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The acceptance of priority criteria in health care: international evidence*

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Abstract

Social health care systems around the world are inevitably confronted with the scarcity of resources and the resulting distributional challenges. Prioritization is applied in almost all countries, implicitly or explicitly, and shapes access to health services. We analyze and compare attitudes towards prioritization of medical treatments in a group of countries. The focus is on the criteria of age, the fact that a patient has or does not have young children or the fact that a patient is a strong smoker or a non-smoker. We use representative data from the International Social Survey Program (ISSP) of the year 2011 for nine countries (DE, US, GB, CH, NL, SE, NO, DK, AU). The empirical analysis reveals strong effects of socio-demographic factors and attitudes towards aspects of the health care system on individual's acceptance of priority criteria. Among countries, Germans exhibit the highest aversion against priority setting whereas individuals from the US or GB are more in favor to prioritize according to the criteria smoking and age. However, a priority for patients with young children only receives support in Switzerland. Finally, we find evidence of egoistic motives for respondents' acceptance of priority criteria.

Keywords: health care priority setting, cultural values
***JEL*:** I14, I18, D63, D71

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1 Introduction

Scarcity of medical resources imposes restrictions on healthcare systems, especially on social health care systems. Many countries reacted to this issue by deciding on priorities or on basic packages of publicly financed medical treatments. In this paper, we analyze public attitudes towards priority setting according to patient characteristics among a set of nine countries with a developed and modern health care system, Germany (DE), United States of America (US), United Kingdom (GB), Switzerland (CH), Netherlands (NL), Sweden (SE), Norway (NO), Denmark (DK), and Australia (AU). Comparing across countries, we especially focus on the relationship between the norms and values a society hold and the attitudes considered.

We aim at investigating the attitudes of the countries' citizens towards priority setting in health care. Citizens are in several ways affected by the priority regulations in social health provision in their country. First, they are involved in the financing of the health care system, i.e. they pay taxes or contributions to the public funding, they pay premiums of private insurances or they pay out of pocket if costs of medical treatments are not covered elsewhere. Second, citizens are (potential) patients who have an interest in access to health care service and in quality of treatment. Third, citizens are voters who have a voice at the polls. For the development of health policies, it is therefore important to know details about the public opinion.

Priority setting in health care may use criteria from different categories. Criteria may depend on characteristics of diseases or interventions or on characteristics of social groups patients belong to. Our study concentrates on public opinions towards three patient-specific characteristics, as they are smoking behavior, age and family status. We use representative data from the International Social Survey Program (ISSP) of the year 2011, when a health module was implemented for the first time. The survey includes questions on priority setting in medical treatment in case of two patients who both need a heart operation. Patients are described to have the same health condition but differ with respect to one of the following personal characteristics, the fact that the patient is a non-smoker or a strong smoker, a difference in age (30 versus 70 years) or the fact that the patient does or does not have to care for young children. The respondents have to decide on who should be treated first. They can also vote for no-difference in priority. Besides individual data on gender, age, income, education, and family status, the respondents also give their opinions on several aspects of the health care system.

In a study on attitudes of the German Public towards priority setting in health care Ahlert and Pfarr (2015) observe a kind of self-serving bias disclosed by a relationship between the priority decisions of an individual and her own affectedness by the respective criteria. For instance, non-smokers tend to prefer a non-smoking patient more often than smokers do, and younger respondents prioritize the younger patient more often than older respondents do. Apart from these deviations from equal treatment, the authors find a strong tendency in Germany to decide in favor of no-difference, which can be interpreted as an avoidance to decide on priorities for the respective criteria or an application of some egalitarian value with respect to the criteria considered.

Egalitarian values of equal access and equal quality of health treatment as well as equity norms in general are intensively investigated theoretically and empirically in health economics and are

often found to govern opinions of respondents in questionnaire studies. Being responsible for effects of lifestyle on health is sometimes revealed as a reason to deviate from egalitarian norms (for a systematic overview on equity considerations in health economics see Olsen 2011). If it is a social value to protect families and to avoid negative effects of illness on family members this may imply priorities in favor of patients with young children (cf. Norheim et al. 2014 for a discussion of justifications of priority criteria). This brings up the question about the relationship between norms and values a society holds and the attitudes towards priority setting in health care. In their discussion of the findings from a European cross-country study (cf. Van Exel et al. 2015) the authors conjecture that there exists an influence of ethical values on public views on criteria for priority setting. We agree to the authors' opinion that there is lack of research giving insights into the normative background of such views. We aim at investigating this issue in our study using representative data from the nine countries considered.

In order to measure values people in the respective societies hold we use the well-known Hofstede-index (HF; Hofstede et al. 2010) and the Inglehart-Welzel cultural map of the world (IW; WVS 2015). The HF measures cultural values in different countries with respect to six dimensions. The IW adds two more dimensions. These indices enable us to investigate country effects in a differentiated manner.

Some evidence on citizens' attitudes for prioritization exists. But this evidence is only available for single countries, for example Raspe and Stumpf (2013), Müller and Groß (2010) or Schomerus et al. (2006) for Germany, Dolan and Tsuchiya (2005) for Great Britain and Alvarez and Rodríguez-Míguez (2011) for Spain. The main findings are that citizens attach lower priorities for people behaving health damaging, older patients – when compared to younger ones – and patients whose medical condition are similar to their own. However, analyses on country level cannot be generalized to an international comparison of attitudes for priority criteria and cannot consider cultural or macroeconomic indicators. We want to relate opinions on priorities to socio-economic characteristics of the respondents, to their attitudes towards the health care system in their country and to cultural values shared in the respective societies. As far as we know, we are the first to reveal such a relation.

The paper is structured as follows. In Section 2, we compare the regulations towards priorities in health care in different countries with a special focus on patient characteristics. The measures of country specific values are discussed in Section 3. Section 4 describes data and statistical methods. Results are presented in Section 5. Section 6 concludes.

2 Prioritization around the world

The countries we consider are characterized by an advanced medical service although they differ in the distribution between public and private shares of health care expenditures; in all considered health care systems per capita expenditures are quite high (see WHO 2015).

During the last three decades, all nine countries developed policies related to priority setting in health care. Table 1 offers an overview on early initiatives with the respective year of their publications together with the basis of the priorities defined. The years of publication show that in the late 1980s Norway as well as Oregon in the US introduced very early initiatives, being followed by institutions in many countries in the late 1990s and some later developments.

Table 1: Initiatives for prioritization in health care – international comparison

Country	Institution, Years of Foundation	Criteria, basis for priorities, or decision process
DE[+]	Federal Joint Committee (G-BA) 2004, Institute for Quality and Efficiency in Health Care (IQWIG) 2004	Case wise decisions about reimbursement of treatments by public health insurance, basic package, prices of pharmaceutical products
US*	OREGON 1989	Ranking of condition-treatment pairs
GB*	NICE 1999	Cost-effectiveness evaluations, QALY
CH[o]	Health Report 2020 by Federal Council 2013	Definition of priority areas (up to now basic package)
NL*	Dutch Committee on Choices in Health Care (Dunning Committee) 1992/1995	Basic package of health service
SE*	Commission of parliament members and experts 1993/1995	Ethical platform principles, political/administrative and clinical priority groups
NO*	Lønning Committee I and II 1987/1997	Priority principles, priority groups based on severity of the disease
DK*	Danish Council of Ethics 1997	Core values, general goals, partial goals
AU[#]	Australian Institute of Health and Welfare AIHW 1996 - 2012	nine national priority areas (diseases)

Source: [+]SGB V (2015), *Sabik and Lie (2008), [o]FOPH (2013), [#]AIHW (2015)

In pursuing our goal to investigate and compare the attitudes of citizens related to priority setting in medical treatments we concentrate on priorities defined by three different patient-specific properties, as they are being a smoker or a non-smoker, age, and having children or not. Overall, in most of the nine countries considered priorities in health care are defined with respect to diseases or treatments. There are not many explicit regulations on priority setting with respect to the three individual characteristics of patients used in this study. However, countries differ in their policies and sometimes exceptions exist or priorities are indirectly introduced. A direct priority setting e.g. with respect to age would mean that the criterion of age is used to define exclusion from medical treatment or rankings on waiting lists. Indirect priority setting may occur if a criterion is used to define the extent of medical treatment that is highly related to age, for instance expected lifetime or life years gained by the treatment.

Let us give some examples of priority setting in the countries considered in this study. In the US' health insurance institutions Medicare and Medicaid smokers have to pay a surcharge up to 50% of their contribution which can be interpreted as some kind of indirect priority setting, not directly in terms of restrictions of treatment but in terms of higher contribution to get the same treatment. In contrast, e.g. the US Age Discrimination Act of 1975 prohibits discrimination by health care if health care providers receive funds from the US Department of Health and Human services. In Germany and the Netherlands, patient characteristics are not explicitly or officially used to discriminate between patients and to prioritize medical treatments. Exceptions are organ transplantations in Eurotransplant (to which Germany and the Netherlands belong) where rules may differ between age groups. According to the Swedish guidelines, biological age and future lifestyle might be considered in priority setting. The reason required for these

types of posteriorization is that the effect of the medical intervention would be negatively influenced and the risk of side effects might increase. In Norway, effectiveness of a treatment plays an important role. This could lead to indirect priorities dependent on age or smoking behavior, if these characteristics would lead to a less effective intervention. In England the regulation by NICE are governed by the principle of cost-effectiveness. According to NICE priorities should not contain age-discrimination (exceptions need reasons), behavior dependent conditions, and social roles should not be considered, too. We do not find regulations prioritizing patients with young children in the nine countries considered.

In many countries, there is an ethical and legal discussion if age-dependent priorities or priorities on other individual aspects such as health behavior or social situation are justified. In a guidance initiated by the WHO for priority setting in health care on a national or sub-national level (cf. Norheim et al. 2014), an international group of experts recommend not to include age as an independent criterion. They point out that other proposed criteria like cost-effectiveness or the aim of health care to increase economic productivity may often be advantageous for the younger and thus may lead to indirect priorities. They also exclude individual responsibility as an explicit criterion in case an individual's behavior may have influenced her health condition. However, they note that governments may consider this aspect and may additionally consider if patients have the ability to pay for their own care. In our case, this applies to smoking and the example of higher contributions for smokers in the US. The authors include in their proposal the option of priority setting for patients who have to take care of others, e.g. young children. A justification they consider applicable is a protection against social effects of sickness.

In a European cross-country study of the EuroVaQ-Group (van Exel et al. 2015) report on five different viewpoints on priority setting in health care and some differences between countries. Within these viewpoints the patient characteristics we consider play a more or less important role, i.e. posteriorizing those with an unhealthy lifestyle (in our case this applies to smoking), priority setting in favor of young patients, and priorities for patients with young children. The results from this explorative study create a strong demand and motivation to investigate the public opinions towards the described patient dependent criteria more deeply in an international representative study.

3 Measuring country specific values

Institutions and regulations governing a country's health care system are important aspects of social life and influence the distribution of wellbeing among citizens (cf. The WHOQOL Group 1998). In democratic societies, these institutions evolve more or less indirectly because of voting processes where citizens' opinions influence political feasibility. This could be observed e.g. in the 2008 and 2012 elections in in the US where Obama put emphasis on a new federal health plan. In the British election of 2015, the National Health Service was an important issue, too. Thus, one can conjecture that in democratic societies regulations of the health care system are related to some extent to the attitudes of people towards the functioning of this system. This concerns a special feature of the set of general attitudes of people in a society that can be assumed to be influenced by a set of internalized values. There might be a variety of values in a society while not everybody will share the same. However, there have been attempts to measure

values found in societies on an aggregate level to enable comparisons between different societies. The most prominent indices are the Hofstede-index (HF) and the Inglehart-Welzel cultural map of the world (IW).

The HF is composed of six dimensions measuring aspects of national cultures (cf. Hofstede et al. 2010, for a detailed description).[4] The first four dimensions are based on four anthropological areas; how individuals deal with inequality (*Power Distance*), with uncertainty (*Uncertainty Avoidance*), how individuals tie to other groups in society (*Individualism*), and how individuals deal emotionally with the fact of being a woman or a man (*Masculinity*). The fifth dimension based on the World Value Survey measures the orientation towards future rewards (Long-Term Orientation or *Pragmatism*), compared to an emphasis on past and present which would characterize a short-term orientation. The sixth dimension (*Indulgence* versus Restraint) measures how free people feel to enjoy their lives compared to a life where the fulfillment of individual desires is restricted by social norms. Scale ranges from zero to 100 for each dimension. Table 2 roughly indicates what a high or a low value of a certain dimension means for the behavior of people in a society. Of course, the characteristics of behavior and their implications for certain areas of social life are much more complex. These issues are extensively discussed in Hofstede et al. 2010.

The second index we include is taken from the IW (cf. World Value Survey Wave 6for a detailed description). Here we concentrate on two dimensions, *Traditional versus Secular-Rational Values* and *Survival versus Self-Expression Values*. The first dimension measures whether a society is oriented towards traditional values such as family, religion and authority or if these values are less important such that e.g. divorces or abortions are accepted. The second dimension displays how important economic and physical security are to secure survival of individuals in a society in contrast to the realization of values like equality and participation in social life and politics or issues of self-expression. Values can range from positive to negative. Table 2 indicates what high or low values of the dimensions mean.[5]

[4] The index differentiates between countries not between individuals within countries.

[5] The IW offers a classification in country clusters, too. However, in our case the considered countries belong to the clusters “Protestant Europe” or “English Speaking” (US, GB, AU), so that we do not have enough variety in our set to expect to observe relations.

Table 2: Dimensions of Hofstede-index and Ingelhart-Welzel cultural map of the world

Dimensions	**High Values**	**Low Values**
Hofstede-index		
Power Distance[1]	acceptance of hierarchies	power inequalities are not accepted
Individualism[1]	more individualistic society	collectivist and interdependent society
Masculinity[1]	success, material welfare and competition	cooperative behavior
Uncertainty Avoidance[1]	feeling uncomfortable in uncertain or ambiguous situations	accept uncertainties
Pragmatism[1]	society pragmatically adapts to challenges in the future	tradition and fulfilling of social obligations is important
Indulgence[1]	people are allowed to enjoy their lives and have fun	restrained societies
Inglehart-Welzel cultural map of the world		
Traditional vs. Secular-Rational Values[2]	traditional values are less important	traditional society
Survival vs. Self-Expression Values[2]	issues of self-expression, equality in society and participation are important	survival is very important, i.e. economic and physical security

[1] Data on these dimensions from HF (Hofstede et al. 2010). [2] Data on these dimensions from IW (WVS 2015).

From the discussion in Hofstede et al. (2010) we derive some coarse expectations on the relation between dimensions of cultural values and the acceptance of priorities in health care. A small *Power Distance* means that inequalities in social relations are not very much accepted. Transferring this aversion to priority setting in health care we conjecture that a small *Power Distance* goes along with many no-difference choices. The dimension *Individualism* correlates with the acceptance of self-oriented decisions but also with taking responsibility for own decisions. Therefore, we expect a positive relation between *Individualism* and the votes of respondents for posteriorizing smokers and therefore prioritizing non-smokers. “Female” societies (low values of *Masculinity*) are characterized by giving weight to helping the needy. This may relate to a rejection of priority setting in the considered cases where patients are in need of the same operation. *Uncertainty Avoidance* may include aspects that also relate to the access to health care, since the quality of health is one source of uncertainty in development of life. This may show up in votes pro priority for the non-smokers, the young or patients with children, since this directly or indirectly influences health in respectively longer life spans. The dimension *Pragmatism* or Long- and Short-Term Orientation implies that service to others is an important goal in social life. This may correlate with many no-difference votes. A low *Indulgence* stands for the tendency that gratifications of desires to enjoy life are regulated by strict social norms. This may result in priority setting in favor of non-smokers in societies where many people think that smokers violate some social norm. In societies where family values are very important, priorities pro patients with young children may also be observed.

Since the two dimensions of IW comprise several aspects of social values it seems ex ante not easy to formulate hypotheses on their relation to priority setting in health care. However, we conjecture that there might be the effect that in more traditional societies the discrimination of smokers in not very acceptable. Respect for older people in these societies might lead to less

priority setting for the younger. The traditional protection of families may result in higher priorities for patients with young children. In IW, a high level of self-expression values goes along with political emancipation and an acceptance of life-style liberty including responsibility for consequences. This might show up especially in priority setting for the non-smoker and maybe in a general insight in the necessity of priority setting in health care.

4 Data and methods

4.1 Data

The micro-econometric analysis is based on the International Social Survey Program (ISSP), 2011, Health and Health Care Module (ISSP Research Group 2013). The ISSP – first conducted in 1984 – is a continuous programme of cross-national annual surveys covering specific topics of social science. The Health and Health Care Module implemented for the first time in 2011, provides data of individuals' evaluation of the health care system, individuals' health status and health insurance coverage. Additionally, the representative samples of the population of several countries contain information about basic socioeconomic characteristics. To compare attitudes towards priority criteria for different countries, we focus on the following nine countries: Germany, USA, GB, Switzerland, Netherlands, Sweden, Norway, Denmark and Australia.[6] For each of these countries, a large sample size is available (between 920 and 1,700 observations) which enables us to produce precise estimates of the determinants of attitudes towards priority criteria.

The dataset contains answers to three questions on priorities in case of a heart operation that are formulated as a decision on the time sequence of the operations of two patients who differ with respect to one characteristic. Survey questions 12, 13 and 14 ask respondents "Suppose two equally sick patients need the same heart operation." In the following, the subject is informed that the two patients differ in one specific aspect in every issue (heavy smoker vs. non-smoker; 30 years old vs. 70 years old; having children vs. not having children). For each scenario, the respondent has to decide who should get the operation first or whether the criterion should make no difference between the patients. Due to the time sequence of the operation, the questions differ from pure priority elicitations. An additional burden of waiting and the risk of complications or death if a patient is not treated first are imposed by using the case of a heart disease. Accordingly, opportunity costs have to be taken into account by the respondents when forming their decisions. The received opportunity costs may differ between countries dependent on expected waiting times for heart operations and risks of dying in between. We do not have information on the perceptions of the severity of a delay of an operation by respondents in different countries, however, we feel justified to assume that respondents realize that the questions raise serious problems. We use the answers to these three questions as dependent variables to measure attitudes towards prioritization criteria. Respondents are assumed to sincerely reveal their underlying preferences.

[6] The sampling procedures differ for the individual country between simple and multi-stage stratified random samples. Background variables were conducted mostly by face-to-face interviews whereas specific questions of the Health Care Module have been gathered by paper and pencil, computer assisted personal or web surveys.

A series of socioeconomic variables, attitudes towards aspects of the health care system, health behavior as well as health status and health insurance coverage are included as explanatory factors for individual's preferences for prioritization criteria. Table 3 provides a description of these variables.

Within the group of socioeconomic variables, we especially focus on the effects of age and if the respondent has children as these characteristics identify the potential group of affected patients within two of the three prioritization decisions. Under an egoistic motive, we expect younger individuals to prefer more often the young patient to be treated first than older respondents and vice versa. The effect of age is covered by five age categories with age1 serving as reference category. For the prioritization decision regarding the criterion children, we assume families with children to be more in favor of patients with children than subjects without children do. We refer to three indicator variables *children1, children2* and *children3* to uncover these effects. Respondents not having children are the reference category. In addition to these core variables, we control for income, education and family status.

Table 3: Variable description

variable name	**label**
socioeconomic Variables	
female	female yes/no
age2	age>=30 and <40 years
age3	age>=40 and <50 years
age4	age>=50 and <65 years
age5	age>=65 years
income position	ln(family income/median of family income)
income position^2	ln(family income/median of family income) squared
education level1	lower or upper secondary school
education level2	post-secondary school, non-tertiary school
education level3	lower level tertiary or upper level tertiary
married	married yes/no
widowed	widowed yes/no
divorced	divorced or separated yes/no
children1	one child in household yes/no
children2	2 children in household yes/no
children3	3 or more children in household yes/no
religion	religious denomination yes/no
attitudes towards aspects of the health care system	
reason: unhealthy behavior	severe health problems: reason unhealthy behavior yes/no
best treatment	would receive best available treatment if falling ill yes/no
health behavior	
cigarettes 1-5	smokes between 1 to 5 cigarettes per day yes/no
cigarettes 6-10	smokes between 6 to 10 cigarettes per day yes/no
cigarettes >10	smokes more than 10 cigarettes per day yes/no
alcohol	has more than several times a week 4 alcoholic drinks yes/no
health status and insurance coverage	
SAH	self-assessed-health: 1=very good to 5=very bad
Public Health Insurance	National or Public Health Insurance yes/no
Private Health Insurance	Private Health Insurance coverage yes/no
Other Health Insurance	other forms of health insurance yes/no

Attitudes towards aspects of the health care system are also included as explanatory variables. The variable *reason: unhealthy behavior* is expected to affect preferences for prioritization regarding the criterion of smoking behavior. The variable captures attitudes that severe health problems are caused by an unhealthy lifestyle. Accordingly, respondents of this conviction are supposed to prefer prioritization of non-smokers. The variable *best treatment* serves as an indicator of whether respondents think they are getting the best treatment available if they fall ill. This attitude should result in a higher tendency to prefer the no-difference option and an aversion to prioritize respectively.

The first prioritization criterion is smoking behavior. Respondents' health behavior is considered to affect their preferences regarding this criterion. Again, assuming individuals to be solely egoistic, smokers should thus prefer smokers to be prioritized. The same should holds true for respondents consuming alcoholic drinks several times a week.[7]

In addition, we control for individuals' health status (*SAH)* and health insurance coverage (*Public Health Insurance*, *Private Health Insurance* and *Other Health Insurance*). *No health insurance* forms the reference category. The summary statistics for all independent variables are presented in table 4.

The complete dataset for all nine countries consists of 13,108 observations. Overall, 53 % of them are females. About 12 % of the respondents have one child, 9 % have two children and only 3 % of the respondents have three or more than three children. The conviction that severe health problems arise because of an unhealthy lifestyle is relatively low (11 %). With respect to health behavior, about 20 % of the respondents smoke at least one cigarette per day and 7 % report to consume alcoholic drinks several times a week.

To compare attitudes towards prioritization criteria, we use four different sets of variables. In the basic scenario (Model I), country fixed effects are included (reported in table 4). We suppose that differences in the evaluation of prioritization should be mainly due to differences between countries. In the second and third model, we refer to measures of cultural differences between countries. Therefore, Model II includes the six dimensions of the HF (cf. Hofstede et al. 2010) and Model III covers the dimensions of the IW (WVS 2015; see table 3). We discuss both indicators below. Finally, Model IV accounts for within country variation by several macro indicators (*hospital beds*, phy*sician density per 1,000 inhabitants*, *health expenditures in percentage of GDP*, *out-of-pocket payments* and the *reduction in the GINI coefficient* as a measure for redistribution; see table 4). The data for the macro indicators come from the *World Development Index* database (The World Bank 2014) and the OECD (2015).

[7] The correlation between smoking behavior and *alcohol* is about 0.1.

Table 4: Summary statistics

	Dataset			*Estimation sample N = 8,333*	
	N	*Mean*	*SD*	*Mean*	*SD*
socioeconomic Variables					
female	13,108	0.53	0.50	0.51	0.50
age2	13,108	0.14	0.35	0.15	0.36
age3	13,108	0.18	0.39	0.19	0.39
age4	13,108	0.29	0.46	0.31	0.46
age5	13,108	0.23	0.42	0.21	0.41
income position	11,071	-0.05	0.76	-0.02	0.74
income position^2	11,071	0.59	1.63	0.55	1.60
education level1	12,799	0.32	0.47	0.30	0.46
education level2	12,799	0.22	0.42	0.23	0.42
education level3	12,799	0.37	0.48	0.40	0.49
married	12,998	0.55	0.50	0.56	0.50
widowed	12,998	0.07	0.25	0.06	0.23
divorced	12,998	0.12	0.33	0.12	0.33
children1	12,872	0.12	0.33	0.13	0.33
children2	12,872	0.09	0.28	0.09	0.29
children3	12,872	0.03	0.17	0.03	0.17
religion	12,937	0.73	0.44	0.72	0.45
attitudes towards aspects of the health care system					
reason: unhealthy behavior	12,580	0.11	0.31	0.12	0.32
best treatment	12,591	0.17	0.38	0.17	0.37
health behavior					
cigarettes 1-5	12,917	0.04	0.21	0.04	0.21
cigarettes 6-10	12,917	0.06	0.23	0.06	0.23
cigarettes >10	12,917	0.10	0.30	0.10	0.30
alcohol	12,943	0.07	0.25	0.07	0.26
health status and insurance coverage					
SAH	12,966	2.78	0.98	2.75	0.97
Public Health Insurance	12,921	0.44	0.50	0.42	0.49
Private Health Insurance	12,921	0.14	0.35	0.14	0.35
Other Health Insurance	12,921	0.38	0.48	0.39	0.49
countries					
DE (reference category)	13,108	0.13	0.33	0.13	0.34
US	13,108	0.12	0.32	0.11	0.31
GB	13,108	0.07	0.26	0.06	0.24
CH	13,108	0.09	0.29	0.09	0.29
NL	13,108	0.11	0.32	0.11	0.32
SE	13,108	0.09	0.28	0.09	0.29
NO	13,108	0.14	0.35	0.14	0.35
DK	13,108	0.11	0.31	0.13	0.34
AU	13,108	0.14	0.35	0.12	0.33
macro economic indicators					
hospital beds	13,108	4.25	1.68	4.27	1.71
physician density per 1.000	13,108	3.48	0.59	3.49	0.58
health expend. % of GDP	13,108	11.29	2.52	11.32	2.44
out of pocket payments	13,108	14.02	5.22	13.92	5.15
GINI reduction	13,108	47.89	17.72	48.11	17.88

4.2 Value dimensions

Table 5 presents an overview on the cultural values. With respect to *Power Distance*, all countries have values between 30 and 40, with the exception of Denmark, where the value of 18 indicates that inequalities are less accepted than in the other countries. All countries show quite high values in the dimension *Individualism*, lying between 67 and 91. There are three countries where the aspects of self-actualization are very high, the US (91), GB (89), and Australia (90), which belong to the "English Speaking" Countries in the IW. Levels of *Masculinity* are relatively low in the Netherlands, Sweden, Norway and Denmark indicating that in these countries aspects or success, material welfare and competition are not very important. Values of *Uncertainty Avoidance* are mostly in the midrange. The highest score is observed in Germany (65), pointing to some relatively strong tendency in Germany to try to impose measures against uncertainties. The lowest values can be found in Denmark (23), Sweden (29), and GB (35) showing that in these countries people accept uncertainties more than in the others. Germany again is characterized by a very high value of *Pragmatism* (83), i.e. the German society seems to be very much long-term oriented. Very low values can be found for Australia (21) and the US (26) followed by Norway and Denmark (35). Here short-term orientation and traditions seem to prevail. With respect to *Indulgence*, values are around 70 except for Germany (40) and Norway (55), which both seem to be more restrained than the other countries.

Table 5: Comparison of cultural values

Dimensions	**Mean**	**DE**	**US**	**GB**	**CH**	**NL**	**SE**	**NO**	**DK**	**AU**
***Power Distance*[1]**	*33.11*	35	40	35	34	38	31	31	18	36
***Individualism*[1]**	*77.67*	67	91	89	68	80	71	69	74	90
***Masculinity*[1]**	*40.89*	66	62	66	70	14	5	8	16	61
***Uncertainty Avoidance*[1]**	*45.56*	65	46	35	58	53	29	50	23	51
***Pragmatism*[1]**	*49.44*	83	26	51	74	67	53	35	35	21
***Indulgence*[1]**	*65.00*	40	68	69	66	68	78	55	70	71
***Traditional vs. Secular-Rational Values*[2]**	*0.75*	1.39	-0.81	0.06	0.74	0.71	1.86	1.39	1.16	0.21
***Survival vs. Self-Expression Values*[2]**	***1.71***	**0.49**	**1.76**	**1.68**	**1.90**	**1.39**	**2.35**	**2.17**	**1.87**	**1.75**

[1] Data on these dimensions from HF (Hofstede et al. 2010). [2] Data on these dimensions from IW (WVS 2015).

The first dimension of the IW, *Traditional vs. Secular-Rational Values* shows three low values for the US (-0.81), GB (0.06), and for Australia (0.21) pointing – at least for US and Australia – again to the characteristics of societies that estimate traditional values higher than the other countries. In the second dimension *Survival vs. Self-Expression Values*, Germany shows the lowest value (0.49), all other countries have values between 1.39 and 2.35. This means that in Germany economic and physical security are more important than in the other countries. This observation fits to the fact that Germany has the highest value in the dimension "Uncertainty Avoidance" of the HF.

Figure 1 shows the deviations from the mean of each dimension of the HF and the IW for each country.

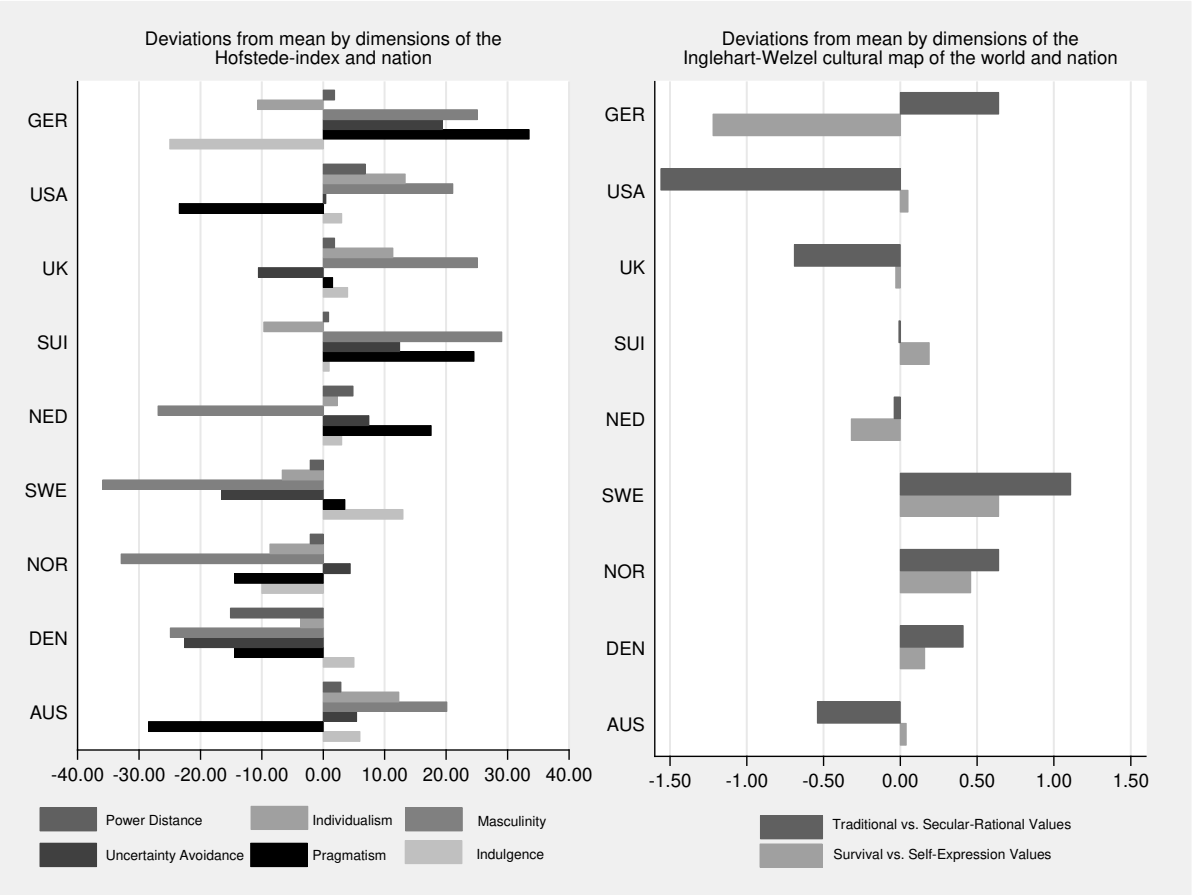

Figure 1: Comparing value dimensions by nations

Comparing pattern of dimensions we find Germany and Switzerland to deviate positively from the mean regarding the dimensions *Power Distance, Masculinity, Uncertainty Avoidance* and *Pragmatism*. This indicates that these societies – compared to the mean of all countries – are characterized by a higher tendency to accept the established hierarchy (*Power Distance*), a higher degree of competition, achievement and success (*Masculinity*), by feeling more threatened by ambiguous or unknown situations (*Uncertainty Avoidance*) and are rather pragmatic regarding future challenges (*Pragmatism*). On the contrary, Germans and Swiss range below the mean regarding the dimension *Individualism* meaning that they are more collectivistic. Therefore, we expect some similarities between the attitudes towards priorities of Germans and Swiss. Germany additionally has the special feature of a very low level of *Indulgence* pointing to a social life governed strongly by certain norms. Combined with the observation of the lowest level of self-expression in the IW dimensions we assume that in Germany priority setting in health care is not broadly accepted.

In addition there are some similarities between the patterns of the US, GB and AU. These countries show levels of *Pragmatism* below average. The levels of all other dimensions are above average, especially with respect to *Masculinity*. Therefore, we may expect a relatively higher acceptance of priority setting. For the US, the very low level of traditional values in IW points to this conjecture, too.

Sweden, Norway and Denmark show levels below average in many dimensions, the lowest ones

are the levels of *Masculinity*. These three countries are also characterized by similar and relatively high values in the IW dimensions. This may show up in some similarities between attitudes towards priority setting in our estimations later on. The pattern for the Netherlands is special; the only dimension with a level below average is *Masculinity*. Relatively strong above average is *Pragmatism*. Therefore, NED ranges between the Scandinavian countries and the other countries.

4.3 Comparing attitudes towards priority setting

Attitudes towards the three prioritization criteria differ markedly between the nine countries considered in our analysis. Figure 2 to figure 4 presents the frequencies of the answers for the three dependent variables *smoking criterion*, *age criterion*, *children criterion.* The graphics are each separated by country and the characteristic of the respective patient group.

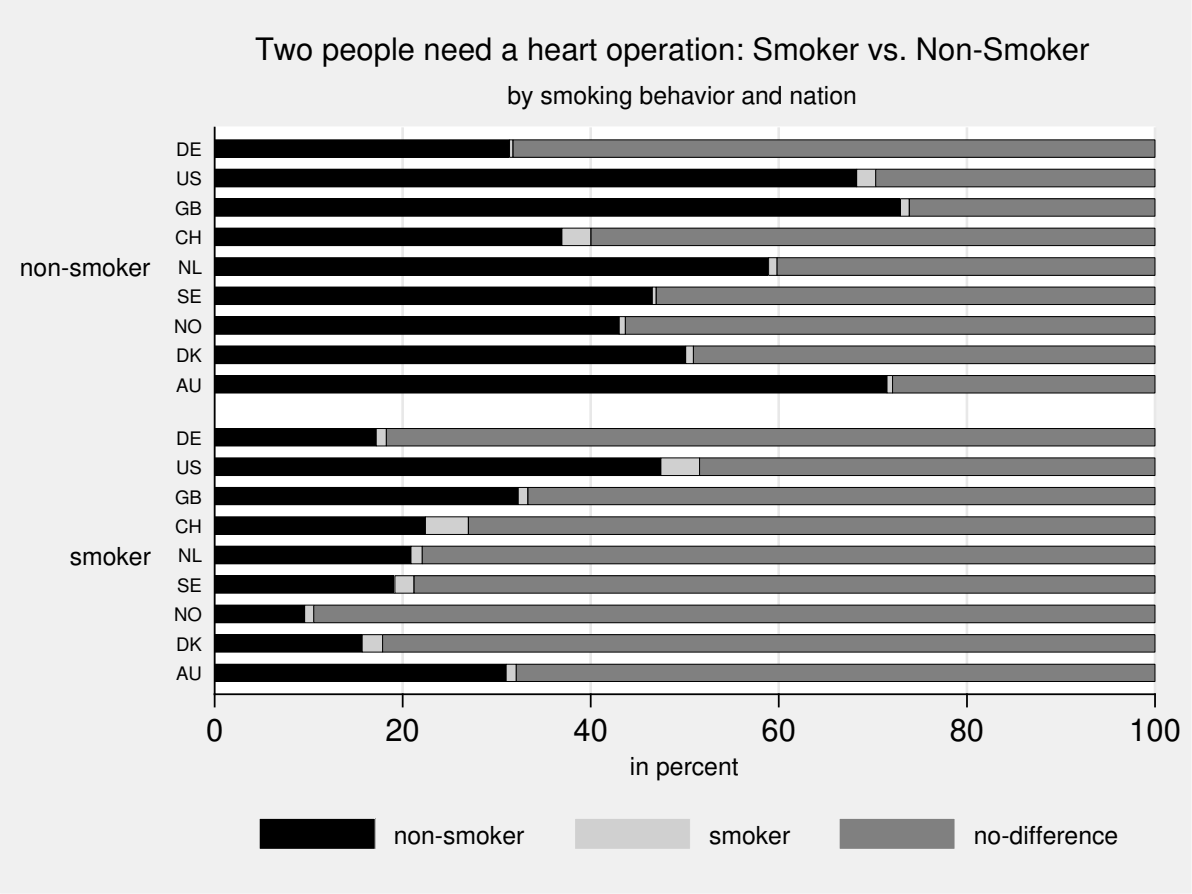

Figure 2: Decisions from priority setting regarding the criterion smoking

Overall, about 47 % of the respondents prefer the non-smokers to be prioritized in case of the heart operation, whereas 52 % are not willing to prioritize regarding the criterion smoking. Only about 1 % gives priority to smokers. However, strong differences in attitudes regarding this criterion exist between countries. For example in the US, GB and Australia, more than 60 % prefer non-smokers whereas in countries such as Germany or Switzerland, only about 30 % are willing to prioritize non-smokers. We also find different evaluations of the prioritization criterion depending on whether the respondent is smoker or not. In general, non-smokers put higher emphasis on prioritizing non-smokers whereas smokers by majority opt for the no-difference

option. This means that smokers do not often give priority to their own group but large majorities of them also do not vote for prioritizing non-smokers.

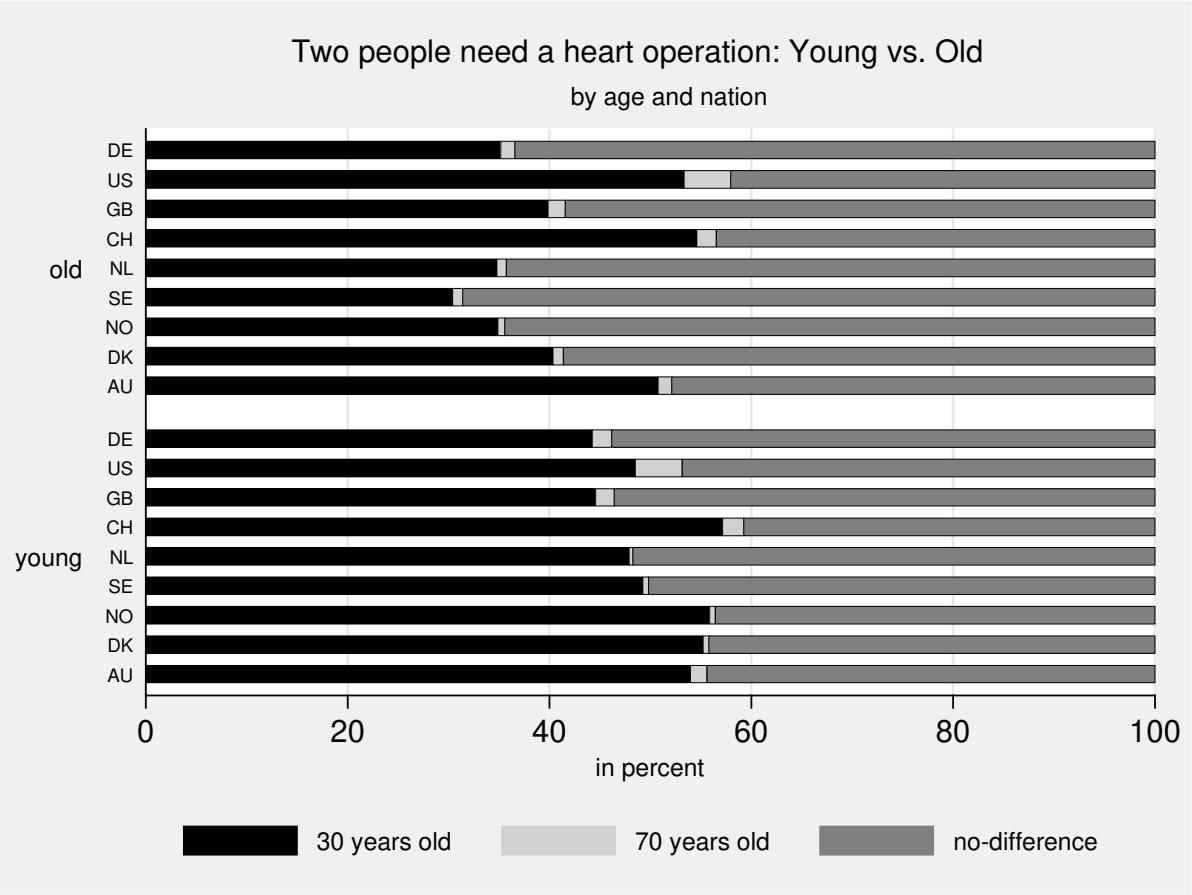

Figure 3: Decisions from priority setting regarding the criterion age

The pattern of attitudes towards prioritization with respect to age does not show differences as strong as in case of smoking. About 46 % of the entire sample prefers young individuals to be treated first. Only 1.57 % chooses the old to be prioritized. We find that in the US, Switzerland and Australia, individuals with preferences to prioritize the young patient form a majority of the society. The strongest aversion (no-difference option) to prioritize patients regarding their age can be found for Germany, GB, Netherlands and Sweden (about 55 % to 60 %). Except of the US, young individuals prefer young patients more often and old respondents put a higher weight on the no-difference option instead of prioritizing patients of their age cohort. The finding for the US is special as the old are giving young patients more often a higher priority than young respondents do.

Finally, prioritizing regarding the criterion of having to care for children is less popular. Only 32.88 % is willing to prioritize parents responsible for young children. Compared to the other criteria, this is the lowest support for prioritization and the strongest aversion against prioritization, respectively. Patients without children do not receive any support (0.52 %). Prioritizing patients with children is most accepted in the US (45 %) and Switzerland (50 %) whereas the aversion against this criterion is highest in the Netherlands (78 %) and Sweden (76 %). Among all countries, the willingness to prioritize patients with small children is higher among respond-

ents having children. However, the difference is not very large. Patients without children receive equal support among respondents having and not having children only in Switzerland (about 1.8 %).

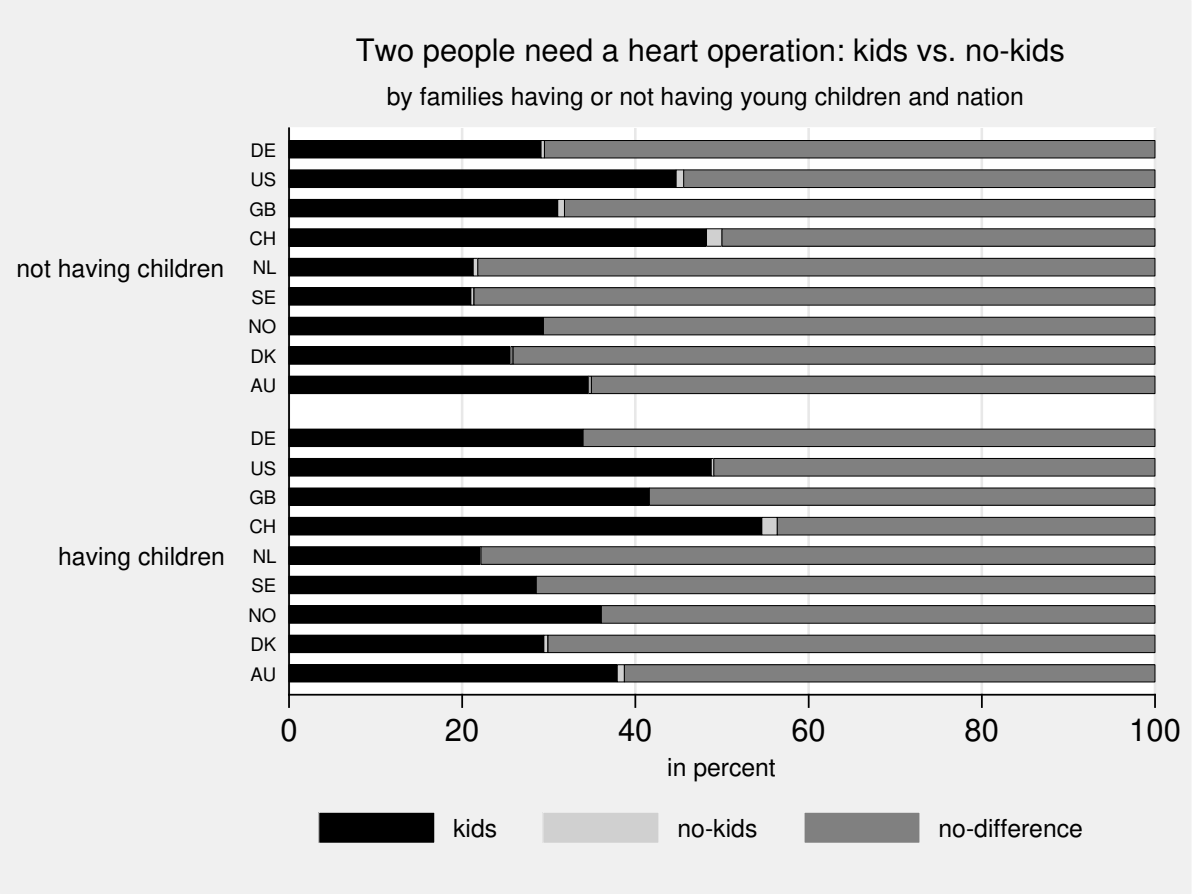

Figure 4: Decisions from priority setting regarding the criterion children

Summarizing the descriptive statistics so far yields interesting insights. First, we find that attitudes towards prioritization criteria differ between countries, between the criteria considered and between groups of respondents who match the respective characteristic. Second, while non-smokers, young or parents receive support, smokers, old patients and patients not responsible for young children are not prioritized, neither by respondents who share the respective characteristic nor by the entire population. Third, the aversion against prioritization with respect to the patient characteristics considered is rather strong among various countries.

The evaluation of prioritization might correlate among the three criteria. Table 6 reports the frequencies of individuals in each country always choosing to prioritize (i.e. one of the two options) and of individuals always opting for the no-difference option. Overall, 17.16 % accept smoking, age and having children as prioritization criteria and about 31 % of the respondents choose the no-difference option in each scenario. Accordingly, attitudes towards prioritization might be governed by a more general attitude of an individual to be willing to prioritize or not and decisions might thus be dependent. Strong differences exist between countries. The fraction of people always opting to prioritize is highest for the US followed by Australia and Switzerland. In Sweden and Germany, this fraction is lowest. The share of respondents in all three

scenarios choosing the no-difference option is highest in Germany and lowest in the US and Australia.

Table 6: **Priority decision behavior**

Country	[1] Always choosing…	
	to prioritize	*no-difference option*
DE	10.54%	45.54
US	29.75%	20.41
GB	20.16%	23.91
CH	21.40%	28.15
NL	12.36%	32.46
SE	9.39%	34.81
NO	12.94%	35.80
DK	15.89%	34.16
AU	25.05%	20.02
Total	17.16%	31.37

4.4 Empirical strategy Formel-Kapitel 4 Abschnitt 1

The underlying dependent variables of prioritization decisions are categorical. However, descriptive statistics show that the frequencies of answers indicating priority for smokers, old patients and patients not having children is fairly low (between 0.5 and 1.6 %). On country level, some countries show a somewhat higher percentage but the total number of observations does not permit to apply a model for categorical variables.[8] In addition, we are interested in the correlation among the single prioritization decisions. Thus, a model accounting for dependencies between dependent variables is required. We delete individuals from the sample who prefer smokers, old patients or patients not having children resulting in three binary dependent variables:[9]

$$
\begin{aligned}
y_1(smoking) &= \begin{cases} 1 & \text{non-smoker} \\ 0 & \text{no-difference} \end{cases} \\
y_2(age) &= \begin{cases} 1 & \text{young} \\ 0 & \text{no-difference} \end{cases} \\
y_3(children) &= \begin{cases} 1 & \text{having children} \\ 0 & \text{no-difference} \end{cases}
\end{aligned}
\qquad [4.1]
$$

For empirically analyzing attitudes towards prioritization and accounting for correlations among individuals' decisions, we apply a multivariate probit model. The equation system reads:[10]

[8] We have tested the use of a categorical model for each of the prioritization decisions. However, results do not change.

[9] This reduces the sample by 349 observations, i.e. about 3 %.

[10] We do not expect a potential endogeneity of either of the dependent variables. Hence, we refrain from estimating a recursive multivariate probit model (cf. Maddala 1983) as this would require a priori assumptions on the dependency of the prioritizing decisions.

$$
\begin{aligned}
y^*_1 &= \beta_1' X_i + \gamma Z + \varepsilon_{i1} \quad ; y_1 = 1\left(y_1^* > 0\right) \\
y^*_2 &= \beta_2' X_i + \gamma Z + \varepsilon_{i2} \quad ; y_2 = 1\left(y_2^* > 0\right) \\
y^*_3 &= \beta_3' X_i + \gamma Z + \varepsilon_{i3} \quad ; y_3 = 1\left(y_3^* > 0\right)
\end{aligned}
\tag{4.2}
$$

The latent variables y_i^* for individual *i* are supposed to measure attitudes towards prioritization with respect to the three criteria (1) smoker vs. no-difference, (2) young vs. no-difference and (3) families having children vs. no-difference.

The equation system consists of three equations according to the three prioritizing decisions. α, β, and γ are the parameters to be estimated. X_i is a vector including socioeconomic variables, attitudes towards aspects of the health care system, health behavior and health insurance coverage varying at the individual level. *Z* denotes variables varying only at the country level, i.e. country dummies. We estimate four models: Model I incorporates country dummies as *Z*; in Model II, we replace country dummies by the six dimensions of the HF in *Z,* while Model III replaces the Hofstede variables by the two dimensions of the IW. Finally, in Model IV vector *Z* includes variables covering macroeconomic factors. ε denote the error term vector distributed as multivariate normal, with a zero mean. The leading diagonal elements of the variance-covariance matrix are normalized to one. The off-diagonal elements ρ reflect the correlations between the three equations.

$$
\begin{bmatrix} \varepsilon_{i1} \\ \varepsilon_{i2} \\ \varepsilon_{i3} \end{bmatrix} \mid X_i, Z \sim N_3 \left[\begin{pmatrix} 0 \\ 0 \\ 0 \end{pmatrix}; \begin{pmatrix} 1 & \rho_{12} & \rho_{13} \\ \rho_{21} & 1 & \rho_{23} \\ \rho_{31} & \rho_{32} & 1 \end{pmatrix} \right]
\tag{4.3}
$$

ρ exhibits statistical significance, i.e. a non-independence of the error terms, if unobserved factors significantly affect the probability that either y_1=1 and y_2=1 or y_1=1 and y_3=1 or y_2=1 and y_3=1. By neglecting the correlation between the disturbances, the three equations can be estimated separately as single probit models. However, this might be inefficient.

5 Results

5.1 Individuals characteristics

Looking first at the results for individual characteristics in the multivariate probit model in table 7 – and neglecting country specific effects for the moment (although they are already included) – reveals strong effects of age, family status and the existence of children and health behavior across all three prioritization decisions. We discuss the effects of individual characteristics consecutively for the three decisions, separately highlighting country specific effects in the next section.

The first decision is between prioritizing non-smokers and choosing the no-difference option (eq. [1]). We find age to correlate significantly with the no-difference option, that is older citizens tend to choose the no-difference option more often than younger individuals do across all countries in the sample. Socio-economic characteristics other than *religion* are not relevant for smoking as prioritization criterion. Religious people more frequently opt for the no-difference option.

Subjects thinking that an unhealthy lifestyle causes severe health problems choose to prioritize non-smokers more often. This figure could be due to some moral motives, i.e. individuals behaving health damaging do not deserve to be treated first because of their personal responsibility. Focusing on own health behavior as an indicator of egoistic motives, we observe that non-smokers more likely prioritize the non-smoker. However, results show that such motives do not prevail in case of smokers. They significantly tend to choose the no-difference option. This effect becomes even stronger the more cigarettes are smoked per day. It seems that smokers are aware of their unhealthy behavior and the non-acceptance of this behavior by the public. Choosing the no-difference option avoids to vote for being penalized for their own behavior. We also find *alcohol* – as an additional indicator for health damaging behavior – to point in the same direction.

The own health status (*SAH*) is negatively correlated with the prioritization decision of non-smokers. Citizens in good health status opt for the no-difference option rather than prioritizing non-smokers. Insurance type does not affect people's attitudes towards the priority criterion smoker.

The second decision is about whether to prioritize young patients or not. This criterion – in contrast to smoking behavior – reflects a characteristic that is beyond one's own influence. Women are less likely to prioritize young patients. Age turns out to be a significant factor of citizen's attitudes towards this criterion. That is, older subjects prefer the no-difference option more likely compared to younger individuals (who form the reference category). Thus, egoistic motives seem to predominate for young individuals while older citizens are more likely to apply some moral norms of equal access resulting in a higher probability to opt for the no-difference option. The more own income exceeds mean income the higher the probability of prioritizing young patients. While income has not been relevant for prioritization with respect to smoking behavior, it affects priority setting regarding age. Furthermore, individuals with children prefer young patients to be treated first. This seems intuitive, as subjects with small children are more likely to match with the group of young patients (i.e. 30 years old). This again points to some egoistic motives that affect citizens' attitudes for prioritization. Religiousness is related significantly with the no-difference option, i.e. abstaining from a prioritization decision.
We observe that subjects who believe that severe health problems arise from an unhealthy lifestyle more likely prioritize the 30 years old patient. Holding the conviction to get the best available treatment in case of illness does not exhibit any significance.

The third criterion deals with patients who have to care for children. Results yield strong gender effects. Females are more likely to opt for the no-difference option. While this result is surprising at first sight because females should have a higher affinity to patients with children, other studies of related fields find women to hold more egalitarian attitudes. Thus, women seem to rank equal access to health care services higher than prioritizing patients with children do. Besides gender, age affects individual's attitudes for prioritization. Except for the oldest cohort, the aversion to prioritize in favor of patients with children increases with age, whereas the oldest cohort shows a strong support of prioritizing parents. We also find income to be negatively related to prioritizing patients with children. Egoistic motives seem to prevail regarding this criterion. Subjects with children strongly favor prioritizing patients with children. Compared to the reference category of single subjects, married, divorced and widowed citizens are more willing to prioritize patients with children, too. Additionally, religious people tend to prioritize

patients who are responsible for small children indicating the high value religious people attach to the protection of families with children.

If an unhealthy lifestyle is considered the reason for severe health problems, priority is given to patients with children more often.

Table 7: Results of multivariate probit estimations

	[1] Priority to non-smoker=1		[2] Priority to 30year old=1		[3] Priority to families with children=1	
	Coeff.	*SE*	*Coeff.*	*SE*	*Coeff.*	*SE*
female	-0.025	(0.030)	-0.097	(0.029)***	-0.129	(0.030)***
age2	-0.191	(0.058)***	-0.202	(0.055)***	-0.159	(0.058)***
age3	-0.130	(0.060)**	-0.316	(0.057)***	-0.214	(0.060)***
age4	-0.341	(0.056)***	-0.460	(0.054)***	-0.134	(0.058)**
age5	-0.283	(0.063)***	-0.374	(0.061)***	0.170	(0.064)***
f_lnincome	0.001	(0.025)	0.061	(0.024)**	-0.095	(0.026)***
f_lnincome sq.	0.003	(0.009)	0.010	(0.010)	-0.014	(0.010)
edu2	0.041	(0.064)	-0.012	(0.063)	-0.130	(0.064)**
edu3	0.126	(0.070)*	-0.008	(0.068)	-0.133	(0.069)*
edu4	0.088	(0.065)	0.037	(0.064)	-0.148	(0.066)**
married	0.046	(0.043)	0.016	(0.041)	0.174	(0.045)***
widowed	0.084	(0.078)	0.210	(0.074)***	0.293	(0.077)***
divorced	0.043	(0.057)	0.050	(0.055)	0.111	(0.058)*
children1	0.035	(0.047)	0.144	(0.046)***	0.273	(0.048)***
children2	0.035	(0.056)	0.111	(0.055)**	0.366	(0.057)***
children3	0.151	(0.086)*	-0.015	(0.083)	0.249	(0.088)***
religion	-0.076	(0.034)**	-0.073	(0.033)**	0.088	(0.035)**
reason: behavior	0.369	(0.045)***	0.159	(0.044)***	0.126	(0.045)***
best treatment	-0.061	(0.040)	0.006	(0.039)	-0.060	(0.041)
cigarettes 1-5	-0.624	(0.072)***	-0.079	(0.068)	0.027	(0.071)
cigarettes 6-10	-0.816	(0.069)***	-0.219	(0.062)***	-0.029	(0.065)
cigarettes >10	-0.856	(0.055)***	-0.091	(0.049)*	-0.036	(0.052)
alcohol	-0.208	(0.059)***	-0.009	(0.056)	0.140	(0.059)**
SAH	-0.047	(0.016)***	-0.012	(0.016)	0.022	(0.016)
Public Insurance	0.055	(0.081)	0.164	(0.077)**	0.020	(0.082)
Private Insuance	0.141	(0.092)	0.146	(0.088)*	0.032	(0.094)
All other forms of Insurances	0.111	(0.080)	0.188	(0.076)**	0.017	(0.081)
_cons	-0.309	(0.128)**	-0.037	(0.122)	-0.638	(0.127)***
country fixed effects	yes		yes		yes	
rho ([1], [2])	0.481	(0,019)***				
rho ([1], [3])	0.409	(0,019)***				
rho ([2], [3])	0.656	(0,021)***				
N	8,333					
AIC	29,378.1					
BIC	30,158.2					
pseudo R-squared adj.	0.286					

Standard errors in parentheses; * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Finally, the econometric specification indicates that priority decisions for the three criteria are not independent and the proposed multivariate probit model results in efficiency gains compared to separate probit models.[11] The pairwise correlations between the three decisions (*rho*) are presented at the bottom of table 8. All correlations are significantly positive indicating that unobservables affect the decisions in the same direction, i.e. a shift towards giving priority. Hence, attitudes towards priority setting – with respect to the criteria smoking, age and children – are not independent. It seems there is an underlying general attitude of citizens of being willing to prioritize or not. We also find decisions related to the criteria age and children to be higher correlated than decisions between smoking and age.

5.2 The effect of country specific factors

Next, we consider country effects. Table 8 presents results of four multivariate probit models. All models contain the individual characteristics discussed in section 5.1 but differ with respect to the country effects. *Model I* includes simple fixed effects, *Model II* controls for cultural dimensions measured by the Hofstede-index and *Model III* includes the two dimensions of the Inglehart-Welzel cultural map of the world. Finally, *Model IV* accounts for macroeconomic indicators.[12]

Results of the country fixed effects reveal positive significant effects for all countries. Thus, compared to Germany all countries are more likely to prioritize with respect to non-smoking behavior. This is in line with our observation of a very low level of self-expression for Germany and the resulting low acceptance of priority setting. Priority setting with respect to smoking behavior is most accepted in the US, GB and AU where self-orientation is quite important. Regarding age as a criterion, effects are much smaller indicating that here differences between countries are not that high compared to the smoking criterion. Considering patients with small children, US, CH and AU are more likely to give priority to them than Germans would. In contrast, support for priorities in favor of patients with children is lower in the Netherlands and Sweden.

Turning now to the six dimensions of the HF, we find differences between the three criteria for priority setting. *Power Distance* does not show a very strong influence on any of the priority decisions in contrast to our conjecture that a small power distance leads to many no-difference choices. *Individualism* is positively related to non-smoking behavior and negatively related to having children as criteria. This seems to be intuitive and is in accordance with our expectations. Individualistic societies attach a higher rank to self-oriented decisions and responsibility for consequences of decisions. Thus, an unhealthy lifestyle such as smoking is related to some discrimination of smokers and priorities for non-smokers. Intuitively, individualistic societies are more likely to opt for the no-difference option when voicing decisions about the criterion of having children. *Masculinity* has a positive impact in cases of the criteria age and having children and a negative in case of non-smoking. This is in contrast to our expectation, that in masculine societies, there is a wider acceptance of priorities, which does not seem to hold in

[11] We have also run separate binary probit models for the three dependent variables. Results of these models differ regarding the level of significance of the coefficients while the magnitude is almost unchanging. Results are available upon request.

[12] Results of the individual characteristics are not presented here but are available upon request. Results remain robust irrespective of the chosen country effects.

case of non-smoking. The dimension *Uncertainty Avoidance* only plays a role in the context of the acceptance of priorities with respect to age. This dimension seems to support priorities for the young in order to reduce uncertainty in the development of society. However, this insurance-effect seems not to be important for the other patient groups considered. For the dimension *Pragmatism,* we expected a tendency to no-difference choices. This is significantly the case for the criteria age and having children, and not significantly in case of non-smoking. *Indulgence* exhibits a positive influence on priority setting in all three scenarios. In our conjectures, we did not infer this for the criterion of age.

Table 8: Country effects: results of multivariate probit estimations

	[1] Priority to non-smoker=1		[2] Priority to 30year old=1		[3] Priority to families with children=1	
	Coeff.	*SE*	*Coeff.*	*SE*	*Coeff.*	*SE*
Model I. country fixed effects						
US	1.056	(0.068)***	0.384	(0.065)***	0.431	(0.066)***
GB	1.064	(0.077)***	0.053	(0.073)	0.068	(0.077)
CH	0.208	(0.078)***	0.419	(0.074)***	0.506	(0.076)***
NL	0.732	(0.066)***	0.113	(0.063)*	-0.257	(0.067)***
SE	0.474	(0.068)***	-0.015	(0.065)	-0.264	(0.071)***
NO	0.337	(0.063)***	0.186	(0.060)***	-0.001	(0.063)
DK	0.409	(0.062)***	0.171	(0.060)***	-0.085	(0.063)
AU	1.109	(0.066)***	0.349	(0.063)***	0.160	(0.065)**
N	8,033		$rho_{1,2}$	0.481***	$rho_{1,3}$	0.409***
pseudo R-squared adj.	0.286				$rho_{2,3}$	0.656***
Model II. Dimensions of the Hofstede-index						
Power Distance	0.008	(0.006)	-0.009	(0.006)*	0.013	(0.006)**
Individualism	0.033	(0.004)***	-0.004	(0.004)	-0.020	(0.004)***
Masculinity	-0.001	(0.001)	0.002	(0.001)***	0.009	(0.001)***
Uncertainty Avoidance	0.001	(0.003)	0.011	(0.003)***	-0.001	(0.003)
Pragmatism	-0.002	(0.001)	-0.005	(0.001)***	-0.008	(0.001)***
Indulgence	0.007	(0.003)**	0.011	(0.003)***	0.005	(0.003)**
N	8,033		$rho_{1,2}$	0.478***	$rho_{1,3}$	0.405***
pseudo R-squared adj.	0.285				$rho_{2,3}$	0.659***
Model III. Dimensions of the Inglehart-Welzel cultural map of the world						
Rational Values	-0.408	(0.021)***	-0.122	(0.020)***	-0.201	(0.020)***
Expression Values	0.207	(0.031)***	0.095	(0.030)***	0.039	(0.032)
N	8,033		$rho_{1,2}$	0.464***	$rho_{1,3}$	0.378***
pseudo R-squared adj.	0.278				$rho_{2,3}$	0.655***
IV. Macroeconomic indicators						
hospital beds	-0.227	(0.022)***	-0.028	(0.021)	0.018	(0.022)
physician density per 1.000	-0.851	(0.056)***	-0.044	(0.054)	-0.124	(0.059)**
health expend. % of GDP	-0.036	(0.010)***	0.027	(0.010)***	0.049	(0.011)***
out of pocket payments	0.060	(0.005)***	0.022	(0.005)***	0.042	(0.006)***
GINI reduction	0.020	(0.002)***	0.001	(0.002)	-0.001	(0.002)
N	8,033		$rho_{1,2}$	0.485***	$rho_{1,3}$	0.412***
pseudo R-squared adj.	0.281				$rho_{2,3}$	0.657***
socio-economic variables	yes		yes		yes	

Standard errors in parentheses; * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

The dimension *Rational Values* of IW is negatively related to all priority decisions considered. That is what we expected except for the criterion having children. The value to protect families does not seem to be influential enough to lead to votes for the respective priority. We derived the hypothesis that a high level of *Expression Values* may respond to an acceptance of priority setting, which holds true for the three criteria we investigate.

Finally, macro indicators seem to explain differences in attitudes towards prioritization between countries. Especially for the criterion smoking, we find *hospital beds, physician density and health expenditures* to decrease support for prioritization. The more beds are available and the higher physician density and health expenditures – that is the higher the supply of health services – the less likely is support for prioritization regarding smoking behavior. Accordingly, citizens are not willing to accept priority setting in countries where the resources to treat each patient are available. On the contrary, support for priority setting is higher for countries in which out-of-pocket payments are high. One can assume that people in these countries are used to direct or indirect priority setting and in their role as voters had a voice in the decisions on health care regulations. The distributive policy of a country measured by *GINI reduction* only has an effect only on priority setting pro non-smokers. Higher income redistribution seems to go along with public acceptance to allocate health expenditures with priority to the non-smokers.

5.3 Ranking prioritization attitudes across countries

The results of the basic multivariate probit model are presented in figures 5 and 6. Figure 5 shows the predicted probabilities for each outcome to equal one, i.e. to prioritize. In line with the descriptive statistics, we find non-smoking as a criterion for prioritization to be most accepted in the US, GB and AU (about 65-70%). These countries have in common that they all range above average according to all dimensions of the HF except of *Pragmatism*, which is below average. NL, with more than 50% acceptance of priority setting with respect to smoking behavior ranges between the three English speaking countries and the Scandinavian countries which corresponds to the midrange of NL with respect to the cultural values (see section 4.3). SE, DK and NO are next and smoking behavior is lowest accepted in CH and GER. With respect to smoking behavior, the proposed ranking of countries according to their cultural similarities holds. We find groups of countries such as (1) AU, US, GB (2) SE, NO, DK and (3) DE and CH to exhibit similar attitudes towards prioritization with regard to smoking. For the criterion age, CH shows the highest support for using this characteristic for prioritization followed by the US and AU. DE and SE are at least supportive for age discrimination while in DE prioritization according to age is more likely to be accepted than prioritization with respect to smoking behavior. Two countries exist which rank the criterion children higher than non-smoking behavior (DE, CH) although they are differing in the absolute amount of support. Acceptance of priority setting for patients with children is highest in CH and US. In the Netherlands and Sweden, priorities for patients with children do not seem to exhibit any support.

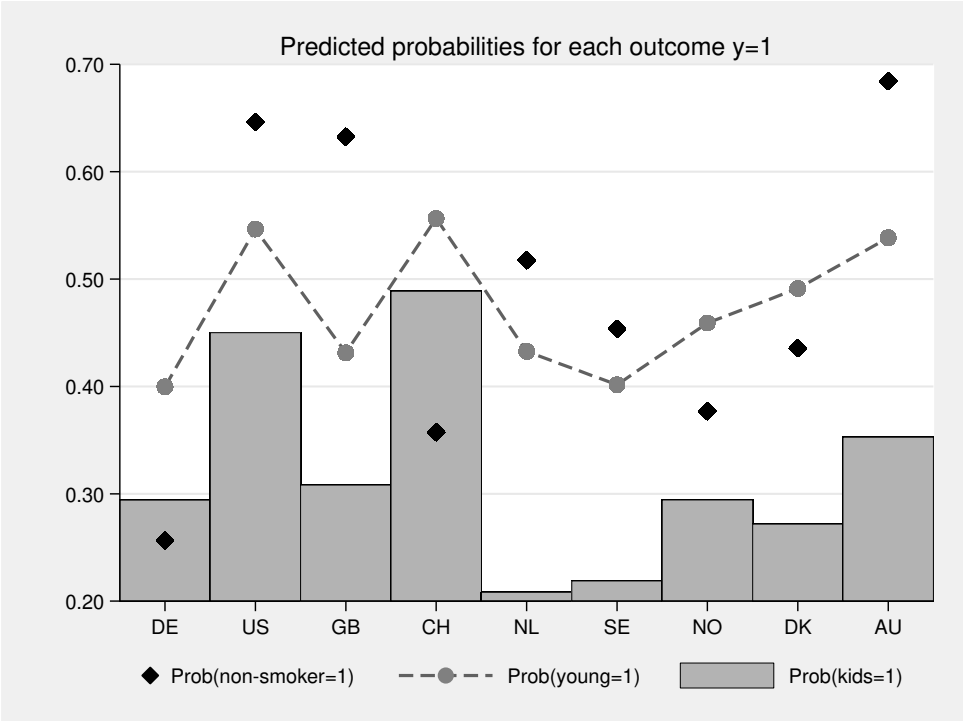

Figure 5: Predicted probabilities of the multivariate probit model

Figure 6 presents the joint probabilities for all outcomes y_1=1, y_2=1, and y_3=1. Germans exhibit the strongest aversion against priority setting with respect to the three criteria (43%) and the lowest support (about 8%) respectively, corresponding to our previous prediction. There are only two countries – the US and Australia – where prioritizing attitudes for all three criteria predominate the aversion of prioritization. The willingness to prioritize is about 28% in the US and 23% in Australia. Thus while we have hypothesized that US, AU and GB should show similar attitudes, we can only support this figure for AU and US. The third highest support for prioritization can be found for CH that is quite surprising as it differs strongly from the attitudes found for DE although cultural values seem to be similar. For the Netherlands and Sweden, support for priority setting regarding the patient characteristics is on a very low level. In GB and CH, overall support for patient characteristics as priority criteria is about 18%. While this would not form a majority, we see from figure 5 that a majority would support age in CH and smoking in GB as criteria for prioritization. Intuitively, support to jointly accept all criteria is lower than support for single characteristics.

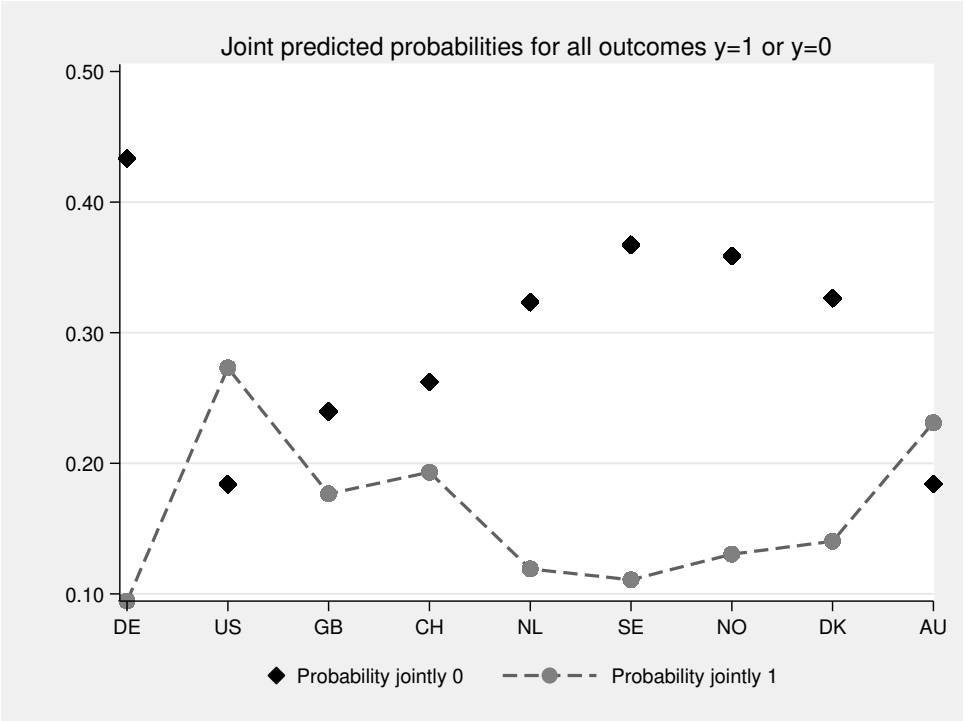

Figure 6: Joint predicted probabilities of the multivariate probit model

6 Discussion and concluding remarks

Our attempt to investigate public attitudes towards priority setting in health care in a cross-national study reveals several insights into determinants of decisions of respondents. First of all there are differences in attitudes on aggregate country level related to the single criteria we consider. For instance, prioritizing non-smokers is strongly (more than 60%) accepted in US, GB, and AU, whereas this holds true for only about 25 % of Germans. Compared to that, the spread of frequencies of priorities in favor of the young is not very large, all share range between 40% and 65 %. Priorities for patients with children do not find much support at all. Exceptions are US and CH, where shares between 40% and 50% are observed.

Second, country-specific differences are related to the characteristics of the existing health system. From our results we may conclude that the higher health care spending, and thus capacities and supply of health care are the less acceptable is priority setting, at least with respect to the criteria considered. However, higher out of pocket payments which are an indicator of existing indirect priorities lead to higher acceptance of all criteria considered. E.g. an implemented priority regulation, like higher insurance contributions for smokers in the US, goes along with some higher approval of this type of criterion in the US, too.

The priority decisions we investigate concern three patient specific characteristics, as they are smoking behavior, age and having children or not. As a third point, we observe that the acceptance of priorities differs between countries not only regarding each criterion but also regarding the set of all criteria. Thus, one is not really justified to speak about attitudes of a society towards priorities in health care in an undifferentiated manner. The type of criterion matters. However, looking at rankings of countries with respect to frequencies of acceptance of no versus all three criteria or at the country fixed effects in the estimations we might infer tendencies

for the strength of public support or resistance related to the issue of priority setting in health care in general in different societies.

However, the most important novelty of the contribution in this paper is to trace back the differences between countries to cultural values characterizing social life. Including the six dimensions of the Hofstede index or two dimensions of the Inglehart-Welzel index in the multivariate probit estimations enlightens the picture of the attitudes towards different priority decisions. Some of the dimensions turn out to be more informative than others, and additionally, their relevance may differ between the criteria. The dimension *Individualism* which measures how strongly individuals are integrated in social groups within a society, turns out to be a significant variable with regard to priorities for non-smokers and patients with children, but not in case of age. In contrast, all other dimensions of HF or IW are significant for prioritizing the young; however effects may differ in their direction. The dimension *Uncertainty Avoidance* with focus on security in the development of individuals and the society seems to be only related to priority decisions with respect to age, i.e. in favor of the young whose health can be seen as forming a basis of the future.

One of the limitations of our study predefined by the data set offered from ISSP is that we are only able to consider three different priority criteria dependent on patient characteristics. However, our results for these criteria suggest that social norms play an important role for the decisions of respondents on issues of allocating health care in general. We find that the fact if a respondent meets the characteristics of the subgroup considered in the priority decision influences the choices. E.g. non-smokers more often prioritize the non-smoker than smokers. Young respondents more often prioritize the young patient than older respondents. However, smokers tend to choice the no-difference option, and there are only a few old prioritizing the old patient. This means that in case of criteria where supporting social norms exist respondents meeting the criterion seem to feel justified in voting in a self-serving manner. The egoistic point of view is not that often taken in priority decisions where self-interest would be inconsistent with prevailing social values, like e.g. disapproval of smoking behavior. This suggests that the existence of some self-serving bias is on the individual level moderated by values important for the society the individual lives in. The extent of moderation varies between criteria and societies. Another limitation is that we could only make use of the information on existing social values on the aggregate country level. In our study the cultural indices of Hofstede and Inglehart-Welzel served as a disaggregation of the variable *country* into six dimensions or two dimensions, respectively. Not all social values are shared by all members of a society to the same degree. Therefore, our results indicate that it would be fruitful to investigate the relations between values held and priority decision on an individual basis in each society, embedded in contextual information on the society and the health care system. Such a type of investigation would have the chance to reveal evidence on the fundamentals of individuals' positions on priority setting in health care for specific criteria or even more general.

7 Literature

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