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# Is the Welfare State Sustainable? Experimental Evidence on Citizens' Preferences for Redistribution

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# Is the Welfare State Sustainable? Experimental Evidence on Citizens' Preferences for Redistribution

## Abstract

The sustainability of the welfare state ultimately depends on citizens' preferences for income redistribution. They are elicited through a Discrete Choice Experiment performed in 2008 in Switzerland. Attributes are redistribution as GDP share, its uses (the unemployed, old-age pensioners, people with ill health etc.), and nationality of beneficiary. Estimated marginal willingness to pay (WTP) is positive among those who deem benefits too low, and negative otherwise. However, even those who state that government should reduce income inequality exhibit a negative WTP on average. The major finding is that estimated average WTP is maximum at 21% of GDP, clearly below the current value of 25%. Thus, the present Swiss welfare state does not appear sustainable.

JEL-Code: C35, C93, D63, H29.

Keywords: income redistribution, welfare state, sustainability, preferences, willingness to pay, discrete choice experiments.

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# 1 Introduction

The sustainability of the welfare state is a hotly debated topic between politicians and interest groups. The economists' contribution to the debate traditionally has been to analyze the effects of redistributive policies on employment, output, and growth. However, in full cognition of these effects, a majority of citizens may still exhibit willingness to pay (WTP) for more redistribution of income. Conversely, its WTP may be negative even in a situation where these side effects of redistribution are unimportant. Ultimately, the sustainability of the welfare state therefore hinges on citizens' WTP. Through a Discrete Choice experiment (DCE), this paper seeks to determine not only the desired amount of redistribution but also to test several hypotheses concerning the determinants of this WTP. The data come from a DCE performed in the fall of 2008 and involving more than 900 Swiss citizens.

Recently, there has been a great deal of research into the demand for redistribution and its determinants, which will be discussed in Section 2 below. One strand relates the measured amount of redistribution to economic, institutional, and behavioral factors. Examples are Alesina and Giuliano (2009) and Akkoyunlu, Neustadt and Zweifel (2009). However, the observed amount of redistribution is the outcome of an interaction between demand and supply, with supply governed by a country's political institutions and processes. This classical identification problem would have to be addressed in order to make inferences about citizens' preferences for redistribution. A second strand of research, exemplified by Alesina and La Ferrara (2005) and Guillaud (2008), relies on surveys designed to measure attitudes towards redistribution. The problem with this approach is its failure to impose a budget constraint. It therefore cannot predict actual decision making (e.g. voting at the polls), where citizens take the consequences in terms of their own income and wealth into account. A third approach seeks to solve this problem through Contingent Valuation (CV) experiments [see e.g. Boeri et al. (2001)<sup>1</sup>, Boeri, Boersch-Supan and Tabellini (2002)].

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<sup>1</sup>Boeri et al. (2001) study international attitudes towards redistribution with a focus on pension and unemployment schemes in France, Germany, Italy, and Spain. They also perform CV experiments that

The weakness of the CV approach is that it holds all the attributes of the good in question constant, varying its price only. One would want to vary other attributes of redistribution besides its tax price, viz. its uses (for health, old age, etc.) and the type of beneficiary (foreigner, national).

By way of contrast, a DCE allows to measure preferences uncontaminated by supply influences, it imposes the budget constraint through the price attribute, and it does so in a realistic way by making respondents choose between alternatives where all attributes are allowed to vary.

There are two contributions whose methodology is similar to the one adopted in this paper. One is by Andreoni and Miller (2002), who test the consistency of altruistic revealed preferences in a dictatorship experiment, varying an implicit price. Their method of inferring preferences through estimating WTP values is close to this paper. The other is by Kuhn (2005), who asked Swiss respondents to estimate wages earned by different professions as well as to indicate the wages they deemed fair. The difference between these two values was then used as an indicator of the demand for redistribution. On average, preferences were for the wages of high-earning professions such as lawyers, physicians, and federal ministers to be reduced by 10 percent while those of low-income groups, to be increased by some 5 percent. Interestingly, such a redistributive scheme would roughly result in budget balance.

The remainder of this paper is structured as follows. Section 2 contains a literature review from which hypotheses to be tested are derived. Its first part concerns general determinants of the demand for redistribution and the second, attitudes towards reduction of inequality as determinants of preferences for redistribution. Section 3 presents a general description of the method of DCEs as well as the design of the present experiment. The descriptive statistics of the experiment follow in Section 4, and hypothesis tests, in Section 5. Section 6 summarizes the results and concludes with an assessment of the sustainability

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impose an explicit trade-off between income and social insurance coverage on respondents. They find that people oppose an extension of the welfare state, with conflicts between young and old, rich and poor, and insiders and outsiders creating significant hurdles to welfare reform.

of the Swiss welfare state.

## 2 Literature Review and Statement of Hypotheses

This section first presents research that defines the general background of this paper and then moves on to contributions that lead to a set of specific hypotheses to be tested.

### 2.1 General Determinants of the Demand for Income Redistribution

In their reviews, Alesina and Giuliano (2009) and Akkoyunlu et al. (2009) identify a wide set of factors that can be categorized as economic, political, and behavioral determinants of the demand for income redistribution.

#### 2.1.1 Economic Determinants

The simplest framework for the analysis of purely economic determinants is provided by a model focusing on current economic well-being, originally proposed by Romer (1975) and Roberts (1977) and extended by Meltzer and Richard (1981) [RRMR model]. This model assumes non-altruistic utility-maximizing individuals differentiated by their income levels only. The government pays a lump-sum transfer to all citizens, financed by a linear uniform income tax. Individuals with an income below the mean favor taxation and transfers while those with an income above the mean oppose it. In a political equilibrium, the majority of voters supports a positive tax rate corresponding to the value desired by the median voter<sup>2</sup>. The model's prediction is that the larger the gap between the mean and the median income, the higher the level of taxation and redistribution.

The empirical evidence is quite mixed. On the one hand, Alesina and Rodrik (1994), Persson and Tabellini (1994), and Milanovic (2000) find some supporting evidence. Fur-

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<sup>2</sup>The median voter's income is assumed to be below the mean. This assumption is satisfied for most economies.

thermore, Guillaud (2008), conducting a cross-section analysis of survey data from four EU countries, shows that poorer and less educated individuals are more in favor of redistribution. On the other hand, Alesina and Glaeser (2004), Perotti (1996), and Rodriguez (1999) fail to find supporting evidence for this model. Moreover, Neustadt and Zweifel (2009) relate willingness to pay (WTP) for income redistribution elicited from a Discrete Choice Experiment (DCE, see Section 3.1 for details) to measures of economic well-being. WTP values are negatively related to income and education, contradicting the RRMR model.

Another economic explanation is the "Prospect of Upward Mobility" (POUM) hypothesis, suggested by Hirschman and Rothschild (1973) as the 'tunnel effect' and more recently reformulated by Benabou and Ok (2001). It extends the RRMR model by introducing individuals' expectations, based on their observations regarding the income mobility of others in society. Expected upward mobility may dampen a poor but forward-looking voter's enthusiasm for income redistribution.

Empirical support of the POUM hypothesis is provided by Alesina and La Ferrara (2005) who, using an actual mobility matrix for the United States, show that people who can expect high future income oppose redistribution<sup>3</sup>. Rainer and Siedler (2008) use probabilistic expectations data to show that individuals with a sufficiently large chance of occupational upward mobility exhibit a lower demand for redistribution; conversely, those with a sufficiently large risk of occupational downward mobility opt for more redistribution. Checchi and Filippin (2004), testing the POUM hypothesis by means of a within-subjects experiment, find corroborating evidence under several alternative specifications. According to Guillaud (2008), however, individuals who subjectively experienced upward mobility over ten years tend to be more (rather than less) supportive of redistributive poli-

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<sup>3</sup>The 'tunnel effect' also works in the opposite direction, causing forward-looking agents with high incomes but downward mobility expectations to be in favor of redistribution. This prediction is confirmed by Ravallion and Lokshin (2000) using a data set from Russia. Furthermore, Molnár and Kapitány (2006a; 2006b) show that individuals who lack clear expectations about their future income favor redistribution even more than those with negative but clear expectations.

cies. Moreover, upward intergenerational mobility in occupational prestige goes along with more positive rather than negative attitude towards redistribution. Alesina and Giuliano (2009) examine the empirical evidence for the United States and briefly across countries, concluding that social mobility (if measured as the change in the occupational prestige) does decrease demand for redistribution once sociodemographic (age, gender, race) and socioeconomic characteristics (income, education) are controlled for. In their DCE-based study, Neustadt and Zweifel (2009) relate preferences for redistribution to mobility. They find partial empirical support for the POUM hypothesis.

Another economic explanation, suggested by the social contract literature, is that preferences for redistribution can at least in part be interpreted as a demand for insurance by risk-averse individuals. In a hypothetical situation, where individuals do not yet know their endowment as well as their future position in society ['veil of ignorance', cf. Rawls (1999)], they are predicted to exhibit positive WTP for an income transfer from more favorable future states to less favorable ones. Redistributive policies can thus be interpreted as reflecting this hypothetical demand for insurance. Beck (1994) investigates individual behavior under the 'veil of ignorance' in an experiment. By placing participants in a hypothetical society with random differences in income, represented by lotteries, he is able to derive the desired amount of income redistribution. Individuals indeed display risk aversion, albeit not of the extreme kind implied by the Rawlsian maximin rule<sup>4</sup>. Furthermore, they show no preference for income redistribution in excess of what can be explained by risk aversion.

### **2.1.2 Political Determinants**

As to the political determinants of the demand for income redistribution, the literature [Persson and Tabellini (2000; 2003); Lizzeri and Persico (2001); Milesi-Ferretti et al. (2002)] predicts that proportional representation tends towards universal programs benefitting various groups (old-age pensioners, working poor, minorities, etc.), while majority rule results

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<sup>4</sup>The Rawlsian maximin rule uses the maximum improvement of the individual with minimum initial wealth as the sole criterion.



in targeted "pork barrel" programs. Persson and Tabellini (2003) find supporting empirical evidence in that countries with proportional representation have GDP shares of government expenditure that *ceteris paribus* are 5 percentage points higher than countries with majority rule. Moreover, Akkoyunlu et al. (2009) present weak evidence of a positive correlation between the degree of proportional representation and the transfer share in GDP in OECD countries. Additional political determinants of redistribution include two-party vs. multiparty system, presidential vs. parliamentary democracy, and direct vs. representative democracy, with two-party systems, presidential, and direct democracies all predicted to induce less public redistribution. In order to sketch the institutional background of the DCE described in Section 3.2, Switzerland can be described as follows. It has a high degree of proportional representation and a parliamentary democracy. Its distinguishing feature, however, is its extensive direct democratic control in the guise of popular initiatives and referenda. This might serve to limit public welfare spending while enforcing efficiency in redistribution [cf. Feld et al. (2007)].

### **2.1.3 Behavioral Determinants**

The mixed empirical evidence bearing on the economic determinants of preferences for redistribution calls for a detailed analysis of their behavioral determinants. In particular, beliefs have been at the center of attention. The theoretical base is laid by Alesina and Angeletos (2005), who develop a model where society's belief whether effort or luck determines economic success gives rise to multiple self-fulfilling equilibria. Benabou and Tirole (2006) propose a model for the emergence and persistence of such collective beliefs. Moreover, beliefs can be seen as a source of altruistic preferences and inequality aversion [see Section 2.2]. On the empirical side, Fong (2001) presents evidence in line with Alesina and La Ferrara (2005) suggesting that beliefs about the role of luck in determining economic success are an important determinant of the demand for redistribution. She also considers the effects of incentives. If effort determines income, then an increased income tax rate causes an output loss due to its effect on incentives. This consideration is hypothesized to

qualify the link between beliefs and the demand for redistribution. However, the data fail to support this hypothesis.

## 2.2 Attitudes towards Reduction of Inequality and Demand for Income Redistribution

While the POUM hypothesis suggests less redistribution than predicted by the RRMR model, the assumption of altruistic preferences can lead to the opposite prediction. In fact, if individuals care also about the utility of others, one might expect more redistribution than predicted by the conventional RRMR model. Fehr and Schmidt (2006) provide a review of several models of social preferences, in particular, altruism, envy, inequality aversion, fairness, and reciprocity. Here, we focus on inequality aversion to derive hypotheses relating it to demand for income redistribution. In a simple model of inequality aversion, Fehr and Schmidt (1999)] assume that individuals feel envy if their incomes are below that of others (disadvantageous inequality, see second term of eq. (1)), but they feel altruistic when their income exceeds it (advantageous inequality, see third term of eq. (1)). An individual  $i$ 's utility function is assumed to have the form

$$U_i(x_1, \dots, x_N) = x_i - \frac{\alpha_i}{N-1} \sum_{j \neq i} \max\{x_j - x_i, 0\} - \frac{\beta_i}{N-1} \sum_{j \neq i} \max\{x_i - x_j, 0\} \quad (1)$$

with  $0 \leq \beta_i \leq \alpha_i$  (the disutility from disadvantageous inequality is assumed to exceed that from advantageous inequality) and  $\beta_i \leq 1$  (individuals are not willing to waste money in order to avoid being significantly richer than others). Here  $x_k$ ,  $k = 1, \dots, N$ , denotes individual  $k$ 's income,  $\alpha_i$ , the marginal disutility from disadvantageous inequality, and  $\beta_i$ , the marginal disutility from advantageous inequality. In this model, the decisive median voter demands more redistribution than in the conventional RRMR model. First, she has disutility from being richer than those with income  $x_j < x_i$ . Second, she has even more disutility from being poorer than those with income  $x_j > x_i$ . Thus, in a political equilibrium, larger values of  $\alpha_i$ ,  $\beta_i$  (higher level of inequality aversion) lead to a higher demand for redistribution compared to that predicted by the RRMR model.

Based on the assumption of inequality aversion, we formulate two hypotheses to be tested in Section 5.2. The first assumes that citizens with higher inequality aversion tend to deem the current level of social benefits to be too low, while those with lower inequality aversion deem it too high or just sufficient. Thus, the former are predicted to exhibit a positive WTP for redistribution while the latter, a negative one. The second hypothesis is based on the consideration that voters exhibiting inequality aversion tend to support the view that the government should reduce the income gap between rich and poor. Consequently, respondents who state that the reduction of the income gap is a task of the government are expected to exhibit a positive WTP for redistribution.

HYPOTHESIS 1: *Willingness to pay for redistribution is expected to be*

- (A) ***negative** if the currently provided level of social benefits is considered **too high**,*
- (B) ***negative but less so than in** (A) if the currently provided level of social benefits is considered to be **just sufficient**,*
- (C) ***positive** if the currently provided level of social benefits is considered **too low**.*

HYPOTHESIS 2: *Willingness to pay for redistribution is expected to be*

- (a) ***negative** if the individual thinks that the government **should not** reduce the income gap between the poor and the rich,*
- (b) ***positive** if the individual thinks that the government **should** reduce the income gap between the poor and the rich.*

## 3 Discrete Choice Experiments

### 3.1 Theoretical Foundations

Discrete Choice Experiments (DCEs) provide a tool for measuring individuals' preferences for characteristics of commodities, the so-called attributes. In contradistinction to classical

Revealed Preference Theory, originating with Samuelson (1938), DCEs allow individuals to express their preferences for non-marketed as well as hypothetical products. During a DCE, respondents are repeatedly asked to compare the status quo with several hypothetical alternatives defined by their attributes including a price. By varying the levels of attributes, different product alternatives are generated. A rational individual will always choose the alternative with the highest utility. From the observed choices, the researcher can infer the utility associated with the attributes. The proposed method, derived from the New Demand Theory of Lancaster (1971), is also known as Conjoint Analysis [Louviere, Hensher and Swait (2000)].

The most prominent alternative to a DCE is Contingent Valuation (CV). A certain situation or product is described in detail, and respondents are asked to indicate their maximum willingness to pay (WTP) for this fixed product. Only its price attribute is varied, while in Conjoint Analysis all relevant attributes are varied simultaneously, making it a multi-attribute valuation method [Merino-Castello (2003)]. While a DCE describes the product in less detail than a typical CV study, it allows for analyzing many product varieties by varying the levels of relevant attributes [Louviere et al. (2000), p. 344]. Trade-offs among attributes can be explicitly taken into account and WTP values of attributes estimated separately (see below). Furthermore, strategic behavior of respondents is less likely than in CV with its exclusive emphasis on price, which facilitates strategic behavior. Finally, biases that easily occur when individuals are directly asked about their WTP are less frequently observed in a DCE [Ryan (2004)].

A particular advantage of a DCE in the present context is that it permits to explicitly impose the budget constraint through a price attribute in the guise of the tax share of income used to finance the transfers considered. Respondents can be made to simultaneously choose this share and hence the 'size of the pie' and the 'slices of the pie' devoted to different types of recipients and uses (health, old age, etc.; see Exhibits No. 1 to 3 in Appendix). Thus, trade-offs among different attributes of the redistribution plan can be calculated to assess the relative importance of the respective redistributive goals.

The econometric method used is based on the Random Utility Theory [see Luce (1959),

Manski and Lerman (1977) and McFadden (1974; 1981; 2001)]. Individual  $i$  values alternative  $j$  according to the utility  $V_{ij}$  attained, which is given by

$$V_{ij} = v_i(a_j, p_j, y_i, s_i, \varepsilon_{ij}). \quad (2)$$

Here,  $v_i(\cdot)$  denotes  $i$ 's indirect utility function,  $a_j$ , the amount of attributes associated with alternative  $j$ , and  $p_j$ , price. The individual's income and sociodemographic characteristics are symbolized by  $y_i$  and  $s_i$ , respectively. Finally,  $\varepsilon_{ij}$  denotes the error term, which is due to the fact that the experimenter will never observe all the arguments entering  $v_i$ , imparting a stochastic element to observed choices. As usual, the utility function is additively split into a systematic component  $w(\cdot)$  and a stochastic one,

$$V_{ij} = w_i(a_j, p_j, y_i, s_i) + \varepsilon_{ij}.$$

A utility-maximizing individual  $i$  will prefer alternative  $j$  to alternative  $l$  if and only if

$$w_i(a_l, p_l, y_i, s_i) + \varepsilon_{il} \leq w_i(a_j, p_j, y_i, s_i) + \varepsilon_{ij}. \quad (3)$$

Due to the presence of the stochastic term, only the probability  $P_{ij}$  of individual  $i$  choosing alternative  $j$  rather than alternative  $l$  can be estimated, with

$$P_{ij} = \text{Prob}[w_i(a_l, p_l, y_i, s_i) + \varepsilon_{il} \leq w_i(a_j, p_j, y_i, s_i) + \varepsilon_{ij}] \quad (4)$$

$$= \text{Prob}[\varepsilon_{il} - \varepsilon_{ij} \leq w_i(a_j, p_j, y_i, s_i) - w_i(a_l, p_l, y_i, s_i)]. \quad (5)$$

Thus, the probability of choosing  $j$  amounts to the probability of the systematic utility difference  $w_i[j] - w_i[l]$  dominating the 'noise',  $\varepsilon_{il} - \varepsilon_{ij}$ . By the central limit theorem, the error terms  $\{\varepsilon_{il}, \varepsilon_{ij}\}$  can be assumed to be normally distributed with mean zero and variances  $\sigma_l^2$  and  $\sigma_j^2$  as well as covariance  $\sigma_{lj}$ . Under these assumptions,  $\varphi_{ij} := \varepsilon_{il} - \varepsilon_{ij}$  is also normally distributed with mean zero and variance  $\sigma^2 := \text{Var}[\varphi_{ij}] = \sigma_l^2 + \sigma_j^2 - 2\sigma_{lj}$ .

Thus, equation (5) can be represented as

$$P_{ij} = \Phi\left(\frac{w_i(a_j, p_j, y_i, s_i) - w_i(a_l, p_l, y_i, s_i)}{\sigma}\right), \quad (6)$$

where  $\Phi(\cdot)$  denotes the cdf of a standard normal distribution. This model is known as the binary probit model [cf. Ben-Akiva and Lerman (1985)]. Hensher, Louviere and Swait

(1999) provide empirical evidence that a linear specification of the function  $w(\cdot)$  leads to good predictions in its middle ranges. Therefore, in the case of the simple model that relates utilities and choice probabilities to the attributes only (see Section 5.1), one posits

$$w_i(a_j, p_j, y_i, s_i) = c_i + \sum_{k=1}^K \beta_k a_{kj} + \varepsilon_{ij}, \quad (7)$$

where  $c_i$  represents an individual-specific constant,  $a_k$ ,  $k = 1, \dots, K$ , are the attributes of the alternative, and  $\beta_k$ ,  $k = 1, \dots, K$ , are the parameters to be estimated. These parameters can be interpreted as the constant marginal utilities of the corresponding attributes. One obtains the following expression representing the difference in utility of individual  $i$  between alternative  $j$  and status quo,

$$\Delta V_{ij} = c_i + \sum_{k=1}^K \beta_k \Delta a_{kj} + \beta_p \Delta p_j + \varphi_{ij}, \quad (8)$$

where  $\Delta a_{kj} = a_{kj} - a_{lj}$ ,  $\Delta p_j = p_j - p_l$ ,  $c_i = c_{il} - c_{ij}$ , and  $\varphi_{ij} = \varepsilon_{il} - \varepsilon_{ij}$  for each  $j \neq l$ . The marginal rate of substitution between two attributes  $m$  and  $n$  is given by

$$\text{MRS}_{m,n} = -\frac{\partial v / \partial a_m}{\partial v / \partial a_n}. \quad (9)$$

Therefore, the marginal WTP for attribute  $a_m$  can be calculated by dividing the marginal utility of this attribute by the marginal utility of the price attribute [in the present context, the income tax rate, see e.g. Telser (2002), p. 56]<sup>5</sup>:

$$\text{MWTP}(a_m) = \frac{\partial v / \partial a_m}{\partial v / \partial p_j}. \quad (10)$$

For econometric inference, it is important to recall that the same individual makes several choices. The two-way random-effect specification takes this into account with  $\varphi_{ij} =$

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<sup>5</sup>By Roy's Identity,  $x_{ij} = -\frac{\partial v(\cdot) / \partial p_j}{\partial v(\cdot) / \partial y_i}$ , the (uncompensated) demand of individual  $i$  for commodity  $j$  corresponds to the negative ratio of partial derivatives of the indirect utility function with respect to price  $p_j$  and income  $y_i$ . If one alternative is chosen, then the optimal quantity demanded is equal to one, i.e.  $x_{ij} = 1$ . Therefore, Roy's Identity yields  $\frac{\partial v}{\partial y_i} = -\frac{\partial v}{\partial p_j}$ , i.e. the marginal utility of income is equal to the negative derivative of the indirect utility function with respect to price.

$\mu_i + \eta_{ij}$ , where  $\mu_i$  denotes the component that varies only across individuals but not across the choice alternatives. The terms  $\mu_i$  and  $\eta_{ij}$  are assumed uncorrelated with the product attributes  $(a_{i1}, \dots, a_{iK})$  and between themselves. By a standard assumption in a probit model,  $\sigma_\eta = 1$ . Hence  $\text{Var}[\varphi_{ij}] = \sigma_\eta^2 + \sigma_\mu^2 = 1 + \sigma_\mu^2$  and  $\text{Corr}[\varphi_{ij}, \varphi_{il}] = \frac{\sigma_\mu^2}{1 + \sigma_\mu^2} =: \rho$ . The parameter  $\rho$  indicates how strongly the various responses of an individual are correlated with each other, or, equivalently, the share of the total variance that can be explained by individual-specific error term. The random-effects specification is justified if  $\rho$  is high and significant.

The simple model can be extended by including various socioeconomic variables (e.g. income group, level of education, social mobility). These variables need to be interacted with the product attributes as well as with the constant, giving rise to the extended model specification which allows to check for preference heterogeneity and thus to test Hypotheses 1 and 2 in Section 5.2. By means of a  $t$  test we can investigate whether the differences in marginal WTP values between different socioeconomic groups are statistically significant. The computation of the variance of the marginal WTP values is performed by the delta method, cf. Hole (2007)<sup>6</sup>.

### 3.2 Experimental Design

The experiment was conducted with a representative sample of 979 respondents in the fall of 2008. Initially, the respondents were provided with full decision sets including graphical representations of the status quo and alternatives and were asked to submit their binary choices during a telephone survey. In order to make sure that decisions were based on a homogeneous information set and made in a consistent way, the respondents additionally received a detailed description of the attributes and their possible realizations. The Ap-

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<sup>6</sup>The estimate of the variance is given by

$$\text{Var} \left[ -\frac{\hat{\beta}_k}{\hat{\beta}_p} \right] = \frac{1}{\hat{\beta}_p^2} \text{Var}[\hat{\beta}_k] + \frac{\hat{\beta}_k^2}{\hat{\beta}_p^4} \text{Var}[\hat{\beta}_p] + 2 \frac{\hat{\beta}_k}{\hat{\beta}_p^3} \text{Cov}[\hat{\beta}_k, \hat{\beta}_p]$$

Attribute	Label	Status Quo Level	Alternative Levels
Shares of benefits going to			
• Working Poor	W_POOR	10%	5%, 15%
• Unemployed	UNEMP	15%	5%, 25%
• Old-Age Pensioners	PENS	45%	35%, 55%
• Families with Children	FAM	5%	10%
• People with Ill Health	ILL	25%	20%, 30%
Shares of benefits going to			
• Swiss citizens	SWISS	75%	60%, 85%
• Western European foreigners	WEU_FOR	10%	5%, 20%
• Other foreigners	OTH_FOR	15%	10%, 20%
Total amount of redistribution	REDIST	25% (of GDP)	10%, 20%, 30%, 40%, 50%
Income tax	TAX	25% (of personal income)	10%, 15%, 40%

Table 1: Attributes and their levels

pendix shows the graphical representation of the status quo (Exhibit 1) and two selected alternatives (Exhibits 2 and 3). The data collection followed in a telephone survey some days later and additionally included a questionnaire covering a wide range of socioeconomic and behavioral characteristics of the respondents.

Prior to the experiment, the attributes and their levels used to define 'income redistribution' had been checked in two pretests for their relevance. Attributes form four groups (see Table 1).

1. Shares of the total redistribution budget to be spent on five types of recipients (viz. the working poor, the unemployed, old-age pensioners, families with children, and people with ill health);
2. Shares of the total redistribution budget to be spent on three groups (viz. Swiss citizens, western European foreigners, and other foreigners);
3. Total amount of redistribution, defined as a share of GDP;
4. Personal income tax rate to be paid by the respondent (the price attribute).



Clearly, these attributes and their levels combine to form a total number of possible scenarios that cannot be realized in an experiment. The scenarios define the  $n$  rows of the observation matrix  $X$ , with associated covariance matrix  $\Omega = \sigma^2 (X'X)^{-1}$  of parameters  $\beta$  to be estimated. So-called  $D$ -efficient design calls for the minimization of the geometric mean of the eigenvalues of  $\Omega$ ,

$$D \text{ efficiency} = \left( |\Omega|^{\frac{1}{K}} \right)^{-1}$$

where  $K$  denotes the number of parameters to be estimated [cf. Carlsson and Martinsson (2003)]. Using this optimization procedure and incorporating several restrictions, the number of alternatives was reduced to 35 and randomly split into five groups. One alternative was included twice in each decision set for a consistency test, resulting in 8 binary choices per respondent.

## 4 Descriptive Statistics

### 4.1 Socioeconomic Characteristics

Income group, CHF <sup>a</sup>	too little		right amount		too much		total valid answers		missing
	No.	%	No.	%	No.	%	No.	%	No.
< CHF 2000	63	35	100	56	16	9	179	100	13
CHF 2000 - 3999	58	32	94	53	27	15	179	100	14
CHF 4000 - 5999	141	43	149	45	39	12	329	100	15
≥ CHF 6000	79	37	118	56	14	7	211	100	10
Missing	11		16		1		28		
Total answers	352	38	477	52	97	10	926		53

<sup>a</sup>1 CHF (Swiss franc) = 0.8 US\$ at 2008 exchange rates

Table 2: Answers to the question "Do you think that the government is spending too much, too little or about the right amount on welfare?" by income group

The sample consists of 979 respondents, 70 percent of them residing in the German-speaking part and 30 percent in the French-speaking part of Switzerland. Some 94 percent

Income group, CHF <sup>a</sup>	yes		no		total valid answers		missing
	No.	%	No.	%	No.	%	No.
< CHF 2000	78	42	108	58	186	100	6
CHF 2000 - 3999	112	59	77	41	189	100	4
CHF 4000 - 5999	124	37	212	63	336	100	8
≥CHF 6000	90	42	122	58	212	100	9
Missing	13		16		29		
Total answers	417	45	535	55	952		27

<sup>a</sup>1 CHF (Swiss franc) = 0.8 US\$ at 2008 exchange rates

Table 3: Answers to the question "Do you agree with the following statement: *'By increasing the income tax rates for rich families and financially supporting poor families, the government should try to reduce the income gap between the rich and the poor?'*" by income group

are born in the country, 50 percent are men, 20 percent having a monthly income below CHF 2,000 and 23 percent, above CHF 6,000, reflecting the structure of the Swiss population. However, only 1.5 percent of the respondents are unemployed.

38 percent of the respondents stated that the current level of social benefits was too low, 10 percent stated that it was too high, and 52 percent found it exactly right [see Table 2]. On the other hand, 45 percent of the respondents agreed with the statement, 'By increasing the income tax rates for rich families and financially supporting poor families, the government should try to reduce the income gap between the rich and the poor', while 55 percent disagreed [see Table 3].

The distribution of answers over income groups of the respondents is obviously in contradiction with the RRMR model. For instance, 35% of respondents with monthly incomes below CHF 2,000 (the 'poor') deem the current amount of social benefits too low, but this holds true for even 37% of those with incomes above CHF 6,000 (the 'rich') [see Table 2]. Similarly, the percentage of those finding the current size of the welfare state excessive is 9% among the 'poor' but only 7% among the 'rich'. Moreover, the

	yes		no		total valid answers		missing
	No.	%	No.	%	No.	%	No.
insurance	164	33	339	67	503	100	10
inequality reduction	219	55	181	45	400	100	13
Missing	34		15		49		
Total answers	417	45	535	55	952		27

<sup>a</sup>1 CHF (Swiss franc) = 0.8 US\$ at 2008 exchange rates

Table 4: Answers to the questions "Do you agree with the following statement: *'By increasing the income tax rates for rich families and financially supporting poor families, the government should try to reduce the income gap between the rich and the poor?'*" and "What is your main motive for redistribution: insurance or inequality reduction?"

share of those supporting a reduction of the income gap by public redistribution is 42% both among the 'rich' and the 'poor' [see Table 3]. Obviously, beliefs do not correlate with income. On the other hand, they may reflect inequality aversion. These findings motivate examining explanations of the demand for income redistribution based on beliefs and inequality aversion. However, as noted in Section 2.1, inequality aversion could be due to risk aversion in front of the 'veil of ignorance'. Indeed, 56 percent of the respondents state 'insurance' as their main motive for redistribution, compared to 44 percent of those with the 'inequality reduction' motive [see Table 4]. Attitudes clearly differ between the two groups, too. Only one-third of respondents with the 'insurance' motivation support the idea of inequality reduction to be provided by government, compared to 55% of those with the 'inequality reduction' motivation. In sum, 'true' inequality aversion in the sense of Fehr and Schmidt (1999) may well be relevant, at least in the present sample.

## 4.2 Respondents' Choice Behavior

There is a total of  $979 \cdot 8 = 7,832$  decisions, of which not quite 20 percent were made in favor of an alternative over the status quo [see Table 5]. There are at least three explanations for this low percentage. First, in spite of checking in the pretests, the levels of the attributes

in the experiment may not have been sufficiently spaced apart to make respondents switch. Second, some attributes (e.g. benefits going to the unemployed; see Table 7), may not have been important enough to cause a switch. Finally, there may be errors in decision making because the consistency test revealed 14 percent of choices to be inconsistent. However, there may simply be marked status quo bias in the face of highly complex decision-making situations, as suggested by the large negative constant in Table 7. Nonetheless, only 21 percent of respondents never opted for an alternative [see Table 5]. Conversely, almost 80 percent departed from the status quo at least once.

Choices	No.	in percent
for alternative	1,562	19.94
for status quo	6,088	77.73
No decision	182	2.32
Total	7,832	100

Table 5: Total number of choices

# choices for alternative	No.	in percent
0	209	21.35
1	309	31.56
2	226	23.08
3	131	13.38
4	57	5.82
5	16	1.63
6	10	1.02
7	0	0.00
8	5	0.51
Total valid answers	965	98.57
Missing	14	1.43
Sample	979	100

Table 6: Distribution of the number of chosen alternatives per respondent

## 5 Estimation Results

### 5.1 Simple Model: Product Attributes Only

Estimation of equation (8) includes REDIST<sup>2</sup> to allow for a possible nonlinearity of the indirect utility function with regard to the GDP share of redistribution REDIST. Moreover, the fact that uses and types of beneficiaries add up to 100 percent needs to be taken into account [see Table 1]. In order to avoid perfect collinearity, PENS (Pensioners) and OTH\_FOR (Other foreigners) were dropped to obtain

$$\begin{aligned}\Delta V = & c_0 + \beta_1 W\_POOR + \beta_2 UNEMP + \beta_3 ILL + \beta_4 FAM + \\ & + \gamma_1 SWISS + \gamma_2 WEU\_FOR + \\ & + \delta_1 REDIST + \delta_2 REDIST^2 + \eta TAX + \varphi\end{aligned}\tag{11}$$

Estimation of a few of the  $5 \cdot 3 = 15$  specifications with alternative exclusions produced results similar to those displayed in Table 7. Specifically, they agree in that alternatives with additional redistribution are chosen with a lower probability [for details with regard to 'slices' of the pie, see Neustadt and Zweifel (2010)]. Also, note the sizeable and highly significant coefficient of the price attribute TAX, which is important for the estimation of marginal willingness-to-pay (MWTP) values [see eq. (10)]. For redistribution, the MWTP value is given by

$$MWTP_{REDIST} = \frac{\partial \Delta V / \partial REDIST}{\partial \Delta V / \partial TAX} = -\frac{\delta_1 + 2\delta_2 REDIST}{\eta}\tag{12}$$

This amounts to -0.25 percentage points of income share per additional percentage point of GDP devoted to redistribution in excess of the status quo. Evaluated at the mean personal income of the sample, this equals CHF -11.78 per month. However, this figure is dwarfed by the compensation one would have to pay respondents to depart from the status quo, amounting to an estimated 63 percent of their monthly income, or 5.27 percent of their annual income [see the large negative constant in Table 7].

Equation (12) serves as the basis for checking the sustainability of the welfare state. Construction of the (quadratic) WTP function yields a maximum (with MWTP=0) at

Variable	Coeff.	Std. err.	$z$	$P >  z $	Marg. eff.
<b>Recipients' Social Group</b>					
W_POOR	0.02784	0.00714	3.90	0.000	0.00697
UNEMP	0.01134	0.00452	2.51	0.012	0.00284
ILL	0.01600	0.00463	3.46	0.001	0.00400
FAM	0.06378	0.00942	6.77	0.000	0.01596
<b>Recipient's Nationality</b>					
SWISS	0.03656	0.00552	6.63	0.000	0.00915
WEU_FOR	0.02925	0.00869	3.37	0.001	0.00732
REDIST	-0.00523	0.00176	-2.97	0.003	-0.00131
REDIST <sup>2</sup>	-0.06619	0.01174	-5.64	0.000	-0.01656
TAX	-0.02053	0.00183	-11.21	0.000	-0.00514
CONSTANT	-1.29878	0.06132	-21.18	0.000	n.a.

# observations	7,650
Log likelihood	-3,566.76
$\chi^2(0)$	108.87
Prob > $\chi^2$	0.000
$\sigma_u$	0.41610
$\rho$	0.14759

Table 7: Random effects probit estimates for the simple model

21.05% of GDP, definitely below the current value of 25%. Therefore, the Swiss welfare state can be said to be too big in the light of average citizens' preferences.

## 5.2 Extended Model: Preference Heterogeneity

### 5.2.1 Ex-Ante Evaluation of the Current Level of Social Benefits and Preferences for Redistribution

The simple model is now extended by one attitudinal variable at a time. The first is respondents' ex-ante evaluation of the current level of social benefits [SB, see Table 2]. The three levels of SB are represented by two dummy variables, SB\_TOOHI and SB\_TOLOW.

For instance, the latter is defined as

$$\text{SB\_TOOLOW} = \begin{cases} 1 & \text{if the current level of benefits is deemed too low} \\ 0 & \text{otherwise.} \end{cases}$$

The reference category is SB\_RIGHT, indicating that the respondent deemed social benefits to have the right size. Since an attribute's marginal utility may vary with attitude, eg. (11) is modified to also contain interaction terms involving the attitudinal variables, resulting in

$$\begin{aligned} \Delta V' = & c'_0 + \dots + \alpha'_1 \text{SB\_TOOLOW} + \dots + \alpha'_2 \text{REDIST} + \alpha'_3 \text{REDIST}^2 + \dots \\ & + \lambda'_2 \text{REDIST} \cdot \text{SB\_TOOLOW} + \lambda'_3 \text{REDIST}^2 \cdot \text{SB\_TOOLOW} + \dots \quad (13) \\ & + \lambda'_4 \text{REDIST} \cdot \text{SB\_TOOHI} + \lambda'_5 \text{REDIST}^2 \cdot \text{SB\_TOOHI} + \varphi'. \end{aligned}$$

	exp. sign	MWTP, % of income	MWTP, CHF	s.e., CHF	
Social benefits too high (Group A)	-	-0.55946	-26.75	16.70	***
The right amount (Group B)	≈0	-0.41789	-19.61	8.34	***
Social benefits too low (Group C)	+	0.05487	2.47	8.09	

Note: \*\*\* denotes statistical significance of MWTP in % of income at the 1 percent level.

Table 8: Marginal WTP values for redistribution (in percent of monthly personal income and CHF) derived from the extended model with ex-ante evaluation of the current level of social benefits

Hypothesis 1(A) states that the demand for redistribution is expected to be negative if the currently provided level of social benefits is considered too high. It is confirmed, with the MWTP for one percentage point increase of the total amount of redistribution being a negative CHF -26.75 [see Table 8]. Hypothesis 1(C), stating that the demand for redistribution should be positive if the level of social benefits is considered insufficient, finds some empirical support by a positive but insignificant MWTP value of CHF 2.47. However, Hypothesis 1(B), predicting the demand for redistribution to be negative but

close to zero for individuals who deem the current level of benefits just sufficient, cannot be confirmed. In fact, the average respondent in this group exhibits a significantly negative MWTP for redistribution of CHF -19.61 per month. A  $t$  test indicates that the difference in MWTP values between respondent groups A and B is not significant, again contradicting Hypothesis 1(B).

As a check on the sustainability of the welfare state in the face of preference heterogeneity, group-specific WTP functions are constructed. Group A is found to have their maximum WTP at a GDP share of 15.89% devoted to redistribution. The values of Groups B and C are 18.45% and 25.52% of GDP, respectively. Therefore, attitudes with regard to the amount of social benefits do go along with heterogeneous preferences with regard to income redistribution. These discrepancies point to sharp conflicts of interest in the event that the amount of redistribution were to be reduced to the value preferred by the average citizen.

### 5.2.2 Assessment of the Government's Role in Dealing with Inequality and Preferences for Redistribution

Next, the simple model is extended by including the dummy variable GOV\_REDUCE (=1 if the respondent thinks that the government should reduce the income gap between the rich and the poor, =0 otherwise) as well as its interactions with the attributes. Thus, eq. (11) is modified to read,

$$\begin{aligned} \Delta V'' = & c_0'' + \dots + \alpha_1'' \text{GOV\_REDUCE} + \dots + \alpha_2'' \text{REDIST} + \\ & + \alpha_3'' \text{REDIST}^2 + \dots + \kappa_2'' \text{REDIST} \cdot \text{GOV\_REDUCE} + \\ & + \kappa_3'' \text{REDIST}^2 \cdot \text{GOV\_REDUCE} + \dots + \varphi'' \end{aligned} \quad (14)$$

Hypothesis 2(a) states that the demand for redistribution is expected to be negative if a respondent believes that the government should not reduce the income gap between the rich and the poor. It is confirmed because MWTP in Group (a) is CHF -16.68 and



	exp. sign	MWTP, % of income	MWTP, CHF	s.e., CHF	
should not reduce (Group a)	-	-0.34515	-16.68	6.35	***
should reduce (Group b)	+	-0.08417	-3.63	9.25	

Note: \*\*\* denotes statistical significance of MWTP in % of income at the 1 percent level.

Table 9: Marginal WTP values for redistribution (in percent of monthly personal income and CHF) derived from the extended model with the assessment whether the government should reduce the income gap between the rich and the poor

statistically significant. Hypothesis 2(b) with its prediction for MWTP to be positive if a respondent wants the government to reduce the income gap cannot be confirmed. If at all, MWTP is negative in Group (b) (but lacks statistical significance).

Thus, individuals who stated support for inequality reduction by the government seem to exhibit inconsistent behavior by having a negative willingness to pay for this reduction. However, the framing of the question, "Do you agree with the following statement: *'By increasing the income tax rates for rich families and financially supporting poor families, the government should try to reduce the income gap between the rich and the poor?'*" did not evoke the trade-off between the reduction of the income gap and the respondent's own income. By way of contrast, the WTP values come from a Discrete Choice Experiment (DCE), where the budget restriction is inevitably present.

Addressing the sustainability issue once more, recall that the average respondent would prefer a share of GDP devoted to redistribution of 21% rather than the current value of 25%. However, construction of the group-specific WTP functions indicates that the optimal values of REDIST are again somewhat apart, with 19.21% of GDP for Group (a) and 24.09% for Group (b), respectively. Therefore, demand for income redistribution as measured by this DCE, while below the amount provided by the government, once more differs importantly between subpopulations, rendering a reform of the Swiss welfare state difficult.

## 6 Conclusion and Discussion

In this paper, we elicited citizens' willingness to pay (WTP) for redistribution through a Discrete Choice experiment performed in 2008. Based on a simple model that relates choices to the attributes of redistribution only, the average Swiss citizen would have to be paid a compensation of CHF 11.78 (some US\$ 9.40) per month (0.25 percent of monthly income) for an additional percentage point of GDP devoted to public redistribution. In addition, a very marked status quo bias would have to be overcome by payment of another 63 percent of monthly income.

Such an experiment also permits to test several hypotheses concerning the determinants of the demand for redistribution without any confounding supply-side influences. In particular, Hypothesis 1 states that it is negative (close to zero) among citizens who think that public welfare currently provided welfare is excessive (sufficient). An extended model that includes the pertinent attitudinal variable as a regressor yields confirming evidence for the 'excessive' component; however, the 'sufficient' component is also related to a negative WTP value, contradicting the hypothesis. Hypothesis 2 predicts that citizens who do (not) want government to reduce the income gap between the rich and the poor exhibit positive (negative) WTP for redistribution. Here, the extended version of the model supports the 'not' component of the hypothesis whereas those in favor of closing the gap fail to exhibit a positive WTP value. The major finding of the paper, however, is that estimated average WTP is maximum at 21% of GDP devoted to redistribution, clearly below the current value of 25%. Moreover, this value differs importantly depending on attitudes toward the desirable amount of redistribution and the government's role in dealing with inequality. Thus, there is reason for concern with regard to the sustainability of the Swiss welfare state.

The analysis presented in this paper is subject to several limitations. First, several behavioral explanations of the demand for redistribution (risk aversion, other beliefs, religiosity) were not tested. However, recent contributions to the field show that up to 90 percent of cross-country differences in public spending can be related to institutional and

behavioral factors [see e.g. Alesina and Glaeser (2004), Akkoyunlu et al. (2009)]. Thus, future work should be devoted to find out whether these factors also influence stated WTP for redistribution. A first step in this direction is done by Neustadt (2010). Furthermore, as suggested by recent contributions to literature in the field of public choice, the citizens' preferences can be importantly influenced by political institutions, in particular by party programs [see e.g. (Schl pfer, Schmitt and Roschewitz, 2007)]. Thus, future work should be devoted to a detailed analysis of political preferences in order to find out whether these factors also influence stated WTP for redistribution. This analysis would, however, require addressing the identification problem once again, since the supply of public redistribution is governed by political institutions. Second, the status quo bias found in this paper calls for more detailed analysis. To the extent that it reflects risk aversion, it should induce demand for redistribution - contrary to the results presented here. One possible explanation why it is so high can be the fact that there are some preferences that are not fully formed [see e.g. (Stutzer, Goette and Zehnder, 2007)]. Another possible explanation might be the redistribution illusion, namely the fact that some respondents are not aware of the actual status quo. Finally, the evidence only relates to a point of time in one country and thus may be subject to transitory shocks and country-specific influences. Still, by appealing to citizens' stated preferences, the present contribution sheds some light on the question whether a welfare state laying claim to one quarter of the GDP is sustainable.

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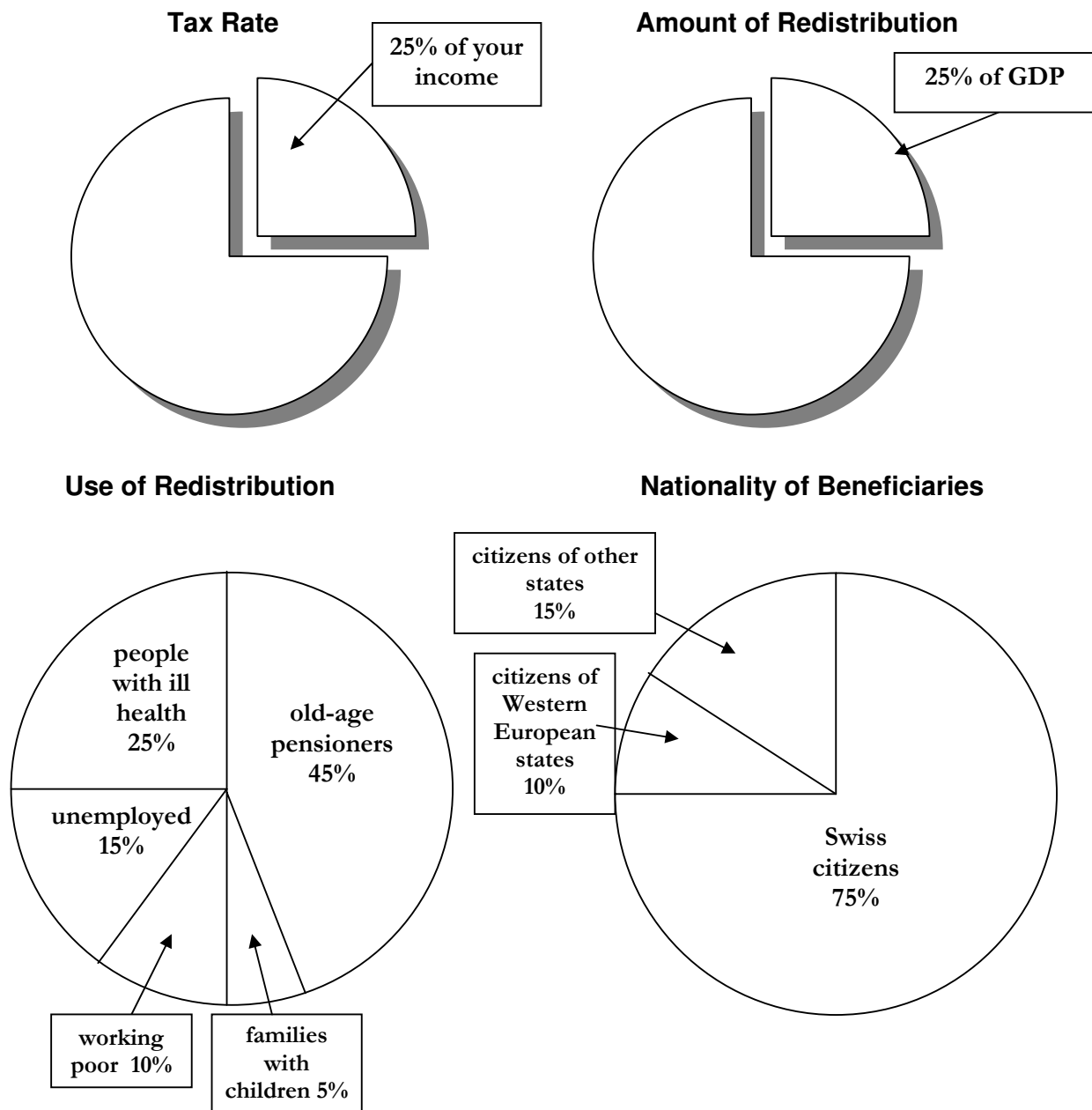
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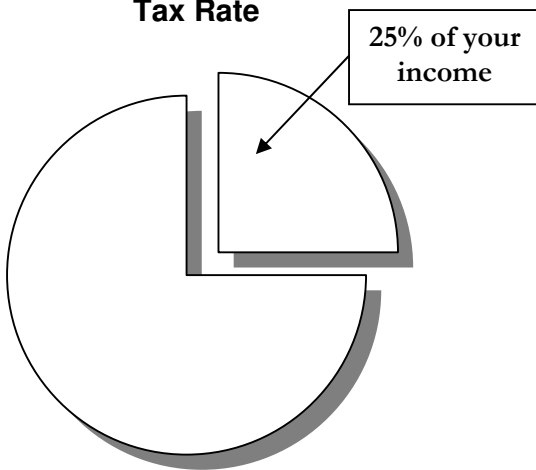
# A Appendix

Exhibit 1: Status Quo Card (current state of redistribution)

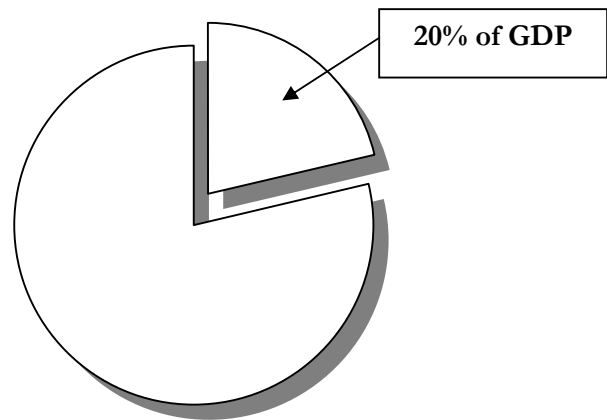


## Exhibit 2: Card for Alternative No. 1

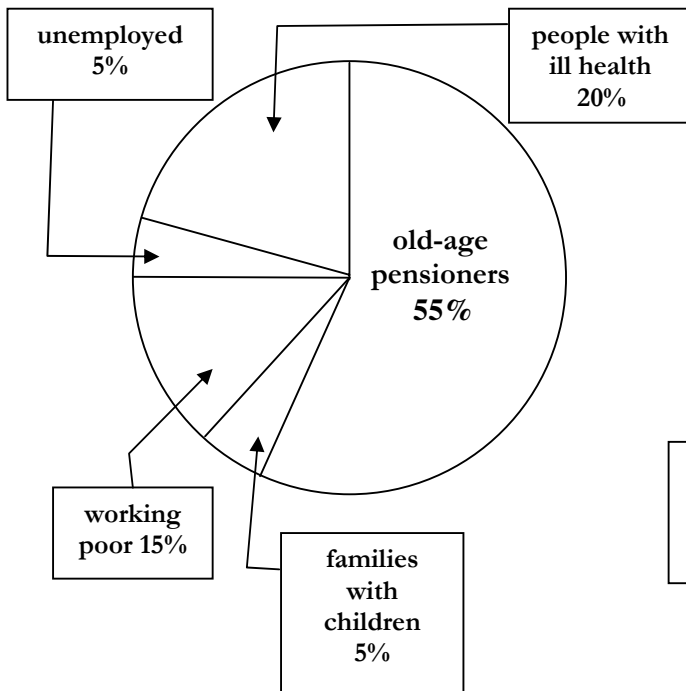
### Tax Rate



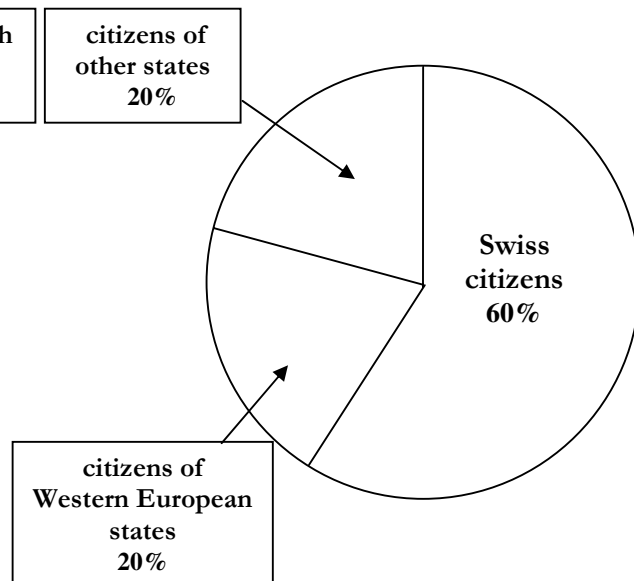
### Amount of Redistribution



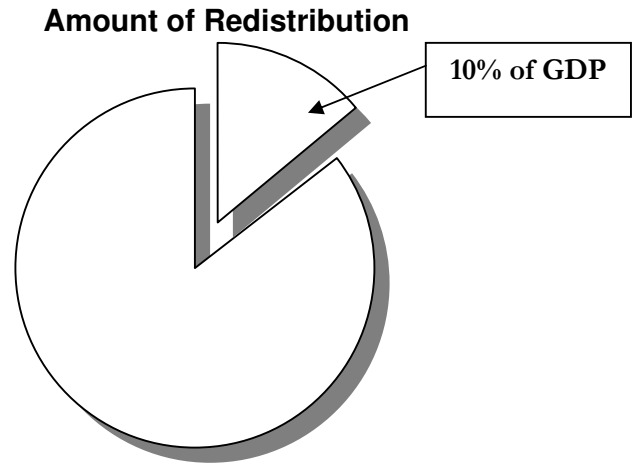
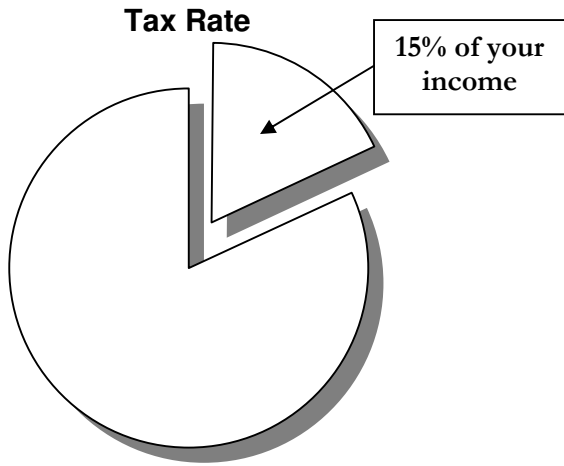
### Uses of Redistribution



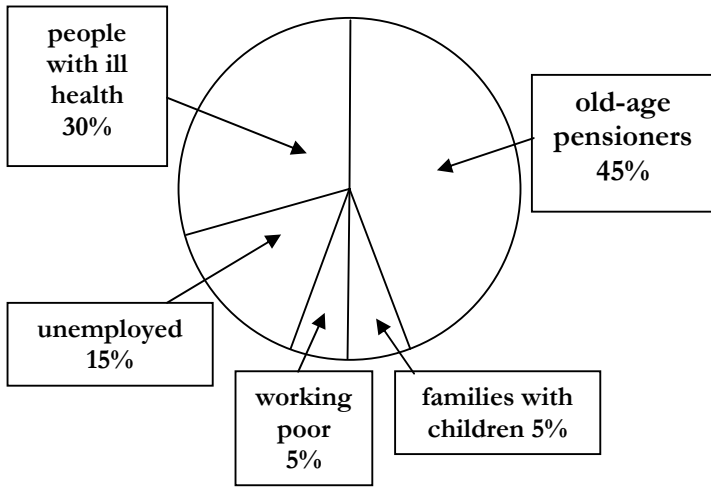
### Nationality of Beneficiaries



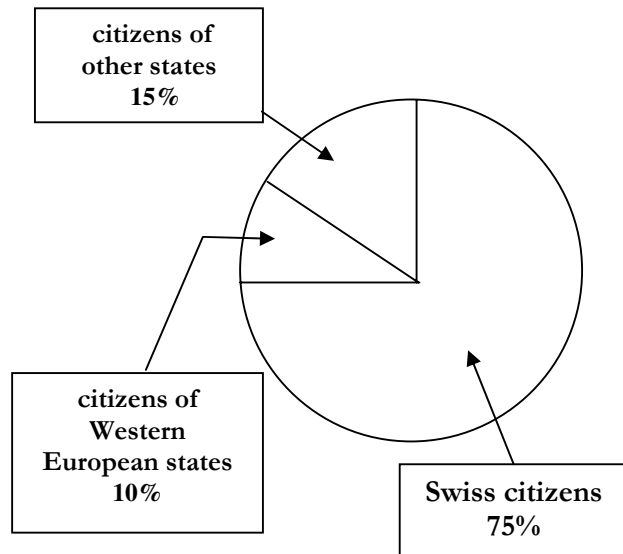
### Exhibit 3: Card for Alternative No. 2



#### Uses of Redistribution



#### Nationality of Beneficiaries



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