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Income Redistribution: How To Divide the Pie?*

Ilja Neustadt† and Peter Zweifel‡

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Abstract

In this paper, we elicit preferences of Swiss citizens for the allocation of income redistribution to different uses through a Discrete Choice Experiment performed in 2008. Neustadt and Zweifel (2009) provide an estimate of the total desired amount of income redistribution as a share of disposable income. Here, we estimate marginal willingness-to-pay values for types of recipients (old-age pensioners, people with ill health, the unemployed, working poor, and families with children) and their nationality (Swiss, citizens of western European countries, others). Hypotheses derived from the insurance motive for redistribution receive some empirical support.

Keywords: Income redistribution, preferences, willingness to pay, discrete choice experiments, conjoint analysis, social status

JEL classification: C35, C93, D63, H29

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1 Introduction

Recently, there has been a great deal of research into the demand for redistribution and its determinants. However, this research focuses on preferences for the total amount of redistribution and its economic, institutional, and behavioral determinants while neglecting preferences for the composition of the redistributive budget. Some recent examples are Alesina and La Ferrara (2005), Alesina and Giuliano (2009), and Neustadt and Zweifel (2009). One notable exception is a study by Boeri et al. (2002) based on Contingent Valuation (CV) experiments. However, there is a weakness to the CV approach in that it holds all the attributes of the good in question constant, varying its price only. This is not descriptive of actual decision making where other attributes almost always vary along with price; moreover, it invites strategic responses because respondents can focus on a single attribute. In this paper, other attributes of importance will be shown to be the uses of the money available for redistribution (health, old age, etc.) and the type of beneficiary (e.g. foreigner, national).

In contrast to CV, the methodology of Discrete Choice Experiments (DCE) used in this study allows the creation of realistic decision-making scenarios by making respondents choose between alternatives where all attributes vary, among them, price. The two main findings are that there is willingness to pay (WTP) for redistribution favoring families with children to the detriment of all other uses and favoring Swiss nationals to the detriment of foreigners.

The remainder of this paper is structured as follows. Section 2 contains a literature review from which hypotheses to be tested are derived. The first set of hypotheses concerns the different uses of the redistribution budget and the second set, the nationality of the potential beneficiaries. 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 implications for public policy.

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 influencing preferences for public income redistribution that can be categorized as economic, political, and behavioral determinants. As to the economic determinants, Alesina and La Ferrara (2005) empirically analyzed the effects of current and future income on the demand for redistribution in the United States. While low current income bolsters demand, chances for higher future income reduce it provided the tax system is progressive. As suggested by the social contract literature, citizens' preferences for redistribution can also be interpreted as preferences for insurance by risk-averse individuals [cf. Rawls (1999)]. In a hypothetical situation, where individuals do not yet know their endowment nor their future position in society ('veil of ignorance'), demand for redistribution is predicted because it provides an income transfer from more favorable future states to less favorable ones. Beck (1994) investigates individual behavior under the 'veil of ignorance' in an experiment. Using lotteries to represent a hypothetical society with random differences in individual incomes, he analyzes the amount of desired income redistribution. Individuals indeed display risk aversion, albeit not of the extreme kind as implied by the Rawlsian maximin rule. Furthermore, their preference for income redistribution does not exceed the level that can be explained by individual risk aversion. This result provides a foundation for our Hypotheses 2 to 4 in Section 2.2.

As to the political determinants, the literature [Persson and Tabellini (2000, 2003); Lizzeri and Persico (2001); Milesi-Ferretti et al. Milesi-Ferretti et al. (2002)] predicts that proportional representation causes a tendency towards universal programs benefitting var-

ious groups (old-age pensioners, working poor, minorities, etc.), while majority rule results in targeted "pork barrel" programs. Persson and Tabellini (2003) find supporting empirical evidence in that countries with proportional representation have a share of government expenditure in GDP that ceteris paribus is 5 percentage points higher than with majority rule. Moreover, according to Akkoyunlu et al. (2009) there are signs of a positive correlation between the degree of proportional representation and the share of transfers in GDP among OECD countries. Further 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.

Among the behavioral determinants of income redistribution, beliefs have been at the center of attention. Alesina and Angeletos (2005) develop a model where society's belief whether effort or luck determines economic success is responsible for multiple self-fulfilling equilibria while Benabou and Tirole (2006) propose a model for the emergence and persistence of such collective beliefs. 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 explanatory variable in the demand for redistribution. Their importance could be conditioned by a concern for incentives. If effort determines income, then an increased income tax rate for financing redistribution causes a loss of output due to weakened work incentives. However, Fong (2001) finds that such concerns do not modify the link between beliefs and the demand for redistribution. Using fiscal data, Corneo and Fong (2008) estimate willingness to pay for distributive justice and show that, in the United States, the monetary value of justice on average amounts to about one-fifth of the disposable household income. However, there exists marked preference heterogeneity between racial and income groups.

Boeri et al. (2001) study attitudes towards redistribution with a focus on pension and unemployment schemes in France, Germany, Italy, and Spain, using CV experiments that impose an explicit trade-off between income and social insurance coverage on respondents. They find opposition against 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.

Neustadt and Zweifel (2009, 2010) elicit preferences for the total volume of income redistribution. According to a specification relating choices to the attributes of redistribution without socioeconomic covariates, the average Swiss citizen would have to be be paid a compensation of CHF 11.78 (some US$ 12) per month (0.72 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 5.27 percent of monthly income. Willingness to pay (WTP) for redistribution is estimated to be maximum at 21 rather than the current 25 percent of GDP. Furthermore, Neustadt and Zweifel (2009) test several hypotheses concerning the effects of economic well-being on the demand for redistribution without any confounding supply-side influences. WTP for redistribution is shown to increase with income and education, contradicting the standard economic model [Romer (1975), Roberts (1977), Meltzer and Richard (1981)]. The Prospect of Upward Mobility hypothesis [Hirschman and Rothschild (1973), Benabou and Ok (2001)] receives very partial empirical support. Finally, Neustadt (2011, forthcoming) studies preference heterogeneity with respect to cultural and religious beliefs, confirming the negative relationship between the degree of religiosity and WTP for redistribution.

2.2 Types of Beneficiaries and Preferences for Redistribution

In this paper, we elicit preferences for different compositions of the redistribution portfolio, i.e. the slicing of the total redistribution pie. First, we consider the following five types of transfer recipients: old-age pensioners, people in ill health, the unemployed, working poor, and families with children. In view of the insurance motivation for redistribution proposed by Beck (1994), the ordering of the risks confronting an individual is of crucial importance. In Switzerland, the 'risk' of living up to retirement age (65 for men, 63 for women) is 85 percent for a 20 year old male and 97 percent for a 20 year old female, respectively [**?**]. However, this risk is highly insured because mandatory public and employment-related

provision together guarantee about 60 percent of pre-retirement income. The highest uninsured risk is to be in a household with children; it amounts to 33 percent as of 2000 [**?**]. Information on the working poor (another uninsured risk) is not available; however, for persons with no education beyond minimum schooling, the share of houselholds with incomes below the poverty level (defined as 60 percent of the median adjusted for household size) is 29 percent [**?**]. A recent survey found that 28 percent of the respondents in the Swiss canton of Fribourg felt chronically ill [**?**]. However, at least the financial consequences of chronic illness are largely covered by mandatory health insurance. Finally, unemployment has always been below 4 percent since 2010 [**?**], and it is largely insured as well. Therefore, one can state the following hypotheses with regard to the types of beneficiaries.

Hypothesis 1: *Demand for redistribution is expected to be highest for families with children, followed by the working poor. At some distance due to existing insurance coverage, pensioners, people in ill health, and the unemployed are predicted to follow.*

In addition, the insurance view of redistribution suggests a set of hypotheses concerning the demand for redistribution by specific subsets of the population.

Hypothesis 2: *Demand for redistribution in favor of old-age pensioners is expected to be the highest for respondents near and beyond the retirement age.*

Hypothesis 3: *Demand for redistribution in favor of the unemployed is expected to be higher for those who expect to become or stay unemployed.*

Hypothesis 4: *Demand for redistribution in favor of people in ill health is expected to be higher for those who experience health problems themselves or have relatives with health problems.*

2.3 Recipients' Nationality and Preferences for Redistribution

The behavioral explanations of redistribution emphasize imperfect altruism [Fong et al. (2006)]. While perfect altruism is exclusively governed by recipients' preferences, imperfect altruism also reflects donor preferences. In particular, people as potential donors are predicted to oppose public welfare if they believe that recipients take advantage of the

system, a behavior that often is attributed to members of ethnic minorities.

In the case of Switzerland, ethnic minorities are the result of recent immigration. This suggests distinguishing three major groups of recipients of public transfers according to nationality: Swiss citizens, citizens of Western European states, and other citizens. The predicted preference structure is as follows. The demand for redistribution in favor of one's own group is expected to be the highest. Western Europeans are next because they are not over-represented among the poor, contrary to citizens from the Balkan states, Africa, and South America who together account for the bulk of immigrants from the rest of the world.

HYPOTHESIS 5: *Demand for redistribution in favor of Swiss citizens is expected to be highest, followed by Western Europeans and by the rest of the world*[1].

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 from 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 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

[1]Both imperfect altruism and the insurance view expounded in Section 2.2 lead to the prediction that e.g. demand for redistribution in favor of immigrants from the rest of the world is highest among respondents coming from the rest of the world. However, since 94 percent of the respondents are born in the country (see Section 4.1), the pertinent subsample is too small to permit valid statistical inference.

the New Demand Theory of Lancaster (1971), is also known as Conjoint Analysis [Louviere et al. (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 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 its 'slices' devoted to different types of recipients (individuals in ill health, old age, etc.). Thus, trade-offs among different attributes of the good 'redistribution' can be calculated to assess their relative importance.

The econometric method used is based on the Random Utility Theory [see Luce (1959), Manski and Lerman (1977) and McFadden (1974, 1981, 2001)]. Thus, individual i values alternative j according to the utility V_{ij} attained, which is given by

$$V_{ij} \quad = \quad v_i(a_j, p_j, y_i, s_i, \varepsilon_{ij}). \tag{1}$$

Here, $v_i(\cdot)$ denotes i's indirect utility function, a_j, the amount of attributes associated with alternative j, and p_j, the price. The individual's income and sociodemographic characteristics are symbolized by y_i and s_i, respectively. Finally, ε_{ij} denotes the error term, which is due to the fact that the experimenter never observes all 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,

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

Individual i will prefer alternative j to alternative l if and only if

$$w_i(a_l, p_l, y_i, s_i) + \varepsilon_{il} \quad \leq \quad w_i(a_j, p_j, y_i, s_i) + \varepsilon_{ij}. \tag{2}$$

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

$$\begin{aligned} P_{ij} &= \text{Prob}\left[w_i(a_l, p_l, y_i, s_i) + \varepsilon_{il} \leq w_i(a_j, p_j, y_i, s_i) + \varepsilon_{ij}\right] &(3)\\ &= \text{Prob}\left[\varepsilon_{il} - \varepsilon_{ij} \leq w_i(a_j, p_j, y_i, s_i) - w_i(a_l, p_l, y_i, s_i)\right]. &(4)\end{aligned}$$

Thus, the probability of choosing j amounts to the probability of the systematic utility difference $w_i[j] - w_i[l]$ dominating the 'noise', $\varepsilon_{il} - \varepsilon_{ij}$. The error terms $\{\varepsilon_{il},\ \varepsilon_{ij}\}$ can be assumed to be normally distributed with mean zero and variances σ_l^2 and σ_j^2 as well as covariance σ_{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 (4) can be represented as

$$P_{ij} \quad = \quad \Phi\left(\frac{w_i(a_j, p_j, y_i, s_i) - w_i(a_l, p_l, y_i, s_i)}{\sigma}\right), \tag{5}$$

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 et al. (1999) provide empirical evidence that a linear specification of the function $w(\cdot)$ leads to good predictions in its middle ranges. Therefore, one posits

$$w_i(a_j, p_j, y_i, s_i) \quad = \quad c_i + \sum_{k=1}^{K} \beta_k a_k + \varepsilon_{ij}, \tag{6}$$

where c_i represents an individual-specific constant, a_k, $k = 1, \ldots, K$, are the attributes of the alternative, and β_k, $k = 1, \ldots, K$, are the parameters to be estimated. These parameters can be interpreted as the constant marginal utilities of the corresponding attributes.

The marginal rate of substitution between two attributes m and n is given by

$$\text{MRS}_{m,n} = -\frac{\partial v/\partial a_m}{\partial v/\partial a_n}. \tag{7}$$

In the case of a linear utility function, this can be estimated as the ratio of the respective slope parameters,

$$\text{MRS}_{m,n} = -\frac{\hat{\beta}_m}{\hat{\beta}_n},$$

representing the marginal WTP for an additional unit of a_m expressed in units of a_n. 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 our context, the income tax rate, see e.g. Telser (2002), p. 56][2]:

$$\text{MWTP}(a_m) = \frac{\partial v/\partial a_m}{\partial v/\partial p_j}. \tag{8}$$

By limiting the specification to the product attributes only (simple model, cf. Section 5.1), one obtains the following expression representing the difference in utility of individual i between alternative j and the status quo l,

$$\Delta V_{ij} = c_i + \sum_{k=1}^{K} \beta_k \Delta a_{kj} + \beta_p \Delta p_j + \varphi_{ij}, \tag{9}$$

where $\Delta c_i = c_{ij} - c_{il}$, $\Delta a_{kj} = a_{kj} - a_{kl}$, $\Delta p_j = p_j - p_l$, $\varphi_{ij} = \varepsilon_{ij} - \varepsilon_{il}$ for each $j \neq l$.

For econometric inference, it is important to take into account that the same individual makes several choices. A popular specification is the two-way random-effect, $\varphi_{ij} = \mu_i + \eta_{ij}$, where μ_i denotes the component that varies only across individuals but not across the choice alternatives. The terms μ_i and η_{ij} are assumed uncorrelated with the product attributes $(a_{i1}, \ldots, a_{iK})$ and between themselves. By a standard assumption in a probit

[2]By Roy's Identity, $x_{ij} = -\frac{\partial v(\cdot)/\partial p_j}{\partial v(\cdot)/\partial y_i}$. Therefore, 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 the price.

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 ρ indicates how strongly the various responses are correlated with each other, or, equivalently, the share of the total variance that can be explained by the individual-specific error term. The random-effects specification is justified if ρ is high and significant.

The variance of the marginal WTP values can be computed using the delta method, cf. Hole (2007).

3.2 Experimental Design

The experiment was conducted with a representative sample of 979 respondents in the fall of 2008. Respondents were mailed 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 Appendix shows the graphical representation of the status quo (Exhibit 1) and two selected alternatives (Exhibits 2 and 3). The telephone survey followed a few 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. They form four groups (see Table 1).

1. Shares of the total redistribution budget (to be spent on five groups of recipients, viz. working poor, the unemployed, old-age pensioners, families with children, and ill people);

2. Shares of the total redistribution budget (to be spent on three groups defined by, viz. Swiss citizens, western european foreigners, and other foreigners);

3. Total amount of redistribution, defined as a share of GDP;

Attribute	Label	Status Quo Level	Alternative Levels
Shares of benefits going to			
• Working Poor	WP	10%	5%, 15%
• Unemployed	UNEMP	15%	5%, 25%
• Old-Age Pensioners	PENS	45%	35%, 55%
• Families with Children	FAM	5%	10%
• People in ill health	ILL	25%	20%, 30%
Shares of benefits going to			
• Swiss citizens	SWISS	75%	60%, 85%
• Western European foreigners	WEU	10%	5%, 10%, 20%
• Other foreigners	OTH	15%	10%, 15%, 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

4. Share of 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 β to be estimated. So-called D-efficient design calls for the minimization of the geometric mean of the eigenvalues of Ω,

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

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 in 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

Age groups	N	% of valid answers
18-35	264	27
36-59	435	44
60 and older	280	29
Total valid answers	979	100
Sample	979	

Table 2: Respondents' age

Unemployment expectation	N	% of valid answers
expect to be unemployed	97	10
do not expect	832	90
Total valid answers	929	100
Missing	50	
Sample	979	

Table 3: Expectation to become/stay unemployed within 2 years

Health status	N	% of valid answers
health problems	512	53
no health problems	458	47
Total valid answers	970	100
Missing	9	
Sample	979	

Table 4: Health status among family members

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 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. 27 percent are younger than 36 while 29 percent are at least 60 years of age (see Table 2 for the age distribution).

Some 10 percent of respondents expect to become or to stay unemployed within the next two years (see Table 3). Further, when asked about the health status of their families, 53 percent of respondents stated that they themselves or their family members experience health problems (see Table 4).

In all, the structure of the sample permits a test of Hypotheses 1 to 4, which are based on the view that income redistribution serves an insurance function. Depending on its structure, it benefits especially the aged, the unemployed, and people in ill health, thus inducing demand for redistribution among these groups. however, Hypothesis 5, emphasizing imperfect altruism, can only be tested in a more cursory matter since the share of foreign-born respondents is no more than 6 percent.

4.2 Respondents' Choice Behavior

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

Table 5: Total number of choices

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). This is a low percentage, for which there are at least four explanations. First, in spite of checking in the pretests, the levels of the attributes in the experiment may not have been sufficiently extreme to induce respondents to switch. Second, some attributes (e.g. benefits going to the working poor; see Table 7), may not have been sufficiently valued to cause a switch. Third, there may be errors in decision making because the consistency test revealed 14 percent of choices to be

# 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 numbers of chosen alternatives per respondent

inconsistent. Finally, it may simply reflect a strong status quo bias in the face of a highly complex decision-making situation (see the large negative constant in Table 7).

Still, only 21 percent of respondents never opted for an alternative (see Table 6). Conversely, almost 80 percent departed from the status quo at least once.

5 Estimation Results

5.1 Relevance of Product Attributes and Testing of Hypotheses 1 and 5

Estimation of equation (9) calls for two adjustments in view of Table 1. First, let a respondent allocate 15 percent of the redistributive budget to the working poor (WP), while opting for 20 percent of the GDP being devoted to redistribution (REDIST). This implies that the preferred share of GDP going to the working poor amounts to 3 percent in this case. Let another respondent also allocate 15 percent of the total to WP but select

40 percent for REDIST. This time, the preferred share of the GDP in favor of WP is 6 percent. To reflect this difference, WP needs to be replaced by $\widetilde{\text{WP}} = \text{WP} \cdot \text{REDIST}$, and similarly for the other shares of benefits listed in Table 1. The second adjustment is that the two adding-up restrictions inherent in Table 1 need to be imposed,

$$\widetilde{\text{WP}} + \widetilde{\text{UNEMP}} + \widetilde{\text{ILL}} + \widetilde{\text{FAM}} + \widetilde{\text{PENS}} = \text{REDIST} \tag{10}$$

$$\widetilde{\text{CH}} + \widetilde{\text{WEU}} + \widetilde{\text{OTH}} = \text{REDIST}. \tag{11}$$

Since REDIST is an important attribute of its own, it needs to be included in the estimation. This means that one of its components must be excluded from both equations (10) and (11). The choice of exclusion restriction is arbitrary but might affect estimated WTP values. This effect is analogous to an omitted variable bias, whose size varies with the absolute value of the pertinent coefficient (Greene (2000), p. 334). Preliminary regressions indicated that $\widetilde{\text{FAM}}$ has the highest coefficient, followed by $\widetilde{\text{WP}}$, $\widetilde{\text{PENS}}$, $\widetilde{\text{UNEMP}}$, and finally $\widetilde{\text{ILL}}$. Similarly, $\widetilde{\text{CH}}$ was found to dominate $\widetilde{\text{WEU}}$, which in turn dominated $\widetilde{\text{OTH}}$. This suggests the following regression strategy for implementing restriction (10). Start with $\widetilde{\text{FAM}}$, checking for omitted variable bias caused by excluding the less important attributes one at a time. Next, turn to second-ranking $\widetilde{\text{WP}}$ without excluding $\widetilde{\text{FAM}}$ because this would cause an unnecessary amount of bias. By the same token, it would make little sense to exclude $\widetilde{\text{FAM}}$ and $\widetilde{\text{WP}}$ when focus is on $\widetilde{\text{PENS}}$, and similarly for $\widetilde{\text{UNEMP}}$. The same strategy was applied to restriction (11). For example, the WTP estimates entered on lines No. 1 and 12 of Table 7 are derived from the model

$$\begin{aligned}\Delta\tilde{V}_{ij} = {} & c_0 + \beta_1\widetilde{\text{WP}}_j + \beta_2\widetilde{\text{UNEMP}}_j + \beta_3\widetilde{\text{ILL}}_j + \beta_4\widetilde{\text{FAM}}_j + \\ & + \beta_5\widetilde{\text{CH}}_j + \beta_6\widetilde{\text{WEU}}_j + \\ & + \beta_7\text{REDIST}_j + \beta_8\text{TAX}_j + \varphi_{ij}.\end{aligned}$$

Estimation results are displayed in Table 7. As was to be expected, the coefficient and marginal effect of $\widetilde{\text{FAM}}$ is most strongly affected when second-ranking $\widetilde{\text{WP}}$ is excluded. The preferred estimate appears on line No. 4, with $\widetilde{\text{ILL}}$ excluded. For $\widetilde{\text{WP}}$, it is the one on line No. 7, and for $\widetilde{\text{PENS}}$, line No. 9. With regard to recipient's nationality, the estimate

Variable	Coeff.	SE	z	$P > \|z\|$	Marginal effect	WTP, % of inc.
Recipients' Social Group						
1. $\widetilde{\text{FAM}}$ if $\widetilde{\text{WP}}$ excluded	0.05374	0.02805	1.92	0.055	0.01370	2.61
2. $\widetilde{\text{FAM}}$ if $\widetilde{\text{PENS}}$ excluded	0.07942	0.02660	2.99	0.003	0.02025	3.86
3. $\widetilde{\text{FAM}}$ if $\widetilde{\text{UNEMP}}$ excluded	0.09795	0.02751	3.56	0.000	0.02498	4.75
4. **$\widetilde{\text{FAM}}$ if $\widetilde{\text{ILL}}$ excluded**	0.15181	0.02975	5.10	0.000	0.03871	7.37
5. $\widetilde{\text{WP}}$ if $\widetilde{\text{PENS}}$ excluded	0.02569	0.01708	1.50	0.133	0.00655	1.25
6. $\widetilde{\text{WP}}$ if $\widetilde{\text{UNEMP}}$ excluded	0.04421	0.01740	2.54	0.011	0.01127	2.15
7. **$\widetilde{\text{WP}}$ if $\widetilde{\text{ILL}}$ excluded**	0.09808	0.02398	4.09	0.000	0.02501	4.76
8. $\widetilde{\text{PENS}}$ if $\widetilde{\text{UNEMP}}$ excluded	0.01853	0.00818	2.27	0.023	0.00472	0.90
9. **$\widetilde{\text{PENS}}$ if $\widetilde{\text{ILL}}$ excluded**	0.07239	0.01693	4.28	0.000	0.01846	3.51
10. **$\widetilde{\text{UNEMP}}$ if $\widetilde{\text{ILL}}$ excluded**	0.05387	0.01759	3.06	0.002	0.01374	2.61
Recipient's Nationality						
11. $\widetilde{\text{CH}}$ if $\widetilde{\text{WEU}}$ excluded	0.01494	0.01420	1.05	0.293	0.00381	0.73
12. **$\widetilde{\text{CH}}$ if $\widetilde{\text{OTH}}$ excluded**	0.10146	0.01819	5.58	0.000	0.02587	4.93
13. **$\widetilde{\text{WEU}}$ if $\widetilde{\text{OTH}}$ excluded**	0.08652	0.02682	3.23	0.001	0.02206	4.20
TAX (for any specification)	-0.02060	0.00180	-11.42	0.000	-0.00525	–
CONSTANT (for any specification)	-0.92929	0.02969	-31.30	0.000	-	-45.11

Note: Bold entries show preferred specifications.

Table 7: Summary of random effects probit estimates for different model specifications.

with smaller bias presumably is on line No. 12 rather than 11. However, regardless of the exclusion restriction imposed, a higher share of the GDP devoted to any of the types of beneficiaries and nationalities has positive utility, while the price attribute (TAX) is negatively valued. Finally, the negative constant points to status quo bias.

Based on the preferred specification (in bold in Table 7), Hypothesis 1 receives a considerable measure of confirmation. Among the beneficiaries that cannot count on insurance, families with children rank first, followed by the working poor as predicted. As to the beneficiaries enjoying insurance protection, pensioners precede the unemployed, again as predicted. Contrary to the hypothesis, however, WTP for people in ill health is lowest of

all, causing them to be defined as the residual category (see above).

Hypothesis 5 is derived from behavioral rather than insurance theory. However, since it also related to the population at large, it is examined next. The preferred specifications (corresponding to lines 11 and 12 of Table 7) indicate that WTP for redistribution is in favor of Swiss citizens, followed by Western European nationals and to the detriment of other nationalities (which was dominated, thus forming the residual category). This constitutes a partial confirmation of Hypothesis 5, which had predicted a clear preference for redistribution benefiting Swiss nationals over one benefiting Western Europeans.

In favor of	to the detriment of	WTP in % of income	WTP in CHF	SE in CHF
1. FAM	WP	2.61	120.40	75.59
2. FAM	PENS	3.86	177.94	71.82
3. FAM	UNEMP	4.75	219.45	75.89
4. **FAM**	**ILL**	7.37	340.13	83.55
5. WP	PENS	1.25	57.55	45.64
6. WP	UNEMP	2.15	99.05	47.54
7. **WP**	**ILL**	4.76	219.73	66.34
8. PENS	UNEMP	0.90	41.50	22.87
9. **PENS**	**ILL**	3.51	162.19	47.76
10. **UNEMP**	**ILL**	2.61	120.68	47.53
11. CH	WEU	0.73	33.47	37.97
12. **CH**	**OTH**	4.93	227.31	54.61
13. **WEU**	**OTH**	4.20	193.83	75.52
CONSTANT		-45.11	-2081.99	223.36

Note: Bold entries show preferred specifications.

Table 8: Mean marginal WTP values for reallocation of redistributive budget between two groups of beneficiaries (in % of monthly disposable income and CHF, 1 CHF = 0.88 $ in December 2008)

5.2 Extended Models: Testing for Hypotheses 2 to 4

Hypotheses 2 to 4 of Section 2.3 make predictions regarding differences in WTP values between segments of the population. The covariates of interest are age, expectations about unemployment, and family health status.

In order to estimate *ceteris paribus* effects, the attributes listed in Table 1 are interacted e.g. with $AGE60^{+}$, a dummy variable indicating that the respondent is at least 60 years old. This gives rise to a first of four sets of interaction terms extending equation.

5.2.1 Extended Model 1: Age and Demand for Old-Age Pensions vs Family Support (Hypothesis 2)

in favor of	to the detriment of	WTP in % of income	WTP in CHF	SE in CHF
(A) FAM	PENS	5.13	231.89	83.80
(B) WP	PENS	0.47	21.05	62.35
(C) PENS	UNEMP	0.64	28.79	28.71
(D) PENS	ILL	3.35	151.49	49.95

Table 9: Marginal WTP values for attributes (in % of monthly disposable average income and CHF, 1 CHF = 0.88 $ in December 2008) derived for the age group 60 and older

Reestimation of equation (13) with all the attributes in linear and interacted form (using $AGE60^{+}$), imposing exclusion No. 1 in Table 7, and using eq. (8) results in the WTP values displayed in Table 9 (entries A, B, C, D correspond to entries 2, 5, 8, 9 in Table 8). Among respondents aged 60 or more, WTP for reallocating 1 percent of GDP to families to the detriment of pensioners amounts to 5.13 percent of the average monthly income in the sample. This is even higher than the 3.86 percent across all groups (see line No. 2 of Table 8). This is a contradiction of Hypothesis 2, stating that the demand for redistribution favoring old-age pensioners is expected to be particularly high in the group aged 60 and more. In turn, the WTP for a reallocation of 1 percent of GDP to the working poor is lower in this group (0.47 percent compared to 1.25 percent of income in line No. 5

of Table 8), but statistical significance is missing. In the two cases where pensioners stand to benefit, WTP values in Table 9 are again below those of Table 8, lines No. 8 and 9. On the whole, Hypothesis 2 has to be rejected.

5.2.2 Extended Model 2: Employment Expectations and Demand for Unemployment Support (Hypothesis 3)

in favor of	to the detriment of	WTP in % of income	WTP in CHF	SE in CHF
(E) WP	UNEMP	5.34	264.80	118.86
(F) PENS	UNEMP	1.02	50.73	45.27
(G) FAM	UNEMP	-4.12	-204.32	157.61
(H) UNEMP	ILL	-0.88	-43.73	91.43

Table 10: Marginal WTP values for attributes (in % of monthly disposable average income) derived for the respondents who expect to be unemployed during the next two years

This time, equation (13) is complemented with all attributes interacted with the dummy variable $UEXP$, indicating that the respondent expects to become or remain unemployed during the next two years. This extended model allows us to test Hypothesis 3, stating that the demand for unemployment support is higher for respondents with expectations to lose their job or to remain unemployed. Here, we observe two statistically significant differences in preferences between respondents with these expectations and others (entries E, F, G, H in Table 10 correspond to entries 6, 8, 3, 10 in Table 8, respectively). The marginal WTP for a reallocation of 1 percent of GDP from the unemployed to families with children exhibited by this group (line G) is significantly lower than for the general population (line 3) and even attains a negative value of -4.12 percent of monthly income, thus supporting the hypothesis. However, when it comes to the question of whether the social budget should more strongly benefit the unemployed to the detriment of people with ill health (line H), those who expect to be unemployed surprisingly resist this as well, exhibiting a marginal WTP of -0.88 compared to +2.61 percentage points of monthly disposable income

in the general population (line 10 of Table 8). Thus, Hypothesis 3 cannot be accepted in its entirety.

5.2.3 Extended Model 3: Health Status and Demand for Support of People with Ill Health (Hypothesis 4)

in favor of	to the detriment of	WTP in % of income	WTP in CHF	SE in CHF
(I) WP	ILL	4.41	202.93	65.62
(K) UNEMP	ILL	3.09	142.11	43.57
(L) PENS	ILL	3.57	164.60	42.22
(M) FAM	ILL	6.51	299.79	82.67

Table 11: Marginal WTP values for attributes (in % of monthly disposable average income) derived for the respondents who experience health problems among their relatives

Finally, we consider an extension of the basic model by including the dummy variable $ILLFAM$ for the health status of respondents' family members and themselves. Hypothesis 4 stated that willingness to pay for redistribution in favor of people in ill health is expected to be higher among those who experience health problems among their close relatives or themselves. However, our results (see Table 11 with entries I, K, L, M corresponding to entries 7, 10, 9, 4 of Table 8) suggest that family health status does not have an impact on preferences for the composition of the redistribution portfolio. For example, those with health problems have a WTP of 4.4 percent of average income for redistributing income in favor of the working poor to the detriment of people with ill health (line I), no different from the 4.76 percent in the general population (line 7 of Table 8). The 'no difference' finding holds true for the other three ways to distribute income away from the unemployed (lines K, L, M of table 11 compared to lines 10, 9, 4 of Table 8). Therefore, Hypothesis 4 cannot be confirmed.

6 Conclusion and Discussion

In this paper, we elicited citizens' willingness to pay (WTP) for the composition of the public redistributive budget through a Discrete Choice experiment performed in 2008. The theoretical background is provided by the insurance motivation for income redistribution (Hypotheses 1 to 4) and imperfect altruism as a motivation (Hypothesis 5). Hypothesis 1 predicts that WTP for redistribution is high if beneficiaries are exposed to major risks that are not insured, namely to have children and to belong to the working poor. Beneficiaries facing a risk that is mitigated by mandatory insurance (illness, unemployment, old age) are predicted to trigger lower WTP. Since this ranking is confirmed with one exception, Hypothesis 1 receives a good deal of empirical support.

Hypothesis 2, predicting the demand for redistribution favoring old-age pensioners to be highest among those close to or beyond retirement age, has to be rejected. Hypothesis 3, stating that the demand for unemployment support is higher for respondents expecting to be unemployed, can be only confirmed with respect to the trade-off between the unemployed and families with children. Hypothesis 4, stating that WTP for redistribution in favor of people with ill health is expected to be higher among those who experience health problems among their close relatives, cannot be confirmed due to a lack of statistical significance.

On the whole, the insurance motive as an explanation of the demand for income redistribution receives limited empirical support in this study. This is the more remarkable as the design of the Discrete Choice experiment permits respondents to express their preferences not only concerning the total amount of redistribution but also with regard to the allocation of the available funds to competing uses. It is in this second context where the insurance motive should become important in principle because individuals can predict to some extent the allocation that may be in their interest in the future. The failure to find the predicted effects points to other motives for income redistribution, in particular 'pure' altruism among the aged on favor of younger segments of the population who bear the burden of raising a family while facing the risks of becoming a working poor and someone in ill health. That altruism, at least of the 'imperfect' variety, may be at work is indicated

by the fact that there is WTP for redistribution in favor of migrants to Switzerland, a group current residents are extremely unlikely to belong in the future. Indeed, hypothesis 5, stating that the WTP for redistribution in favor of Swiss citizens is expected to be the highest, followed by citizens of Western European countries and others, is partially confirmed. WTP in favor of the two first groups dominates that in favor of recipients from other parts of the world but without the predicted difference in favor of Swiss nationals.

In sum, the view of income redistribution as a way of providing insurance against a miserable life at the bottom of the income distribution receives empirical support from this experiment only to the extent that WTP for it broadly reflects the degree to which recipients are exposed to risks not covered by social insurance. The more restrictive variant of this insurance view, relating types of beneficiaries (e.g. pensioners) to current states of respondent (e.g. age above 60) has to be rejected. However, the finding that Swiss preferences for redistribution are tilted against migrants from culturally distant countries suggests an important role for imperfect altruism. It would be worthwhile to explore the precise role of this type of altruism in future work. While perfect altruism does not put constraints on how to slice the pie in public redistribution policy, imperfect altruism conditions citizens' support of policy on the perceived cultural distance between its financiers and its beneficiaries. Policy makers would therefore be well advised to pattern programs designed to modify the distribution of income to the discussions of cultural distance of relevance in their country.

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A Appendix

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

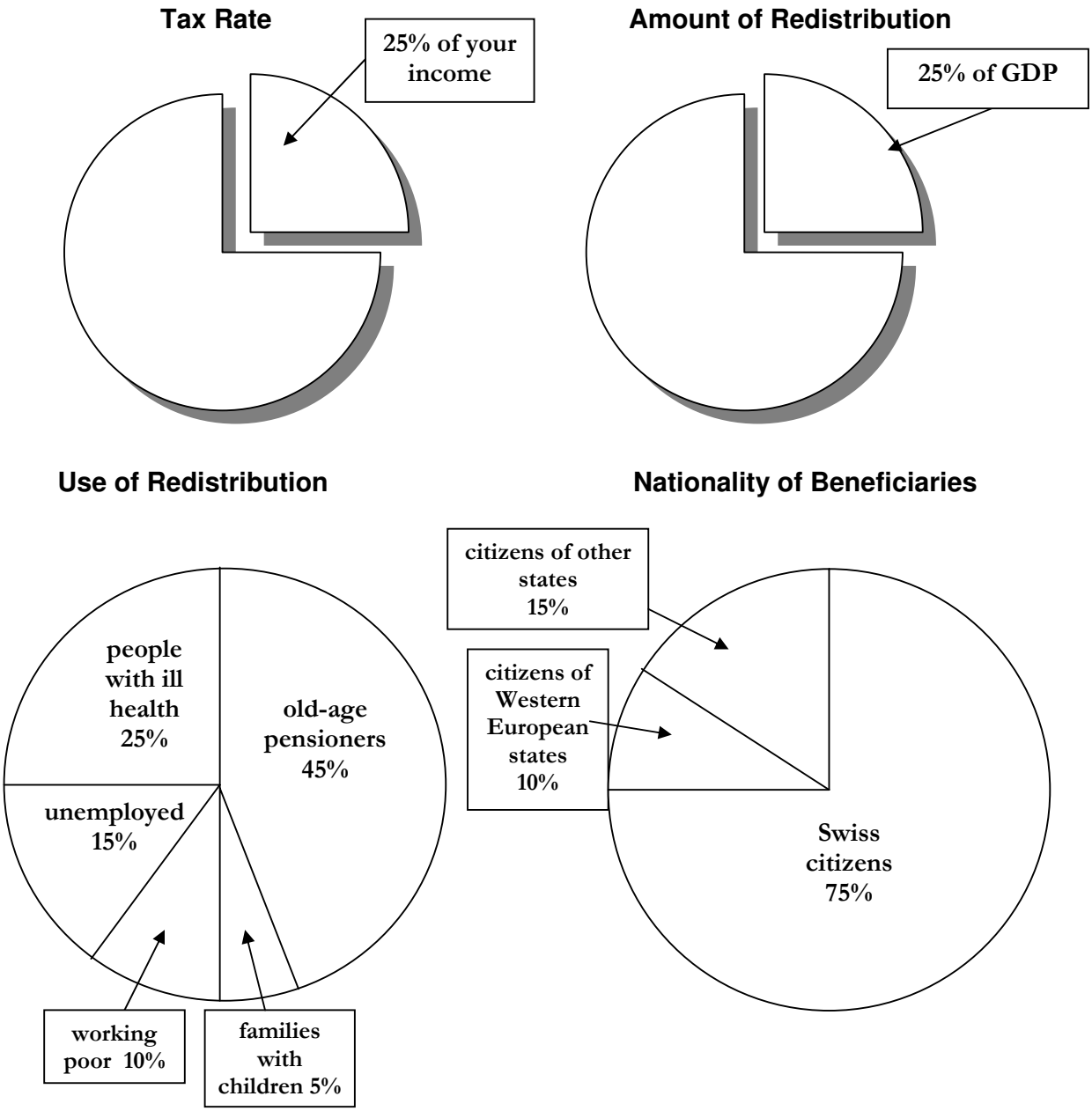

Exhibit 2: Card for Alternative No. 1

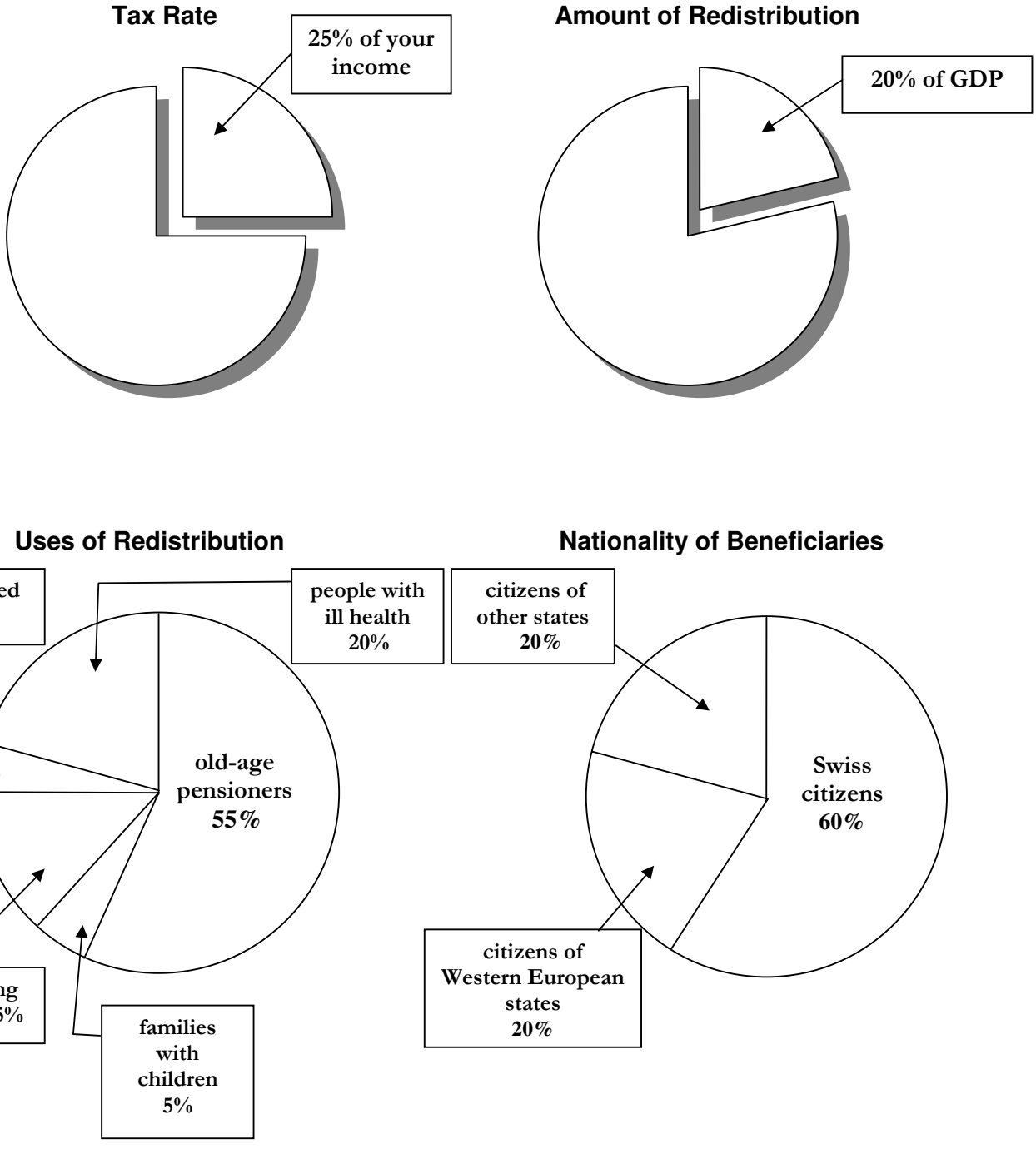
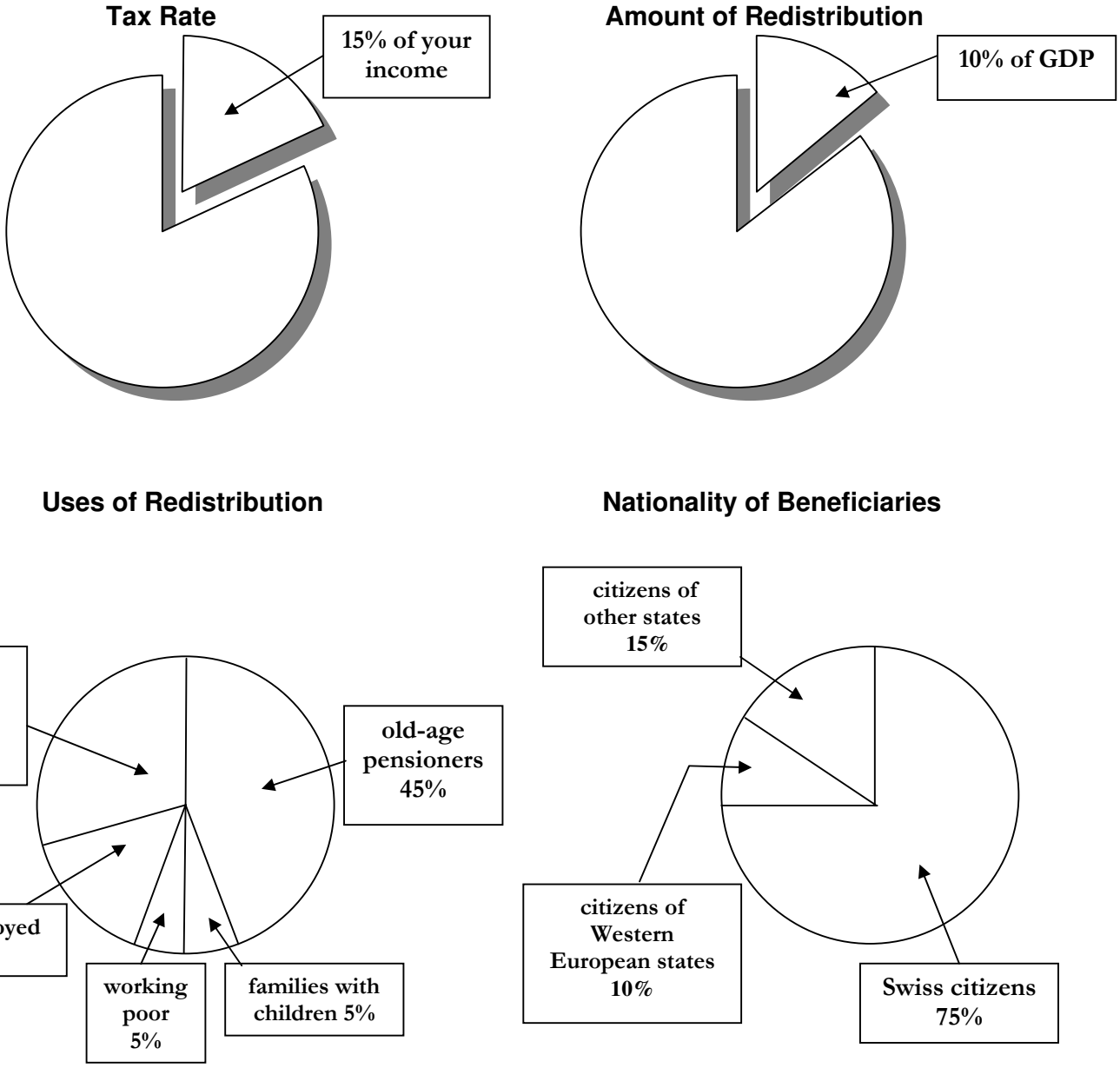
Exhibit 3: Card for Alternative No. 2