondary school tend to be less willing to voluntarily pay for education than students with at least University-Entrance Diploma.¹² We made the same tests for the dependent variable high health insurance premium, but without any significant results.

¹¹ We excluded the class “No school leaving certificate“ because of the small sample size and the class “Others” because of the lack of interpretability.

¹² This was confirmed by pairwise Wilcoxon-Mann-Whitney-Tests. Only the test between the class “at least University-Entrance Diploma” and “Lower Secondary School Leaving Certificate” shows a significant result at a 5 % level of confidence (p-value: 0.012).

6. Discussion

The purpose of this article was to test whether the name of a contribution and its earmarking can influence the perceived contribution burden of working persons. The model of a rational maximizer of consumption utility served as a reference, under which individuals attempt to avoid all contribution burdens which provide no concrete reward.

In order to test this question empirically, we applied the instrument of conjoint analysis. We polled 542 gainfully employed individuals in Germany. The task of the test persons was to rank various combinations of contributions. From these rankings we derived part-worth utilities and the relative significance of the attributes of the individual contributions, which we could then compare with part-worth utilities and the relative significance of a fictitious rational maximizer of consumption utility.

In the total sample only one-fourth of the test persons actually chose the rational behavior described by economic theory. The initial hypothesis that taxpayers always and exclusively strive to maximize their net pay and therefore their consumption potential must be rejected.

The labeling of the contribution (as “income tax,” “health insurance premium,” or “education allowance,”) and the description (earmarking) of the appropriation of the “education allowance” influence the perceived burden through this contribution. In order to distinguish the labeling effect and the earmarking effect from one another, test persons were divided into two subgroups of which only one received additional information about the allocation of revenues from the education allowance. For the group that received no additional information regarding the allocation of funds, a statistically significant and economically relevant difference could be identified between the rational and the empirically proven sequencing behavior (labeling effect). It became clear that some test persons assigned a positive part-worth utility to a high but not concretely earmarked education allowance although this is associated with a decrease in their net income. The labeling of a contribution therefore has an influence on its acceptance. A similar but also weaker effect in the same direction could be observed for the contribution “health insurance premium.”

An appropriation of the contribution “education allowance” significantly strengthened this effect. On average the test persons no longer described this contribution as a burden (negative net burden).

These results mean for tax effects research that models which predict the conformance of decisions on general fiscal conditions based on the rationality hypothesis and which fail to

take into account either the labeling or the appropriation of contributions, may lead to inaccurate predictions. If our conclusions for working persons also apply to companies is an open research question.

We think that the results found here are of great interest for future reforms to the tax and contribution systems. It was shown that not every contribution burden is perceived by taxpayers to be negative to the same extent. The labeling of a contribution and especially the definition of the use of the tax revenue generated led to an increase in the acceptance and willingness to pay among working individuals. An increase in acceptance likely also leads to diminished evasion and avoidance behavior and therefore lower transaction costs and tax collection costs.

There are numerous links between the current study and possibilities for further research. For instance, the question arises as to what extent the labeling and appropriation of individual types of contributions can also lead to negative perceptions and therefore to an increase in the perceived tax burden. It should be considered when interpreting these results that this study dealt solely with a pure preference sequence, which had no economic consequences for the test person. There is need for further research which validates these results in connection with actual monetary incentives. As previously mentioned, the potential to transfer the results for contributions that are levied on a corporate level also remains to be tested.

In conclusion, the study yields empirical findings regarding how taxpayers deviate from the model of a *homo oeconomicus* in their decision making and how this deviation can be influenced simply through the presentation of contributions. Fiscal decisions made by the taxpayers seem to be essentially determined through their subjective perception. Not only the name of a contribution but also in particular its appropriation influence the “tax satisfaction” and therefore the perceived tax burden (“windchill tax rate”).

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