



-Master Thesis-

Organ Donation in the EU

Personal Willingness to Donate vs. Willingness to give Consent as a Relative

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Abstract

Transplantable organs are scarce in every country. To increase the number of available organ donors, more understanding of the factors driving organ donation rates is needed. This study examines the impact of several factors influencing the willingness to donate personally and the willingness to give consent for donation of a relative's organs after death.

Data used was from Eurobarometer surveys in 2002, 2006 and 2009, supplemented with data related to several country characteristics. Results of a logistic regression showed that several factors were associated with the willingness to donate. An interaction term is included to examine the relationship between a legislation system used in a country and people's awareness of this legislation system.

The results indicate that more knowledge and a 'left' political position (commitment to society) are strongly related to the personal willingness to donate, while health status (good or bad, as well as having a longstanding illness) is closely related to the willingness to give consent. Religion performs well as predictor of personal willingness to donate, though there are chances to utilize the positive attitude of religion more by religious leaders providing better information. To conclude, the probability of willingness to donate is slightly lower in presumed consent systems. This probability is higher when there is also knowledge of the legislation. However, the latter finding might be mainly explained by the impact of knowledge. Therefore, a change to a presumed consent system is not direct the solution to improve the willingness to donate.

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1. Introduction

After the first successful kidney transplant in 1954, transplantations became possible for other organs (Eurotransplant, 2012). The great medical success caused a fast growth of the waiting lists for organ transplants. The number of available organ donors has increased as well, though not fast enough to keep up with the increasing number of patients on waiting lists. This makes transplantable organs scarce in every country; people die while waiting for replacement organs (Langone & Helderma, 2003). The subject is an important issue and high on the political agenda in many developed countries, including countries of the European Union (Abadie & Gay, 2006). Differences in number of organ donations between these countries are considerable (Coppen et al., 2005). To find out what reasons are behind these differences, several studies were conducted (Matesanz, 1998; Pugliese et al., 2003; Coppen et al., 2008). Special attention lies in the field of the legislation systems. Two different legislation systems exist within Europe - the explicit consent (or informed consent) and presumed consent systems. The difference between these two is the default option. In the informed consent system, an individual has to give written permission during his life for removal of organs after his death. When no choice is made, the individual is automatically not recognized as donor. In the case of a presumed consent system, a person who does not make a choice during life will be assumed to be donor. The former system is also known as the 'opting-in' system, while presumed consent systems are also called 'opting-out' systems. In practice there exist different variations on these two systems. In many cases relatives have an important role in either giving consent or making objection, especially if the deceased person has not made a choice during life (Gevers et al., 2004).

As long as the registration costs for opting in or opting out are both low, it seems it would not matter which system is used. However, many studies in behavioral economics have found that a small difference between such systems can lead to large disparities (Thaler, 2009). Several studies were done to examine whether one of these systems would lead to higher donation rates over the other, but the conclusions differ. At one side there is an appeal for a presumed consent system (Abadie & Gay, 2006; Johnson & Goldstein 2003, 2004). Others note that this opt-out system would not guarantee higher donation rates (Rithalia et al., 2009). A third concludes that the differences between countries cannot be explained by the legislation system (Coppen et al., 2005; Coppen et al. 2008). The latter two explain the differences between countries by factors such as: organization of the transplantation system, magnitude of the donor pool (allowed age, etc.), religion, information providing for the public and mortality rates. Underlying public attitudes to and awareness of organ donation and transplantation is also mentioned as possible explanation for the different organ donation rates between countries (Rithalia et al., 2009).

According to the legislation system, no concluding evidence is given in preference of one of the systems. However, a change to the presumed consent system can bring strong opposition. There are many objections about government presumption concerning something so personal as organ donations, even if the costs are very low to opt-out (Thaler, 2009). For that reason, most of the countries with a presumed consent system give the family the possibility to make the decision instead of the government. Relatives have therefore large influence on the number of available donor organs. A frequently mentioned explanation for the gap between demand and supply is the low consent rate of families (Abadie & Gay, 2006). To increase these consent rates, different studies highlight the need for public education, family communications and good support and timing of that education and communication in hospitals (Rodrique et al., 2006; Vincent & Logan, 2012; Siminoff et al., 2001).

Less research is related to the underlying public attitudes to and awareness of organ donation and transplantation. The focus of this thesis will lie specifically in that part of the broad organ donation field. The willingness of an individual towards personal organ donation will be examined, as well as the willingness to give consent for organ donation of a relative. This concerns *potential* family consent rates, not the actual decision of people in the hospital.

Information about willingness to donate and willingness to give consent is available from individuals living in the European Union. This information will be used to find an answer on the following research question:

Which factors influence the willingness to donate your own organs and do they differ from factors influencing the willingness to donate the organs of a deceased relative?

An answer to this question will be searched for in this thesis. Chapter two gives an overview of the research done in this field, including possible variables influencing willingness to donate and willingness to consent. Chapter three describes the logistic regression done with the use of the variables discussed in chapter two. Chapter four provides and discusses the results of the study. Chapter five concludes. Chapter six discusses the limitations of the analysis and gives suggestions for further research.

2. Theoretical Framework

Individual willingness to donate should not be confused with the attitude people have with respect to organ donation or the actual choice they make in this field. Postponing making a choice or having a positive or negative attitude related to organ donation does not necessarily mean that a person is not willing to donate. The attitude corresponds towards the object –organ donation in general-, while willingness corresponds with the attitude towards the act involving the object –donating organs- (Horton & Horton, 1999). The rates of willingness to donate differ from actual donation rates in a country as well (Jansen-Frazer, 2012). Wide research has been done to find explanations for the different organ donation rates on national levels. Much less attention is spent on willingness to donate. Although the need for donor organs is at the national level, the personal choice and the choices of relatives have to be made on the individual level. It may be easier to influence this individual willingness.

2.1 Potential donors

The first work in profiling potential donors -including knowledge of the organ donation topic and willingness to donate both personally and for a relative- was done in 1999 by Horton & Horton. They hypothesized and tested two decision models for the actual choice of signing or carrying a donor card. The first model hypothesized the relation among values (summarized as being helpful), factual knowledge regarding donation, attitudes, willingness to donate (personal and for a relative) and the actual choice people made (sign/carry donor card). The results are based on a study among 268 American students and find evidence that knowledge (more) and values (being helpful) are positively related to the attitude towards organ donation. Attitude (positive) towards organ donation and willingness to donate, as well the relationship between willingness and actual choice, are found to be strongly related and extremely significant.

The developed model was expanded in a second study with three additional variables: attitude towards death, age and previous blood donation experience (Figure 2.1). Applicability of this model was studied among 465 adults from a community in the United States. The community sample supports the hypothesized model 1. According to the new included variables, no relation was found between attitude towards death and attitude towards donation. Earlier experience with donating blood was neither found as significant predictor of willingness to donate. Based on the results a direct path between 'knowledge' and 'signing a card' seems not to exist. All other factors (except

age) are significant of positive influence to the attitude towards donation. The relationship between age and attitude was found to be significantly negative. Special attention is given to education and communication as two factors which are important in increasing the number of donor card holders.

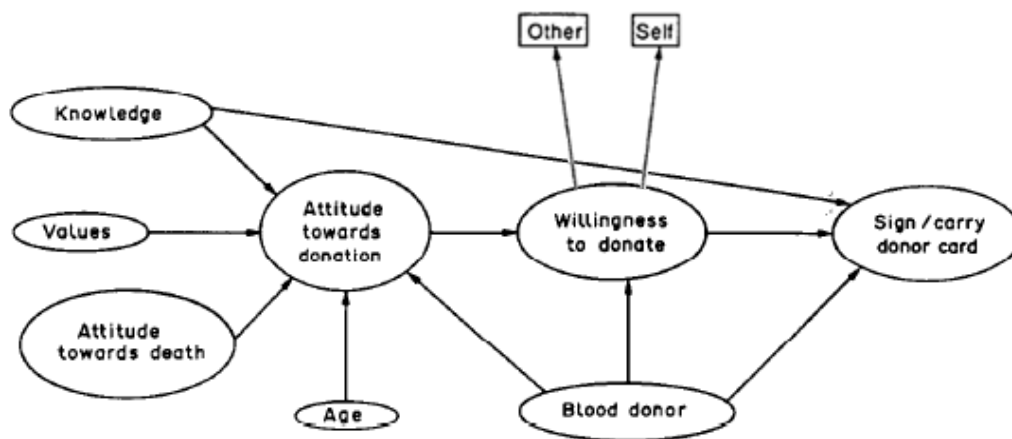


Figure 2.1: A model of willingness to donate an organ (Horton & Horton, 1999)

The relationship between attitude and willingness to donate is found highly significant. Although it is a theoretical discussion whether card carrying is increased by attitude or willingness, the factors of relevance for these two elements can differ. For this thesis the predictors of willingness to donate are of interest.

Mossialos et al. (2008) have used data from the Eurobarometer survey 58.2 (2002) to estimate determinants of willingness to donate, both personal and for a deceased relative. They concluded that a presumed consent system positively influences the willingness to donate – both personally and for a relative. Awareness of the legislation is important in this relationship, as well as the level of social interactions and knowledge.

Verheijde et al. (2009) is critical on the survey design used in this study and the conclusions made. Organ donation is specified in the questions as something occurring after death, while the procedure involved in organ donation begins before death. For a more accurate medical description, they suggest to formulate the statement as follows: ‘You allow donating one of your organs to an organ service at the end of your life’. Although this is medically more correct, it deters people unnecessarily since the actual removal of organs starts after death.

Mossialos et al. (2008) describes organ donation as an implicit social contract with others in society. Making organs available after death is seen as paying back for social support and inclusion in the community during life. The hypothesis based on this ideology is that more social interactions will

lead to a higher probability of willing to donate. Verheijde et al. (2009) argues against this idea and claims that inequality in access to care -including transplantations- based on socio economic status, precludes the ideology of 'paying back society'. However, the inequality of care says mainly something about the possibility to obtain a donor organ, less about the willingness to donate one.

Another point of critique is that the study of Mossialos et al. covers only one year. Where Mossialos et al. (2008) found evidence for education as predictor of willingness to donate, Cantarovich et al., (2007) argues that the impact of knowledge is changed in later years. In a study done among students and university staff from three European and two South-American universities, researchers found that after 2004 the knowledge of well-educated people in the field of organ donation is still limited and strongly influenced by a lack of information about the views of religions, leading to higher unwillingness to donate.

Verheijde et al. (2009) are right in their criticism that Mossialos et al. (2008) suppose that knowledge of the legislation system equates knowledge of procedures and processes in organ donation. Finally a critical note is added concerning the ethical consequences of the recommendation to use a presumed consent system. Even if a presumed consent system is found to improve organ donation rates, political leaders must consider whether they want to promote organ donation as the norm.

2.2 Personal willingness to donate

A systematic review of literature published in the period 1988-2009, evaluating the factors related to willingness to donate is given by Wakefield et al. (2010) - including attitude toward deceased organ donation and donor behavior. They report different social-demographic characteristics as predictors of personal willingness to donate. A lower age, high social economic status and high level of education are positively associated with willingness to donate (Boulware et al., 2002; Siminoff et al., 2006). Women are in general more willing to donate than men (Reubsaet et al., 2001; Breitkopf, 2006).

Knowledge about the healthcare system and organ donation was reported in several studies as an important predictor of willingness to donate (Horton & Horton, 1991; Rumsey et al., 2003; Wakefield et al., 2010). Previous interaction with the healthcare system can give (dis)trust in the system. Depending on experience with the healthcare system previous interaction is given as reason for being (not) willing to donate. Otherwise, more contact with the healthcare system removes negative feelings surrounding organ donation. Reasons given by people for not willing to donate are: fear that organ donors would not receive proper care and/or organs will be used for research or

people who not deserve them. This kind of misunderstanding could be taken away when there is a good provision of information (Irving et al., 2012).

Social interaction as predictor for willingness to donate (Mossialos et al, 2008) can be proxied by different factors - for example, family composition. This social interaction is assumed to increase when having a (large) family. Beside its influence on social interaction, a family can influence an individual - positively, but negatively as well. Discussion of the topic with family leads often to higher willingness to donate (Rios et al., 2007). Further, the potential veto relatives have in the organ donation decision can push an individual to make a definite decision during life, to prevent family members from being burdened with such a difficult choice later (Verheijde et al., 2009). On the other hand can this role of the family give the (negative) feeling that permission is needed from family in this individual choice (Irving et al., 2012).

The statement that within a presumed consent system the willingness to donate is larger than in informed consent countries may indicate that attitudes are shaped by institutional setting. Enforced opt-out system countries (where the family has no possibility to veto) show an even higher willingness to donate (Mossialos et al., 2008), which supports the indication that organ donation policy reflects prior attitudes and values. Further research over the years is needed to come to solid conclusions in this field.

Most religions support organ donation. Christianity, the largest religion in the Western world, is subdivided into protestant, catholic and orthodox branches. Protestants in general encourage organ donation, but have respect for the right of a person to make decisions about his own body. Transplants are morally and ethically acceptable in the Vatican. Catholics view organ donation as an act of love, charity and self-sacrifice. This way of love for the health and welfare of others is at the heart of the Christian ethic. The Orthodox Church is not against organ donation when the organs are used for the purposed intended, which means not for research or experiments.

Judaism teaches the sanctity of the human body, which implies that the body should be buried as a whole. However, saving a life takes precedence over the sanctity of the human body.

The Moslem Religious Council rejected organ donation in 1983, but changed this view later. The Islam has nowadays a positive attitude towards organ donation, but Muslims must be able to decide it for themselves and their organs must be transplanted immediately (no storage).

If organ donation is allowed according to the guidelines given by a certain religion, it can positively contribute to willingness to donate (Rumsey et al., 2003; Irving et al., 2012). Despite the mostly positive attitudes toward organ donation, religion can also discourage the willingness to become an organ donor. Boulware et al. (2002) provide in their study to determinants influencing the willingness to donate in one of the states of America, an example of religion having a negative effect on the willingness to donate. It is very important for individuals that they know that their religious leader supports organ donation (Skowronski, 1997). This gives a large responsibility for religious leaders and churches in providing (correct) information.

2.3 Giving consent for a relative

Family consent is often discussed in the field of hospitals, to examine where possibilities are to improve the procedures surrounding organ donation (Simpkin et al., 2009; De Groot et al., 2011; Masterplan Orgaandonatie, 2011; Jansen-Frazer, 2012). Findings highlight the importance of timing, emotional support and provision of information (Vincent & Logan, 2012). Less research is done at the individual level of 'the relative'.

In general people are more likely to donate their own organs than to give consent for those of another to be donated (Mossialos et al., 2008). These family refusals are important since it causes a difference between the number of potential donors and actual donors (Jansen-Frazer, 2012). Refusal rates can differ among different levels; individuals, hospitals, regions and countries. Points of interest for this thesis are on the individual and national level. A high education level and access to and use of resources help to increase consent rates (Brown et al., 2010). Rodrigue et al. (2006) did not find a significant relation between education level and donation decision. They found that white employed next-of-kin are more willing to donate, as well people with a positive attitude towards organ donation. A good understanding of brain death is often needed to obtain consent of the family (Siminoff et al., 2001; Rodrigue et al., 2006). Knowledge of the wishes of a deceased individual is important, but gives no guarantee that the relatives' decision will correspond to that wish. Although organ donation is often described as a gift of life, for relatives it may feel more like a sacrifice (Sque et al., 2007).

A step before the real consent giving is the *willingness* to give consent. If a person is not willing to donate his organs, he is not likely to give consent. The willingness to consent is affected by the legislation system (presumed consent system), awareness of this legislation, social interaction,

age (younger), education (more educated) and political placement (left oriented) (Mossialos et al. 2008).

Close related to willingness to donate is the attitude towards organ donation, influenced by (knowledge of) religion if religious. Since most religions are positive with respect to organ donation, a positive attitude from religious persons is expected. However, the attitude towards organ donation can be influenced positively by religion, though still not result in willingness to give consent. Among Catholics and Muslims is the important value of making decisions about one's own body, which may lead to less willingness to give consent.

2.4 Relevance

Organ donation is often discussed at the national level, though the individual level needs attention as well. Not only must personal willingness to donate be discussed, consent of relatives is important in the conversion of potential donors to actual donors. The study of Mossialos et al. (2008) is, as indicated, an important basis for this thesis. However, as they mention, religion and family structure are not included in their analysis. Besides that, the results are based on only one year, 2002. More years must be included, especially to examine the relation between legislation and attitudes.

This study is foremost an extension of the study of Mossialos et al. (2008). It covers a longer period to examine whether the preference for the presumed consent system continuous to exist over a longer period. Because of this longer period the eventual change of attitude of well-educated people can be investigated as well. To extend the factors to proxy knowledge, information about access to internet is included. Tools to proxy the amount of social interactions include information about the number of household members. Information about religions in countries is included as an important control variable.

Taking into account these extra factors leads to a more sophisticated study in willingness to donate and will improve the understanding of choices people make in organ donation.

2.5 Hypothesizes

Several factors affecting willingness to donate are already studied. This theoretical evidence forms the basis for the hypothesis that social interactions (more), knowledge (more), education (higher), age (lower), contact healthcare system (more) and discussion with family are predictors of willingness to donate.

For the legislation system the theory is less clear. Evidence related to *willingness* to donate is found in favor of the presumed consent system (Mossialos et al., 2008), though doubtful is whether this is caused by initial *attitudes* of individuals living in that country. However, a positive attitude is found to be related to willingness to donate (Horton & Horton, 1999). Therefore, when initial attitudes are more positive to organ donation in countries with a presumed consent system, the willingness to donate in these countries is hypothesized to be higher as well.

Religion and health status are factors suspected to have a different effect on personal willingness to donate and willingness to give consent for relatives. Religion is hypothesized to be positive of influence on personal willingness to donate, because of the positive attitude of most religions towards personal organ donation. Religion can discourage the willingness to consent, since several religions note the importance of persons own decision with respect to what happens with their body.

Further is hypothesized that a bad health status results in less willingness to donate personal for people with a really bad health state –having a longstanding illness- because those people (think they) cannot donate their own organs. The impact of a bad health state on willingness to give consent is suspected to be of positive influence, because of more aware ness of the need for organ donors and the value of a healthy life.

3. Empirical study

3.1 Data sources

The European Commission has been performing the Eurobarometer survey since the early nineteen seventies, a regularly survey which monitors public opinion in the European Union member countries. It includes only citizens aged 15 years or older. In this study, we use the Eurobarometer surveys from 2002, 2006 and 2009.

The data were collected between October and December of each year, using face-to-face interviews. Respondents were selected based on a multi-stage sample design. The first selection was at national level and based on the degree of urbanization in different parts of the country. Secondly a cluster of addresses was selected from the initial samples. Finally, in each household one respondent was selected randomly. The sample is therefore a good representation of the whole population living in the participating countries.

15 countries participated in 2002: Austria, Belgium, Denmark, Finland, France, Germany, Great Britain, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, Spain and Sweden. Due to the enlargement of the European Union in 2004, interviews after that year were held in 25 EU-member countries (extended with: Cyprus, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Slovakia and Slovenia), two acceding countries (Bulgaria and Romania) and a candidate country (Croatia). For 2009 two extra countries, Turkey and Macedonia, increased the sample up to 30 countries.

The data from the Eurobarometers are supplemented with general country characteristics. Data on religion are from the World Christian Database, but is only available for 2010. However, the information about that year is used as a proxy for religion in the other years. Other country characteristics like GDP, Healthcare expenditures and size of the population are from the World Bank development indicator's index. These data cover all three years. Information about the legislation systems in the different countries is used from Abadie & Gay (2006).

3.2 Sample

Different samples are used for the different years. Also the numbers of respondents differ over the years and per country. The original dataset included 16,230 respondents over 15 countries in 2002, 28,585 respondents covering 28 countries in 2006 and 30,292 respondents in 2009 based on 30 countries.

The data split up the United Kingdom into Great Britain and Northern Ireland. Also Germany was divided into two parts, West and East Germany, as well Cyprus into Cyprus and Turkish Cypriot Community. All three countries are included in the sample as a whole. Bulgaria changed the legislation system in 2006¹ to a presumed consent system. This could have consequences for the interpretation of the results. However, Bulgaria is one of the 'extended countries', which means that it is only involved in the years 2006 and 2009 - the years after the change. Since Macedonia and Turkey were only included in the survey in 2009, they are not taken into account in the analysis. The used sample is therefore smaller than the original one, but still includes data based on 73,102 respondents. An overview of sample sizes for each country in every year is given in table 3.1.

Table 3.1: Country Sample Sizes				
Country	Years			Totals
	2002	2006	2009	
France	1,037	1,022	1,000	3,059
Belgium	1,110	1,012	1,001	3,123
The Netherlands	1,035	1,069	1,007	3,111
Germany	2,042	1,551	1,550	5,143
Italy	1,027	1,005	1,032	3,064
Luxembourg	602	500	513	1,615
Denmark	1,000	1,060	1,040	3,100
Ireland	1,013	1,000	1,008	3,021
United Kingdom	1,312	1,375	1,354	4,041
Greece	1,003	1,000	1,000	3,003
Spain	1,000	1,026	1,003	3,029
Portugal	1,002	1,006	1,031	3,039
Finland	1,024	1,030	1,017	3,071
Sweden	1,000	1,006	1,012	3,018
Austria	1,023	1,013	1,005	3,041
Cyprus		1,006	1,003	2,009
Czech Republic		1,072	1,066	2,138
Estonia		1,011	1,011	2,022
Hungary		1,001	1,044	2,045
Latvia		1,031	1,018	2,049
Lithuania		1,016	1,026	2,042
Malta		500	500	1,000
Poland		1,000	1,000	2,000
Slovakia		1,180	1,006	2,186
Slovenia		1,039	1,031	2,070
Bulgaria		1,027	1,000	2,027
Romania		1,026	1,010	2,036
Croatia		1,000	1,000	2,000
Total	1,623	28,584	28,288	73,102

¹ Bulgarian law: Art. 24 (1) Law of the Transplantation of Organs, Tissues and Cells

3.2.1 Variables included

An overview of all variables included in the analysis, with their definition and availability over the years, is shown in table 3.2.

Table 3.2: Overview of the variables					
Variables	Dummies - values		Available in the year		
	1	0	2002	2006	2009
Personal willingness*	Yes	No	x	x	x
Willingness for relative*	Yes	No	x	x	x
Discussed with family	Yes	No	x	x	x
Marital status	Partner	Single	x	x	x
Finishing fulltime education			x	x	x
≤ 16 years old	Yes	otherwise			
17-18 years old	Yes	otherwise			
19-20 years old	Yes	otherwise			
≥21 years old	Yes	otherwise			
Still studying	Yes	otherwise			
No fulltime education	Yes	otherwise			
Gender	Male	Female	x	x	x
Age			x	x	x
15-24 years	Yes	otherwise			
25-39 years old	Yes	otherwise			
40-54 years old	Yes	otherwise			
≥ 55 years old	Yes	otherwise			
Community type	Town	otherwise	x	x	x
Smoking	Smoker	otherwise	x	x	x
Law system	Presumed	otherwise	x	x	x
Health state	Good	otherwise	x	x	
Longstanding illness	Yes	No	x	x	
Political placement			x	x	
Left	Yes	otherwise			
Centre	Yes	otherwise			
Right	Yes	otherwise			
Knowledge legislation	Yes	otherwise	x		x
Internet access at home	Yes	otherwise		x	x
Drinking Alcohol	Yes	otherwise		x	x
	Continuous variables				
Household members	Value between 1 and 27			x	x
GDP	1000\$ per inhabitant, US 2000 is constant		x	x	x
Population size	Per million of inhabitants		x	x	x
HC expenditures	As % of the GDP		x	x	x
Religion			x	x	x
- %Christians (orth, prot, cath)	As % of the population				
- %Jews	As % of the population				
- %Muslims	As % of the population				
* Dependent variable					

3.2.2 Dependent variables

The two dependent variables are *Personal Willingness to Donate* and *Willingness to give Consent for donation for a relative*. The question about personal willingness to donate was possible to answer in 2002 with four choices: Yes-definitely, Yes-probably, No-probably not or No-definitely not. For 2006 and 2009 it was a binary choice variable, just 'Yes' or 'No'. To make it one variable where we can work with, the variable of 2002 is converted into a binary choice variable taking value '1' if the person is willing to donate and value '0' otherwise ('Yes-definitely' and 'Yes-probably' defined as a 'Yes', 'No-probably not' and 'No-definitely not' defined as a 'No'). The willingness to give consent in case you have to make the organ donation choice for a relative is in all three years available as a variable with a binary outcome (with value 1 for the individual who is willing to give consent).

3.2.3 Explanatory variables

To find out which people have a positive attitude towards organ donation for themselves and/or for others, different variables are included in the model. These variables are all related to social interaction, knowledge of the healthcare system, individual health status, lifestyle, other individual characteristics or country characteristics.

Social interactions are a stimulator to willingness to donate (Mossialos et al., 2008). Variables like Community type, household composition and marital status are guidelines to proxy to what extent an individual has social interactions. Information about the size of the community where a person lives is available for the three years. Answer possibilities were: 1. Rural area or village, 2. Small or middle sized town and 3. Large town. This unordered multinomial variable is changed into a binary outcome variable with value '1' for town (small, middle sized or large) and value '0' as the person is living in rural area or a village. Another variable to measure the amount of social interactions is the household composition. In this analysis the total number of people living in the household is included as a variable. We also include information about marital status.

Having knowledge about the rules, healthcare organizations, and about the topic in general is hypothesized to have influence on the choice one will make in organ donation. Variables related to this knowledge are: knowledge of legislation with respect to organ donation, whether you have discussed the topic of organ donation with your family, internet access at home and years of education. Discussing the topic 'organ donation' with your family could say something about knowledge in two ways: it can give more information about the personal preference of a relative and

secondly it results in obtaining more information about the topic. To proxy the ability to access information, a dummy variable (internet access) is included.

To get more information about years of education, people were asked at what age they finished having fulltime education. The question could be answered with any possible number and is grouped up in dummies for six subcategories; finished education at 1) an age of 16 years or younger, 2) 17 or 18 years, 3) 19 or 20 years, 4) 21 years and older, 5) still studying and 6) no fulltime education at all. More years of education doesn't mean better knowledge in all cases. However, more years of education is assumed as higher educated, resulting in more - and better understanding of - knowledge of the issues related to organ donation.

To proxy the amount of contact people have with healthcare organizations and to evaluate the health state of an individual, a variable about having a longstanding illness or not is included. The health status of a person is closely related to knowledge of the healthcare system. A lot of contact with healthcare organizations suggests that there is more knowledge in this field. Having a longstanding illness can also have directly influence on your personal choice of being an organ donor and the choice you will make for a relative. For example, people with a longstanding illness could be too ill to donate their own organs, but know the need of donor organs because of their own experience and might therefore be more willing to give consent for others. Another variable in the same category is the personal health state. People self-assessed their health with the ordered multinomial outcomes: 1=very good, 2=good, 3=neither good nor bad, 4=bad and 5=very bad. In the analysis it is included as a dummy variable, with the categories 1 and 2 turned into a 'good health state' and the categories 3, 4 and 5 into a 'bad health state'.

To characterize the person who makes a certain choice in his lifestyle, two binary choice variables are included for smoking (current smoker or not) and alcohol behavior (if the individual had consumed any alcohol in the last month).

Information about political placement of an individual is included in the analysis, to examine the role of political preference in willingness to donate. The question about political placement asks where people place their views on a scale from one to ten, where one is 'left' and ten is 'right'. Although it is too exaggerated to split it up in this way, the left part in the political field is in general associated with more feeling for social involvement. Organ donation is an example of something which can be reached by such social involvement. To find a connection between these two, three dummies are

created for this political spectrum: 'left' (1-3), 'centre' (4-6) and 'right' (7-10). Age and gender are included as control variables.

To make it possible to compare countries, they are split up in four categories; West-, North-, East- and South-Europe (table 3.3)².

Table 3.3: Groups of Countries			
West-Europe	North-Europe	East-Europe	South-Europe
Austria	Lithuania*	Poland*	Cyprus*
Belgium	Latvia*	Bulgaria*	Malta*
Ireland	Sweden	Croatia*	Spain
The Netherlands	Denmark	Czech Republic*	Portugal
Luxembourg	Estonia*	Hungary*	Greece
Great Britain	Finland	Slovenia*	Italy
Germany		Slovakia*	
France		Romania*	

* = not available for 2002

Countries differ in wealth, size, institutions, cultural values, etc. Therefore act the following country characteristics as control variables: Gross Domestic Product (GDP, \$1000 per inhabitant), population size (million people), healthcare expenditures (percentage of the GDP) and the religions Christianity (subcategories: orthodox, catholic, protestant), Islam, and Judaism (all expressed as percentage of the total population adhering to a certain religion in that country). The law system related to organ donation used in a certain country is included as a dummy variable for having a presumed consent system. This could give more information about the relation between willingness to donate and the instituted law system in a country.

3.3 Methods

3.3.1 Estimation

For the analysis, Stata/SE 11.2 is used. Since the dependent variables have both a binary outcome, a binary regression model must be used.

The linear regression model describes the relation between the unobserved dependent latent variable Y^* , the willingness to donate, and the observed independent variables (x_k ; given in table 3.2):

² There are not enough observations per country to include dummies for every single country.

$$Y^* = \beta_0 + \beta_1 x_1 + \dots + \beta_k x_k + \varepsilon$$

(Equation 1)

Where ε represents the random error.

The connection between the observed binary dependent variable (Y) and the latent dependent variable (Y*) is shown in the following equations:

$$Y = 1 \quad \text{if } Y^* > 0$$

$$Y = 0 \quad \text{if } Y^* \leq 0$$

(Long & Freese, 2006)

When the error term (ε) follows a symmetric distribution the estimated equation for the probability of willing to donate or willing to give consent is:

$$P(y = 1 | x_k) = P(y^* > 0 | x_k) = F(\beta_0 + \beta_1 x_1 + \dots + \beta_k x_k)$$

(Equation 2)

Assuming the standard logistically distribution of the error (ε) leads to the **logit** model:

$$\begin{aligned} Pr(y = 1 | x_1, \dots, x_k) &= \Lambda(\beta_0 + \beta_1 x_1 + \dots + \beta_k x_k) \\ &= \frac{\exp(\beta_0 + \beta_1 x_1 + \dots + \beta_k x_k)}{1 + \exp(\beta_0 + \beta_1 x_1 + \dots + \beta_k x_k)} \end{aligned}$$

(Equation 3)

(Long & Freese, 2006)

The P-value of the coefficients gives information about an eventual relationship between the explanatory variables and the dependent variables (Y*). Since this is a nonlinear model, no direct information yet is given about the *magnitude* of the effect. The sign of the logit coefficients only tells whether there is a positive or a negative effect of the independent variables on the probability that a particular choice will be made.

To find out which is the partial effect (β_k) of a certain explanatory variable (x_k) on the dependent variable (y*), marginal effects are calculated.

$$\beta_k = \frac{dY^*}{dx_k}$$

(Equation 4)

Equation 5 shows the average marginal effect over the whole sample (the one used in this thesis), for a continuous variable X_c :

$$\frac{1}{N} \sum^N \beta_c f(\beta_0 + \beta_1 x_1 + \dots + \beta_k x_k)$$

(Equation 5)

The founded coefficients show the change in probability of success for the dependent variable, as result of one unit change in the independent variable (Cameron & Trivedi, 2009).

The average marginal effect over the whole sample for a discrete change in a dummy variable X_d looks like:

$$\frac{1}{N} \sum^N [P(y = 1 | x_d = 1, x_1, \dots, x_k) - P(y = 1 | x_d = 0, x_1, \dots, x_k)]$$

(Equation 6)

For this dummy variable the average marginal effect is calculated as the change in probability for the dependent variable being equal to 1, as the dummy variable changes from 0 to 1 (Cameron & Trivedi, 2009).

3.3.2 Models

Because of the use of different datasets, not all variables are available for all years. To prevent the loss of relevant information, four different models are used in the analysis. Every model is split up into two variants, one for each dependent variable. In this case the difference can be found between the two decisions; personal donorship and the donorship of another.

Model 1:

Three years are included in the first model (2002, 2006 and 2009) as well as the variables available for these years. To examine the impact of knowledge on the willingness to donate, a dummy variable for discussion with family is included. Dummies for different ages of ending fulltime education are included to study whether extra years of schooling have an impact on the willing to donate.

In considering the relation between social interactions and willingness to donate, a dummy for having a partner as well a dummy for living in a town are included. To characterize the person who has a higher chance to donate, dummies for age, for being male, and for being a smoker are included. Control variables like GDP, health care expenditures, law system (a dummy for having a presumed consent system) and religion are included as well. Dummies are included for groups of countries (table 3.3). To examine the difference between 2002 and the other two years, two dummies are included for the years 2006 and 2009.

The effect of some other variables may be also relevant, but are only possible to estimate with subsamples, since there are no data available for each year. Those variables will be included in the other models.

*Willing to donate**

$$\begin{aligned} &= \beta_0 + \beta_1 * \text{Consent for relative} + \beta_2 * \text{Discussed with family} + \beta_3 \\ &* \text{having a partner} + \beta_4 * \text{Education}_{\leq 16} + \beta_5 * \text{Education}_{17-18} + \beta_6 \\ &* \text{Education}_{19-20} + \beta_7 * \text{Education}_{\geq 21} + \beta_8 * \text{Education}_{\text{student}} + \beta_9 * \text{male} \\ &+ \beta_{10} * \text{Age}_{15-24} + \beta_{11} * \text{Age}_{25-39} + \beta_{12} * \text{Age}_{40-54} + \beta_{13} * \text{Age}_{\geq 55} + \beta_{14} \\ &* \text{Town} + \beta_{15} * \text{smoker} + \beta_{16} * \text{GDP} + \beta_{17} * \text{Populationsize} + \beta_{18} \\ &* \text{HCexpenditures} + \beta_{19} * \text{Lawssystem}_{\text{presumed consent}} + \beta_{20} * \text{Orthodox} \\ &+ \beta_{21} * \text{Catholics} + \beta_{22} * \text{Protestants} + \beta_{23} * \text{Jews} + \beta_{24} * \text{Muslims} + \beta_{25} \\ &* \text{Year}_{2006} + \beta_{26} * \text{Year}_{2009} + \beta_{27} * \text{Country}_{\text{north}} + \beta_{28} * \text{Country}_{\text{East}} + \beta_{29} \\ &* \text{Country}_{\text{South}} + \varepsilon \end{aligned}$$

*Willing to give consent**

$$\begin{aligned}
&= \beta_0 + \beta_1 * \text{Willing to donate} + \beta_2 * \text{Discussed with family} + \beta_3 \\
&* \text{having a partner} + \beta_4 * \text{Education}_{\leq 16} + \beta_5 * \text{Education}_{17-18} + \beta_6 \\
&* \text{Education}_{19-20} + \beta_7 * \text{Education}_{\geq 21} + \beta_8 * \text{Education}_{student} + \beta_9 * \text{male} \\
&+ \beta_{10} * \text{Age}_{15-24} + \beta_{11} * \text{Age}_{25-39} + \beta_{12} * \text{Age}_{40-54} + \beta_{13} * \text{Age}_{\geq 55} + \beta_{14} \\
&* \text{Town} + \beta_{15} * \text{smoker} + \beta_{16} * \text{GDP} + \beta_{17} * \text{Populationsize} + \beta_{18} \\
&* \text{HCexpenditures} + \beta_{19} * \text{Lawsystem}_{presumed consent} + \beta_{20} * \text{Orthodox} \\
&+ \beta_{21} * \text{Catholics} + \beta_{22} * \text{Protestants} + \beta_{23} * \text{Jews} + \beta_{24} * \text{Muslims} + \beta_{25} \\
&* \text{Year}_{2006} + \beta_{26} * \text{Year}_{2009} + \beta_{27} * \text{Country}_{north} + \beta_{28} * \text{Country}_{East} + \beta_{29} \\
&* \text{Country}_{South} + \varepsilon
\end{aligned}$$

Model 2:

Information about personal health state and longstanding illness is included for a twofold reason: first, to examine what the health status does with the choice for organ donation, and second, to examine the influence of knowledge based on contact with the healthcare system. To consider the influence of political placement three dummies are created; one for positioning yourself as 'left' in the political spectrum and one for being 'right'-oriented, the third -'centre'- is used as reference point. These variables are only available for the years 2002 and 2006. The sample is therefore smaller than it was in model 1.

A dummy variable is included for the year 2006 and could tell something about the development over time. However, for 2006 more countries were included, which must be taken into account when evaluating the change over time and the differences between groups of countries. A change over time could be explained by the introduction of these new countries. For example, none of the East European countries are included in the data for 2002.

*Willing to donate**

$$\begin{aligned}
&= \beta_0 + \beta_1 * \text{healthstate}_{good} + \beta_2 * \text{Longstanding illness} + \beta_3 * \text{Political}_{left} \\
&+ \beta_4 * \text{Political}_{right} + \beta_5 * \text{Consent for relative} + \beta_6 \\
&* \text{Discussed with family} + \beta_7 * \text{having a partner} + \beta_8 * \text{Education}_{\leq 16} + \beta_9 \\
&* \text{Education}_{17-18} + \beta_{10} * \text{Education}_{19-20} + \beta_{11} * \text{Education}_{\geq 21} + \beta_{12} \\
&* \text{Education}_{student} + \beta_{13} * \text{male} + \beta_{14} * \text{Age}_{15-24} + \beta_{15} * \text{Age}_{25-39} + \beta_{16} \\
&* \text{Age}_{40-54} + \beta_{17} * \text{Age}_{\geq 55} + \beta_{18} * \text{Town} + \beta_{19} * \text{smoker} + \beta_{20} * \text{GDP} + \beta_{21} \\
&* \text{Populationsize} + \beta_{22} * \text{HCexpenditures} + \beta_{23} \\
&* \text{Lawsystem}_{presumed consent} + \beta_{24} * \text{Orthodox} + \beta_{25} * \text{Catholics} + \beta_{26} \\
&* \text{Protestants} + \beta_{27} * \text{Jews} + \beta_{28} * \text{Muslims} + \beta_{29} * \text{Year}_{2006} + \beta_{30} \\
&* \text{Country}_{north} + \beta_{31} * \text{Country}_{East} + \beta_{32} * \text{Country}_{South} + \varepsilon
\end{aligned}$$

*Willing to give consent**

$$\begin{aligned}
&= \beta_0 + \beta_1 * \text{healthstate}_{good} + \beta_2 * \text{Longstanding illness} + \beta_3 * \text{Political}_{left} \\
&+ \beta_4 * \text{Political}_{right} + \beta_5 * \text{Personal willing to donate} + \beta_6 \\
&* \text{Discussed with family} + \beta_7 * \text{having a partner} + \beta_8 * \text{Education}_{\leq 16} + \beta_9 \\
&* \text{Education}_{17-18} + \beta_{10} * \text{Education}_{19-20} + \beta_{11} * \text{Education}_{\geq 21} + \beta_{12} \\
&* \text{Education}_{student} + \beta_{13} * \text{male} + \beta_{14} * \text{Age}_{15-24} + \beta_{15} * \text{Age}_{25-39} + \beta_{16} \\
&* \text{Age}_{40-54} + \beta_{17} * \text{Age}_{\geq 55} + \beta_{18} * \text{Town} + \beta_{19} * \text{smoker} + \beta_{20} * \text{GDP} + \beta_{21} \\
&* \text{Populationsize} + \beta_{22} * \text{HCexpenditures} + \beta_{23} \\
&* \text{Lawsystem}_{presumed consent} + \beta_{24} * \text{Orthodox} + \beta_{25} * \text{Catholics} + \beta_{26} \\
&* \text{Protestants} + \beta_{27} * \text{Jews} + \beta_{28} * \text{Muslims} + \beta_{29} * \text{Year}_{2006} + \beta_{30} \\
&* \text{Country}_{north} + \beta_{31} * \text{Country}_{East} + \beta_{32} * \text{Country}_{South} + \varepsilon
\end{aligned}$$

Model 3:

The third model is used to examine the role knowledge of legislation plays in the willingness to donate. An interaction variable is included to estimate the joint effect of a presumed legislation system and awareness that this legislation is in use.

Only the years 2002 and 2009 are included, so a dummy variable for the year 2009 is used to proxy the difference in willingness to donate between 2009 and 2002. However, it must again be noted that for 2009 more countries were available than for 2002.

*Willing to donate**

$$\begin{aligned}
&= \beta_0 + \beta_1 * \text{Known with legislation} + \beta_2 * \text{Interaction} + \beta_3 \\
&* \text{Consent for relative} + \beta_4 * \text{Discussed with family} + \beta_5 \\
&* \text{having a partner} + \beta_6 * \text{Education}_{\leq 16} + \beta_7 * \text{Education}_{17-18} + \beta_8 \\
&* \text{Education}_{19-20} + \beta_9 * \text{Education}_{\geq 21} + \beta_{10} * \text{Education}_{student} + \beta_{11} \\
&* \text{male} + \beta_{12} * \text{Age}_{15-24} + \beta_{13} * \text{Age}_{25-39} + \beta_{14} * \text{Age}_{40-54} + \beta_{15} * \text{Age}_{\geq 55} \\
&+ \beta_{16} * \text{Town} + \beta_{17} * \text{smoker} + \beta_{18} * \text{GDP} + \beta_{19} * \text{Populationsize} + \beta_{20} \\
&* \text{HCexpenditures} + \beta_{21} * \text{Lawsystem}_{presumed consent} + \beta_{22} * \text{orthodox} \\
&+ \beta_{23} * \text{catholics} + \beta_{24} * \text{protestants} + \beta_{25} * \text{Jews} + \beta_{26} * \text{Muslims} + \beta_{27} \\
&* \text{Year}_{2009} + \beta_{28} * \text{Country}_{North} + \beta_{29} * \text{Country}_{East} + \beta_{30} * \text{Country}_{South} \\
&+ \varepsilon
\end{aligned}$$

*Willing to give consent**

$$\begin{aligned}
&= \beta_0 + \beta_1 * \text{Known with legislation} + \beta_2 * \text{Interaction} + \beta_3 \\
&* \text{Willing to donate} + \beta_4 * \text{Discussed with family} + \beta_5 \\
&* \text{Discussed with family} + \beta_6 * \text{having a partner} + \beta_7 * \text{Education}_{\leq 16} + \beta_8 \\
&* \text{Education}_{17-18} + \beta_9 * \text{Education}_{19-20} + \beta_{10} * \text{Education}_{\geq 21} + \beta_{11} \\
&* \text{Education}_{student} + \beta_{12} * \text{male} + \beta_{13} * \text{Age}_{15-24} + \beta_{14} * \text{Age}_{25-39} + \beta_{15} \\
&* \text{Age}_{40-54} + \beta_{16} * \text{Age}_{\geq 55} + \beta_{17} * \text{Town} + \beta_{18} * \text{smoker} + \beta_{19} * \text{GDP} + \beta_{20} \\
&* \text{Populationsize} + \beta_{21} * \text{HCexpenditures} + \beta_{22} \\
&* \text{Lawsystem}_{presumed consent} + \beta_{23} * \text{orthodox} + \beta_{24} * \text{catholics} + \beta_{25} \\
&* \text{protestants} + \beta_{26} * \text{Jews} + \beta_{27} * \text{Muslims} + \beta_{28} * \text{Year}_{2009} + \beta_{29} \\
&* \text{Country}_{North} + \beta_{30} * \text{Country}_{East} + \beta_{31} * \text{Country}_{South} + \varepsilon
\end{aligned}$$

Model 4:

The last model includes a continuous variable for members of the household to estimate the effect of living in a large household. To proxy the ability to have access to information a dummy variable is included for having internet access at home. To extend the lifestyle information of an individual, a dummy for drinking alcohol is included.

These variables are only available for the years 2006 and 2009, creating a sample where the same countries are represented in each year. The dummy variable for the year 2009 is used to consider the development over the years between 2006 and 2009.

*Willing to donate**

$$\begin{aligned} &= \beta_0 + \beta_1 * householdmembers + \beta_2 * Internetaccess + \beta_3 \\ &* Drinkingalcohol + \beta_4 * Consentforrelative + \beta_5 \\ &* Discussedwithfamily + \beta_6 * havingapartner + \beta_7 * Education_{\leq 16} + \beta_8 \\ &* Education_{17-18} + \beta_9 * Education_{19-20} + \beta_{10} * Education_{\geq 21} + \beta_{11} \\ &* Education_{student} + \beta_{12} * male + \beta_{13} * Age_{15-24} + \beta_{14} * Age_{25-39} + \beta_{15} \\ &* Age_{40-54} + \beta_{16} * Age_{\geq 55} + \beta_{17} * Town + \beta_{18} * smoker + \beta_{19} * GDP + \beta_{20} \\ &* Populationsize + \beta_{21} * HCexpenditures + \beta_{22} \\ &* Lawssystem_{presumedconsent} + \beta_{23} * Orthodox + \beta_{24} * Catholics + \beta_{25} \\ &* Protestants + \beta_{26} * Jews + \beta_{27} * Muslims + \beta_{28} * Year_{2009} + \beta_{29} \\ &* Country_{North} + \beta_{30} * Country_{East} + \beta_{31} * Country_{South} + \varepsilon \end{aligned}$$

*Willing to give consent**

$$\begin{aligned} &= \beta_0 + \beta_1 * householdmembers + \beta_2 * Internetaccess + \beta_3 \\ &* Drinkingalcohol + \beta_4 * Willingtodonate + \beta_5 * Discussedwithfamily \\ &+ \beta_6 * havingapartner + \beta_7 * Education_{\leq 16} + \beta_8 * Education_{17-18} + \beta_9 \\ &* Education_{19-20} + \beta_{10} * Education_{\geq 21} + \beta_{11} * Education_{student} + \beta_{12} \\ &* male + \beta_{13} * Age_{15-24} + \beta_{14} * Age_{25-39} + \beta_{15} * Age_{40-54} + \beta_{16} * Age_{\geq 55} \\ &+ \beta_{17} * Town + \beta_{18} * smoker + \beta_{19} * GDP + \beta_{20} * Populationsize + \beta_{21} \\ &* HCexpenditures + \beta_{22} * Lawssystem_{presumedconsent} + \beta_{23} * Orthodox \\ &+ \beta_{24} * Catholics + \beta_{25} * Protestants + \beta_{26} * Jews + \beta_{27} * Muslims + \beta_{28} \\ &* Year_{2009} + \beta_{29} * Country_{North} + \beta_{30} * Country_{East} + \beta_{31} * Country_{South} \\ &+ \varepsilon \end{aligned}$$

4. Results

4.1 Descriptive statistics

Willingness to donate differs between countries. Table 4.1 represents personal willing to donate and willingness to give consent for another in different EU-countries (as percentage of the population), including the difference between these two in percentage-points. In countries with a negative number - marked red - people are less willing to donate their own organs than those of relatives. Percentages higher than 80% are marked green, highlighting countries with high performing.

The average of the percentages is taken in three ways. Distinction is made between the full sample and two subsamples: 1. Western European countries (15 countries, available for all years) and 2. Additional countries (added to the sample in 2006, later connected to the EU).

Sweden is the best performing country concerning personal willingness to donate, with percentages above 82.6%. Denmark, Ireland, Spain, Finland and Malta are other examples of countries with a very high percentage of the population personally willing to donate. Austria, Romania, and Latvia are poorly performing countries. Latvia as the worst, performing with percentages not higher than 22.2%.

Italy began in 2002 with an impressive personal willingness to donate (80.6%). However, in later years the score is even beneath the average of the full sample (62.0 and 63.0%). Austria, a Western country, represents low percentages of the population personally willing to donate in all three years. The Netherlands scores in 2006 and 2009 were above average, but it was not among the really good performing countries.

The personal willingness to donate is higher in Western countries on average than in the remaining countries. The highest average percentage was achieved in 2002; the two later years show lower values (decreased from 73.5% to 71.6 and 71.9%). The average of the extended countries is the highest in 2009 with 62.4% of the population personally willing to donate.

Concerning willingness to give consent for another, Ireland, Spain, Finland, Sweden and Malta showed to have high percentages. Sweden is as West-European country on top with percentages between 78.5% and 90.0% of the population willing to give consent. The countries with low personal willingness to donate (Austria, Romania and Latvia) show low percentages of the population willing to give consent for relatives.

Willingness to give consent for relatives in West-Europe was at its maximum in 2006 (71.8%), but decreased afterwards (to 71% in 2009). These averages are still higher than the average willingness to give consent among the extended countries (respectively, 64.1 and 65.2%).

The highest difference between the two types of willingness was shown in Latvia in 2009 with 16.7 percentage points *lower* personal willingness to donate than willingness to give consent. For the same year Denmark's preparedness to donate organs was 7.7 percentage points *higher* than the willingness to consent for organ donation of a relative.

The two types of willingness to donate were more closely related during 2006 and 2009. In Western countries the percentages differ, on average, less than in the extended countries. Remarkably, half of all researched countries in the two latest studies showed a situation with more people willing to give consent for others than for their selves.

Table 4.1 : Overview of percentages of the population willing to donate									
Country	2002			2006			2009		
	Personal %	Consent %	Difference %-point	Personal %	Consent %	Difference %-point	Personal %	Consent %	Difference %-point
The Netherlands*	0.637	0.598	0.039	0.783	0.770	0.013	0.738	0.723	0.015
France	0.705	0.636	0.069	0.768	0.731	0.037	0.758	0.734	0.024
Belgium	0.692	0.659	0.033	0.760	0.713	0.047	0.759	0.714	0.045
Germany*	0.604	0.556	0.048	0.610	0.627	-0.016	0.596	0.589	0.006
Italy	0.806	0.759	0.046	0.620	0.595	0.025	0.630	0.610	0.020
Luxembourg	0.732	0.725	0.007	0.706	0.717	-0.011	0.783	0.768	0.015
Denmark*	0.784	0.695	0.090	0.787	0.745	0.043	0.830	0.753	0.077
Ireland*	0.802	0.828	-0.027	0.799	0.784	0.015	0.823	0.826	-0.003
United Kingdom*	0.794	0.770	0.023	0.724	0.779	-0.055	0.704	0.755	-0.051
Greece	0.690	0.666	0.024	0.576	0.610	-0.033	0.528	0.543	-0.014
Spain	0.821	0.833	-0.012	0.756	0.837	-0.082	0.736	0.756	-0.021
Portugal	0.703	0.634	0.069	0.735	0.706	0.029	0.728	0.738	-0.011
Finland	0.795	0.772	0.024	0.800	0.809	-0.008	0.790	0.806	-0.016
Sweden	0.826	0.785	0.041	0.906	0.900	0.007	0.898	0.864	0.035
Austria	0.631	0.632	-0.001	0.412	0.448	-0.035	0.483	0.473	0.009
Cyprus				0.705	0.742	-0.038	0.726	0.722	0.003
Czech Republic				0.538	0.532	0.006	0.552	0.529	0.023
Estonia				0.699	0.705	-0.006	0.641	0.623	0.017
Hungary				0.592	0.599	-0.007	0.632	0.635	-0.003
Latvia				0.333	0.468	-0.135	0.325	0.492	-0.167
Lithuania*				0.601	0.652	-0.052	0.647	0.710	-0.063
Malta*				0.869	0.886	-0.017	0.900	0.919	-0.018
Poland				0.636	0.722	-0.086	0.668	0.753	-0.085

Slovakia				0.555	0.554	0.001	0.573	0.599	-0.026
Slovenia				0.742	0.737	0.005	0.741	0.726	0.014
Bulgaria				0.558	0.599	-0.041	0.610	0.665	-0.055
Romania*				0.356	0.446	-0.090	0.435	0.494	-0.059
Croatia				0.676	0.685	-0.010	0.660	0.606	0.053
Average – Western Countries	0.735	0.703	0.031	0.716	0.718	-0.002	0.719	0.710	0.009
Average – extended countries				0.605	0.641	-0.036	0.624	0.652	-0.028
Average - full sample	0.735	0.703	0.031	0.664	0.682	-0.018	0.675	0.683	-0.008

N.B. A negative number (red) means that the personal willingness to donate < willingness to give consent.

Percentages higher than 80% are green marked.

* countries with an informed consent legislation system

An important difference between countries is the legislation system instituted. Countries with an informed consent system are The Netherlands, Germany, Denmark, Ireland, UK, Lithuania, Malta and Romania (identified in table 4.1). The two legislation systems are compared based on willingness to donate in figure 4.1.

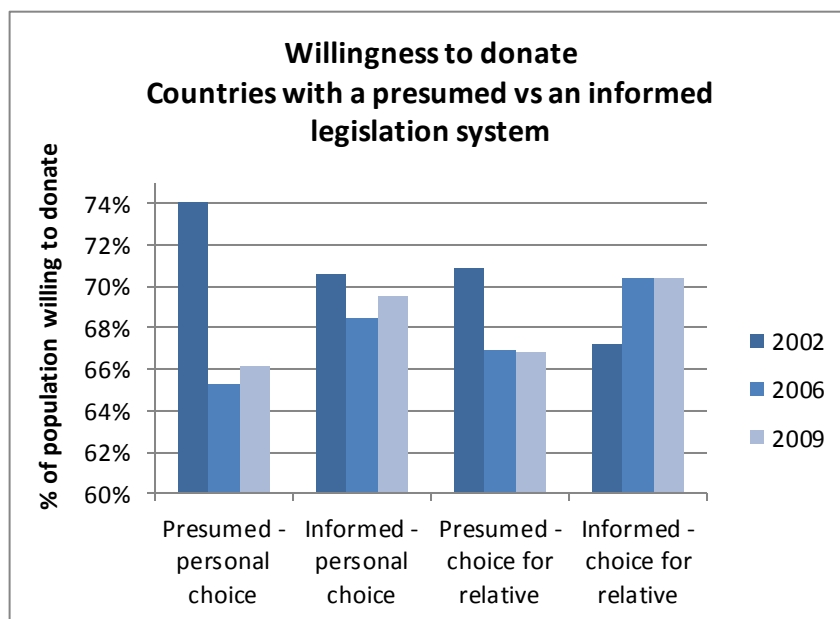


Figure 4.1

In 2002 the percentage of the population willing to donate (both personal and for a relative) was higher in countries with a presumed legislation system than in countries with an informed system. Exactly the opposite was found for 2006 and 2009. This change, as well as the large decrease in personal willingness to donate after 2002, may be caused by the inclusion of additional countries in 2006 and 2009.

To figure out whether these changes can be explained by the introduction of countries or by a real decrease in willingness to donate in presumed system countries, figure 4.2 shows only the willingness to donate in the 15 Western EU-countries available for the three years.

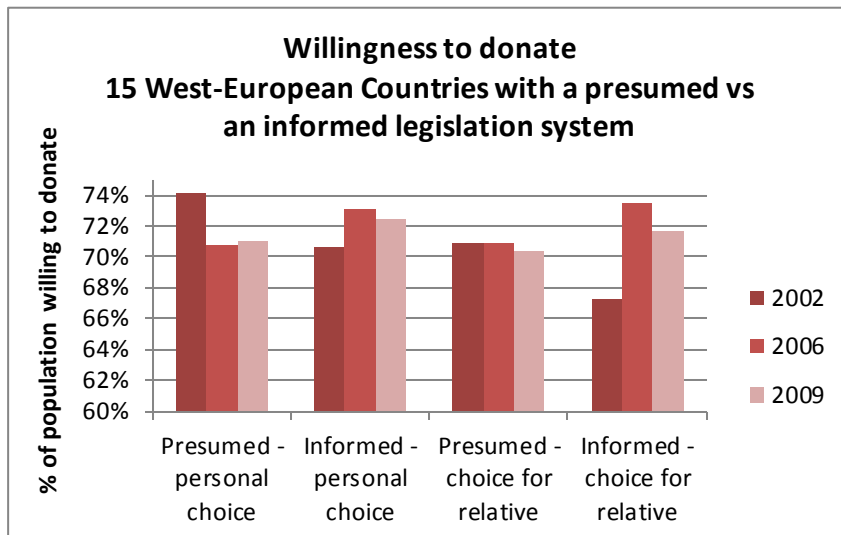


Figure 4.2

West-European countries with a presumed legislation system started in 2002 with a higher percentage of the population willing to donate, both personally and for relatives. After that year this turned into a higher willingness to donate in countries with an informed legislation system –as was also the case for the full sample.

Based on this, figures can be concluded that the decrease in *personal willingness* to donate after 2002 (table 4.1) has mostly occurred in presumed legislation systems; in informed system countries personal willingness to donate is on average increased. The increased willingness to give *consent* in Western countries until 2006 mainly occurred in informed system countries. The decrease after that year has mainly taken place in countries with an informed consent system.

The Western countries show a shift over the years from higher willingness to donate in presumed system countries to higher willingness to donate in informed system countries. The same pattern is shown in the graph including all countries (figure 4.1) with only lower average percentages -since the willingness to donate is lower in most of the extended not-Western countries (table 4.1). This shift is mainly caused by the drop in willingness to donate in Austria and Italy, two presumed consent countries (table 4.1).

Willingness to donate after discussing the organ donation topic with family is charted in figure 4.3 to examine the importance of discussing organ donation. The first two groups of columns represent

personal willingness to donate. The willingness is much higher among people who have discussed the topic with their family than among those who did not. The same trend, with a smaller difference, is visible for the effect on the willingness to give consent for a relative. We can conclude that discussing the topic with family is associated with willingness to donate.

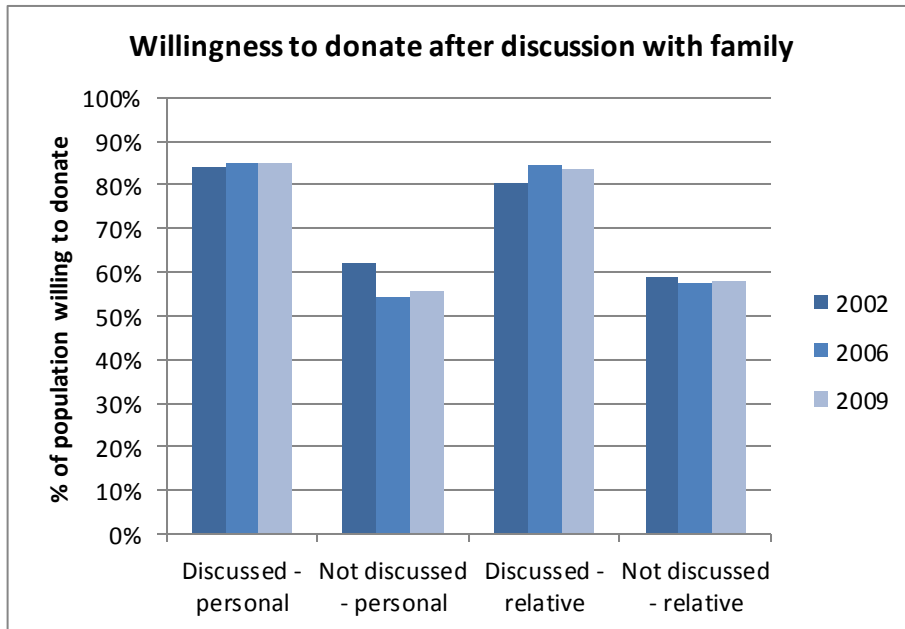


Figure 4.3

Figure 4.4 shows an overview of the choices people make, based on the whole sample. 5.81% of the whole population is personally not willing to donate but indicated being prepared to give consent for a relative. More people (6.11%) are personally willing to donate but would *not* give consent in case they have to decide for a relative.

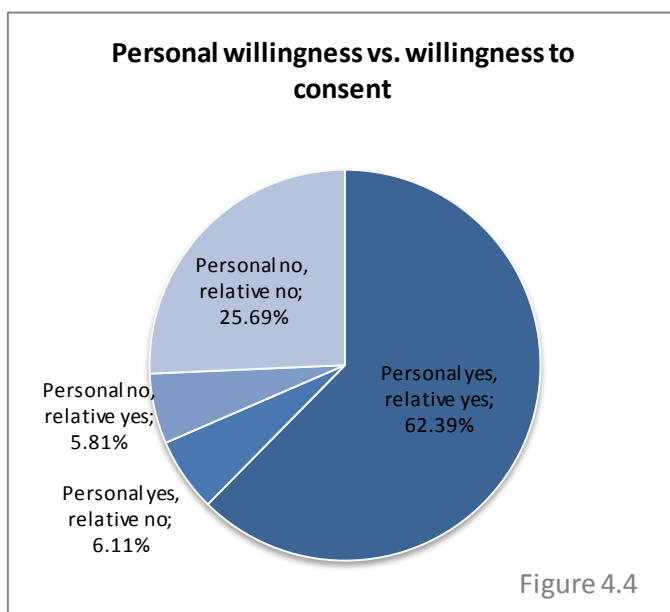


Figure 4.4

Table A1 (Appendix) summarizes all variables included in the regression, including the response rate, means, standard deviation, the minimum and the maximum value the variable has taken. Three different means are given: one mean for the full sample, one for those in the population who declared that they are personally willing to donate their organs and one for those in the population who are willing to give consent for the organ donation of relatives. The different values a variable can take with their means are displayed as well, showing differences within a variable. Many variables are included in the analysis as a binary variable. The mean provides in that case the percentage of people matching with the variable outcome '1'.

From the subsample 'personally willing to donate,' a lot of people are willing to give consent for relatives (91.1%). Barely 18.5% of the people who didn't want to donate personally were prepared to give consent for another. More people who are willing to donate have discussed the organ donation topic with their family (51.8%) than is the case in the full sample (38.0%) and among people not willing to donate (19.6%). The health state of people who were personally willing to donate was more often evaluated as good compared to people not willing to donate (72.0 vs. 60.5%) and fewer people had a longstanding illness (29.7 vs. 33.8%). Relatively more people personally willing to donate had knowledge about the legislation (38.1% vs. 17.2%). Internet access at home, as proxy for accessibility to knowledge, was higher among those who were willing to donate (58.6 vs. 37.5%). According to the country characteristics, people who were willing to donate lived in countries with a higher GDP per capita (\$ 19573.02 vs. \$ 16437.15), higher health care expenditures (8.82 vs. 8.59%) and a smaller population (22.1 million vs. 22.4 million).

The means in the subsample 'willing to consent for a relative' follow a same pattern as the means in the subsample 'personal willingness to donate'.

4.2 Regression results

Table 4.2 provides the results of the logistic regressions, represented by the marginal effects. As explained, the variables used can be grouped in different categories: variables related to knowledge about healthcare, social interaction of people, individual health status, lifestyle and variables including information about the country where people live in.

Knowledge

To proxy the knowledge a person has related to organ donation, variables such as topic discussion with family, access to internet and years of education were included. Discussion of the organ donation topic with family had a significant positive influence on the willingness to donate. The probability for 'personal willingness to donate' increased (9.6 percentage points) when a person had discussed the topic with family. The probability of willingness to consent increased as well (by 5.6 percentage points). There was a significant difference between people who didn't follow fulltime education and people who did. The marginal effects increased with the years of education, while students had the highest probability of being willing to donate (8.2 percentage points higher than no fulltime education at all). Although having more years of education does not necessarily indicate being better informed about organ donation (Cantarovich et al., 2007), it has a positive impact on personal willingness to donate.

No significant difference was found between years of education and willingness to consent. Access to knowledge through access to internet at home is included in the fourth model. Having internet access at home increased both the probability that one was personally willing to donate (2.7 percentage points) as well the probability of willingness to give consent (1.7 percentage points).

These results are in line with the hypothesis based on the theoretical framework. Discussion with family is the most important factor related to knowledge. It can be argued in two ways; people who want to become a donor are people who discuss this more with others. Or, because of the discussion people become more willing to donate. Discussion of the organ donation topic with family is important also in forming personal attitudes towards the topic known by relatives. Internet access gives individuals greater access to information. More information leads to greater awareness of the shortage of organ donors as well as more knowledge about procedures and similar facts. More access to information implies more willingness to donate. Years of education seems to have no significant relation to willingness to give consent, where it has a positive influence on the personal decision. More knowledge is closer related to the personal decision than the decision for another.

Health status

Related to knowledge is the health state of a person; more contact with – and therefore more knowledge of - the healthcare system results in being more convinced that organ donation is needed and not dangerous.

A good health status positively influences personal willingness and willingness to give consent for others. The probability that a person with a positive evaluated health state is willing to donate is 1.6 percentage points higher than for those with bad health evaluations. The preparedness to give consent for others increases here with 2.6 percentage points. Having a longstanding illness is not significantly related to willingness to donate one's own organs, though it has a significant positive influence on the willingness to give consent for organ donation of a relative (increased probability of 1.7 percentage points).

Having a longstanding illness could cause people to believe they are not appropriate to become personal organ donors. However, the attitude towards organ donation can still be positive. Since there is no individual opportunity, the only way to contribute is in giving consent for relatives. This does not apply for people with a poor health state evaluation. However, people with a longstanding illness might have more contact with healthcare organizations. Another explanation is that people with a bad health state experience less happiness in life, resulting in less preparedness to payback the society.

Lifestyle

Smoking increases the probability of personal willingness to donate significantly by 0.9 percentage points, based on model 1. When the data from 2002 is excluded and drinking behavior is included (model 4), smoking is no longer significantly related to personal willingness to donate. None of the models show a significant relation between smoking and willingness to give consent for a relative. People who did drink alcohol during the last month had an increased probability of personal willingness to donate (2.3 percentage points) and willingness to give consent for a relative (1.5 percentage points).

Lifestyle does not seem to be a great predictor of willingness to donate. Still, people who did drink alcohol in the last month are more often willing to donate. This can also be evaluated as a proxy for social interaction; people who did drink alcohol in the recent month are people with more social interaction than people who did not drink alcohol during the last month. More social interaction leads in this case to more willingness to donate.

Social interaction

To proxy the relation between social interaction and willingness to donate, community type, marital status and number of people in a household were included. Both marital status and community type were not significantly related to personal willingness to donate. However, they were significantly related with the willingness to give consent. Having a partner increased the probability of willingness to give consent, with 0.9 percentage points. Living in a town instead of a village decreased the probability slightly by 0.6 percentage points. The number of household members of an individual had no significant influence on the willingness to donate.

Although Mossialos et al. (2008) reported social interaction as predictor for willingness to donate, this survey did not find evidence for this relation. The survey for this thesis covers more years and included other variables to proxy social interaction – Mossialos et al. (2008) included proxies such as the ability to count on others in case of problems³. Having a big household and living in a village seems to be more limited proxies to measure the amount of social interaction. Only having a partner, as proxy for social interaction, increases the probability that one would become an organ donor. Additionally can be argued that people with a partner are better acquainted with the personal preference of the relative, being the partner, and for that reason more willing to donate.

Other individual characteristics

Political placement indicates how an individual will be socially involved with the government. People who place themselves 'left' within the political spectrum have a significantly higher probability of being willing to donate their own organs (1.2 percentage points). The probability that they were willing to give consent for relatives is lower (0.2 percentage points) compared to people who are positioned in the center.

In the first three models no significant difference was found between males and females in personal willingness to donate. After exclusion of the year 2002, the probability that males were personally willing to donate was significantly lower (0.6 percentage points, significance at the 10% level). Little evidence is found for a difference in gender.

Age was significantly related to personal willingness to donate - the younger people are, the higher the probability that they were willing to donate. People aged 15-24 had the highest (3.2 percentage points) compared to people older than 55 years. This can be related to the high personal willingness to donate among students. No significant difference in willingness to give consent was found between people older than 55 years and younger people.

³ These variables were only available for the year 2002 and for that reason not included in this survey.

Older people have been confronted with death more often and are more likely to have gathered information related to the topic. However, younger people are more prepared to donate. Thinking of organ donation means thinking of your own death. An explanation might be that death feels further away for younger people and is therefore an easier subject to talk and think about.

Country characteristics

A higher GDP of \$1000 per inhabitant increased the probability of personal willing to donate significantly by 0.1 percentage points. The influence of GDP remained significant when other variables were included. No significant relation was founded between GDP and willingness to give consent. An increase in the population by 1 million people reduced the probability of personal willingness to donate by 0.05 percentage points. The size of the population had no significant influence on the willingness to give consent in model 1.⁴ The result that people from smaller countries have a higher probability to be willing to donate supports the idea of social interaction. However, the magnitude of this effect is small and no significant evidence was found on the regional level, being village versus town. Surprisingly, healthcare expenditures were not significantly related to personal willingness to donate, but were related to willingness to give consent. An increase of the health care expenditures with 1 percentage point of the GDP decreased the willingness to give consent by 1.3 percentage points. The magnitude of this relationship differed between the models, but was consistently a value between 1.1 and 2.0 percentage points.

People living in countries with fewer healthcare expenditures and a small population had a higher willingness to donate. These findings support the idea that willingness to donate is not a matter of paying back to the society, but more related to commitment at a national level. Smaller countries seemed to be better at reaching this commitment. Higher healthcare expenditures may take responsibility from the society away. Still remarkable is the fact that the amount of expenditures has no impact on personal willingness to donate and living in a village does not appear to have an effect on the personal willingness to consent.

Religion

The personal willingness to donate is generally more influenced by the presence of religion in a country than the preparedness to give consent for a relative.

The percentage of Catholics in a country is neither significantly related to personal willingness to donate nor the willingness to give consent for another.

⁴ Only a small significant influence is founded when the year 2009 is excluded from the model.

A 1 percentage point increase of Muslims in a country increased the probability of personal willingness to donate by 23.5 percentage points, according to model 1. The impact of the percentage of Muslims in a country is significant in all models, but changes in magnitude. The influence is the highest when the year 2002 is excluded from the sample. This can partly be explained by the introduction of new (Islamic) countries in the sample after 2002. For the willingness to give consent a totally different view was given - a decrease in the probability of 10 percentage points in two of the four models. This is not surprising, given that organ donation in Islam is accepted under the condition that Muslims are able to decide for themselves.

Most of the countries added after 2004 have a high percentage of orthodox inhabitants. This is also shown in the results; orthodoxy in the first three models (including the year 2002) had a negative of impact, while in model 4 (excluding 2002), there was an increase of 9.3 percentage points on the probability of personal willingness to donate.

The influence of percentage of Protestants in a country on the personal donation decision differs between 4.2 percentage points in the first model and 5.6 percentage points when 2002 is excluded. There was no direct relation found between percentage of protestants in a country and willingness to give consent.

The present percentage of Jewish people in countries is very low, but significant related to the personal willingness to donate; an increase of 1 percentage point of Jewish people in a country increased the probability of the willingness to donate by 244 percentage points in the first model⁵. Excluding years and including other variables leads to different marginal effects varying from 2.44 to even 4.01 in model 2. This impact in combination with low percentages of Jewish people in countries shows that Jewish people live according to the guidelines their religion gives.

Countries are grouped and a dummy is included in the analysis (table 3.3). The results are evaluated according to model 4, which includes all countries. West-Europe is used as reference.

Living in East-Europe increases the probability of personal willingness to donate by 2.7 percentage points, with respect to living in West-Europe. Living in North- or South-Europe is not significant different from living in West-Europe concerning personal willingness to donate. The probability of willingness to give consent increased (2.6 percentage points) when living in South-Europe; other parts of Europe did not differ significantly from West-Europe.

When the means of the variables were evaluated (table A1), the 15 EU-countries available from 2002 - and indicated as West-Europe - included the 'South-European countries'. Based on the

⁵ This high percentage change can be explained by the low percentage Jewish people in all countries. The country with the highest percentage Jews is France, with just 1% of the population.

regression results it can be concluded that the relatively high percentage of willingness to donate among these 15 European countries is mostly due high performing countries in South-Europe.

To examine the relation between the two types of willingness, the variable about willingness to consent for relatives is an explanatory variable included in the models to predict the personal willingness to donate and vice versa.

All models show that the chance someone individually wants to become donor increases by about 35 percentage points when that person is also willing to give permission for a relative to become donor. The probability that an individual is willing to give permission for a relative increases by about 37 percentage points when that person is personally willing to donate. The deviation between these percentages confirms that the choice for another is not the same as the choice for oneself.

Legislation

In countries where a presumed law system is applied, the probability of personal willingness to donate is 0.9 percentage points lower, according to model 1. Excluding 2009 and including information about health state and political placement results in no evidence for a significant difference between the two systems. Including knowledge of legislation in model 3 leads to a significantly lower probability for willingness to donate in presumed consent countries, with a magnitude comparable to model 1 (1.2 percentage points). Knowledge of legislation increases the probability of personal willingness to donate by 2.5 percentage points. The interaction term indicates that people with knowledge of the legislation system, who live in a presumed consent country, have 2.6 percentage points higher probability of being personally willing to donate than people living in informed consent countries and/or who do not know the legislation. It is difficult to say whether this is because of more knowledge of legislation than the law system itself.

No significant difference between the two systems was found for willingness to give consent. To conclude, it can be said that after inclusion of more years, religion, family structure and several possibilities to obtain knowledge (like access to internet), some evidence is found for a direct relation between legislation system and willingness to donate, but only when people have knowledge of the legislation system.

Table 4.2 : Marginal Effects for the four different models																
Years	2002, 2006 & 2009				2002 & 2006				2002 & 2009				2006 & 2009			
	Model 1a		Model 1b		Model 2a		Model 2b		Model 3a		Model 3b		Model 4a		Model 4b	
Dependent variable	WTD - personal		WTD - relative		WTD - personal		WTD - relative		WTD - personal		WTD - relative		WTD - personal		WTD - relative	
Variable	dy/dx	SE	dy/dx	SE	dy/dx	SE	dy/dx	SE	dy/dx	SE	dy/dx	SE	dy/dx	SE	dy/dx	SE
Personal WTD			0.3724***	0.0016			0.3671***	0.0022			0.3708***	0.0022			0.3668***	0.0017
Consent for relative	0.3539***	0.0012			0.3477***	0.0017			0.3454***	0.0015			0.3527***	0.0014		
Health state (good)					0.0158**	0.0053	0.0262***	0.0055								
Longstanding illness					0.0074	0.0053	0.0166**	0.0055								
Political placement (left)					0.0115**	0.0049	-0.002*	0.0050								
Political placement (right)					-0.0078	0.0049	-0.0046	0.0051								
Political placement (centre)					(omitted)		(omitted)									
Knowledge legislation									0.0250***	0.0070	0.0290***	0.0073				
Knowledge legislation * lawsystem									0.0263***	0.0087	0.0119	0.0089				
Household members													-0.0018	0.0013	0.0011***	0.0013
Internet access at home													0.0268***	0.0038	0.0168***	0.0039
Drinking Alcohol													0.0232***	0.0035	0.0150***	0.0036
Discussed with family	0.0955***	0.0031	0.0559***	0.0032	0.0932*	0.0044	0.0559***	0.0046	0.0814***	0.0041	0.0434***	0.0042	0.0968***	0.0036	0.0537***	0.0037
Marital status (partner)	0.0019	0.0031	0.0089***	0.0031	0.0059	0.0045	0.0044	0.0046	0.0000	0.0040	0.0090**	0.0041	-0.0021	0.0037	0.0065*	0.0038
Educ; ≤ 16 years old	0.0305*	0.0174	-0.0052	0.0181	0.0159	0.0315	0.0379	0.0327	0.0412	0.0254	-0.0386	0.0277	0.0277	0.0175	-0.0060	0.0180
Educ; 17-18 years old	0.0522***	0.0175	-0.0048	0.0183	0.0379	0.0317	0.0394	0.0329	0.0593**	0.0256	-0.0376	0.0278	0.0466**	0.0177	-0.0117	0.0182
Educ; 19-20 years old	0.0692***	0.0177	-0.0021	0.0185	0.0485	0.0319	0.0404	0.0332	0.0770***	0.0258	-0.0392	0.0280	0.0598**	0.0180	-0.0079	0.0185
Educ; ≥ 21 years old	0.0727***	0.0176	0.0201	0.0184	0.0547*	0.0318	0.0655**	0.0330	0.0794***	0.0256	-0.0192	0.0279	0.0595**	0.0179	0.0129	0.0184
Educ; Still studying	0.0822***	0.0188	-0.0093	0.0194	0.0713**	0.0332	0.0368	0.0343	0.0847***	0.0270	-0.0358	0.0291	0.0733***	0.0194	-0.0231	0.0198
Educ; No fulltime educ	(omitted)		(omitted)		(omitted)		(omitted)		(omitted)		(omitted)		(omitted)		(omitted)	
Gender (male)	-0.0003	0.0028	0.0040	0.0029	0.0022	0.0041	0.0066	0.0043	0.0021	0.0037	0.0005	0.0038	-0.0061*	0.0033	0.0005	0.0034
Age; 15-24 years	0.0321***	0.0063	-0.0101	0.0064	0.0229**	0.0095	-0.0134	0.0096	0.0383***	0.0081	-0.0119	0.0083	0.0214**	0.0077	-0.0150*	0.0078
Age; 25-39 years old	0.0214***	0.0039	0.0012	0.0040	0.0211***	0.0059	-0.0043	0.0061	0.0252***	0.0050	0.0069	0.0052	0.0112**	0.0048	-0.0047	0.0049
Age; 40-54 years old	0.0146***	0.0037	0.0051	0.0038	0.0143**	0.0054	0.0033	0.0056	0.0164***	0.0048	0.0093**	0.0050	0.0066	0.0044	-0.0023	0.0046
Age; ≥ 55 years old	(omitted)		(omitted)		(omitted)		(omitted)		(omitted)		(omitted)		(omitted)		(omitted)	
Community type (town)	0.0034	0.0029	-0.0056*	0.0030	0.0049	0.0043	-0.0092**	0.0044	0.0038	0.0038	-0.0093**	0.0040	0.0032	0.0033	-0.0032	0.0034
Smoking	0.0085***	0.0031	-0.0013	0.0032	0.0102**	0.0045	-0.0043	0.0046	0.0105***	0.0040	-0.0040	0.0042	0.0051	0.0036	-0.0025	0.0037
GDP	0.0013***	0.0003	0.0006*	0.0003	0.0008*	0.0004	0.0006	0.0004	0.0014***	0.0004	0.0009**	0.0004	0.0011**	0.0003	0.0002	0.0004
Populationsize	-0.0005***	0.0001	0.0001	0.0001	-0.0005***	0.0001	0.0002**	0.0001	-0.0005***	0.0001	0.0001	0.0001	-0.0006***	0.0001	0.0001	0.0001
Hcexpenditures	0.0002	0.0015	-0.0132***	0.0015	-0.0043*	0.0026	-0.0200***	0.0026	0.0004	0.0019	-0.0141***	0.0019	-0.0025	0.0017	-0.0114***	0.0017
lawsystem (presumed)	-0.0091**	0.0040	-0.0018	0.0041	0.0035	0.0061	0.0072	0.0063	-0.0122**	0.0060	-0.0010	0.0062	-0.0108**	0.0045	-0.0080*	0.0046

orthodox	-0.0899***	0.0094	-0.0191**	0.0096	-0.0838***	0.0149	0.0081	0.0154	-0.0694***	0.0126	-0.0154	0.0132	-0.0926***	0.0102	-0.0204**	0.0104
catholics	-0.0071	0.0082	0.0024	0.0086	-0.0118	0.0130	0.0152	0.0137	-0.0113	0.0108	0.0024	0.0114	0.0033	0.0088	0.0083	0.0092
protestants	0.0420**	0.0162	0.0056	0.0166	0.0793**	0.0267	0.0356	0.0274	0.0326	0.0207	-0.0020	0.0215	0.0570**	0.0179	0.0059	0.0182
jews	2.4432***	0.7043	0.9011	0.7252	4.0101***	1.0997	1.7612	1.1272	2.7228***	0.9419	0.8963	0.9822	2.4895**	0.7662	1.0000	0.7831
muslims	0.2358***	0.0426	-0.0451	0.0442	0.1444**	0.0688	-0.1237*	0.0719	0.1139*	0.0585	-0.1041*	0.0617	0.3530***	0.0479	0.0121	0.0490
dyear2006	-0.0321***	0.0041	0.0393***	0.0042	-0.0298***	0.0050	0.0385***	0.0051					(omitted)		(omitted)	
dyear2009	0.0213***	0.0046	0.04226***	0.0046					-0.0196***	0.0051	0.0436***	0.0052	0.0087**	0.0036	-0.0014	0.0036
dyear2002	(omitted)		(omitted)		(omitted)		(omitted)		(omitted)		(omitted)					
North European	-0.0042	0.0113	-0.0065*	0.0115	-0.0389**	0.0178	-0.0201	0.0183	0.0037	0.0146	-0.0062	0.0151	-0.0090	0.0126	0.0028	0.0128
East European	0.0290**	0.0100	-0.0232**	0.0103	0.0035	0.0150	-0.0456**	0.0155	0.0292**	0.0131	-0.0231*	0.0134	0.0271**	0.0113	-0.0126	0.0115
South European	0.0624***	0.0068	0.0214**	0.0070	0.0523***	0.0098	0.0210**	0.0101	0.0587***	0.0090	0.0134	0.0092	0.0648	0.0079	0.0260**	0.0080
West European	(omitted)		(omitted)		(omitted)		(omitted)		(omitted)		(omitted)		(omitted)		(omitted)	
Nr. of countries included	15		15		28		28		28		28		28		28	
Nr. of observations	73,102		73,102		44,814		44,814		44,518		44,518		56,872		56,872	

N.B. *** = significant at 1% level, ** = significant at 5% level and * = significant at 10% level

5. Discussion & Conclusion

This study attempted to find an answer on the question: *'Which factors influence the willingness to donate one's own organs after death, and do they differ from factors influencing the willingness to consent for the donation of organs from a deceased relative?'* Although a complete and conclusive answer is not given, the knowledge in decision making related to organ donation is increased.

Many factors influence both the personal decision as well the decision for others, but differ in their contribution. Knowledge is really important for the two kinds of willingness, though especially for personal organ donation. Access to internet and discussion of the topic with family lead both to significant higher probabilities of willingness to consent. These two variables, together with years of education, explain even better the choice a person makes in his decision to become personal donor.

Health state is a better indicator of the choices people make for others. A good health state and having a longstanding illness increase the probability a person is willing to give consent. For the personal decision having a longstanding illness does not affect willingness, and a good health state is less important.

Social interaction - measured by marital status, type of community and household members - is not significantly related to personal willingness to donate. On the other hand marital status and community type are of interest in the willingness to give consent, although not per se according to the hypothesis based on the idea of social interaction. An increased probability of willingness to consent when having a partner may also be explained as the result of better knowledge of the wishes of one's partner. The magnitude of the effect for living in a small town is that small, that based on barely this result, no conclusions can be made that people with more social interactions feel the need to pay the society back.

People identified as 'left' in the political field have a significantly higher probability of willingness to donate personally and a lower willingness to give consent. Smaller countries perform slightly better in personal willingness to donate, but don't differ from bigger countries in preparedness to give consent. Healthcare expenditures are not related to personal willingness to donate, but when the expenditures increase, the willingness to consent decreases.

Politically 'left'-oriented means in general having more focus on society as a whole, translated into more commitment to the society. Based on these findings, support is given for the idea that commitment to society, more than a public payback system, affects willingness to donate.

Although many religions have a positive attitude towards organ donation, not all religions increase the willingness to donate significantly. The percentage of Catholics, for example, is not indicated as a predictor of the willingness to donate. The other religions affect more the willingness to donate personally than to donate relatives' organs, as some religions are strongly convinced that people have to make their own choice in this topic (Catholic Church, Islam). Within the Islamic religion, Orthodox Christianity, and Judaism, highly significant relations among religion and willingness to donate exist. The presence of Protestants in a country affects the willingness to donate only slightly, while it is a large religion with positive attitude towards organ donation. The reason that religion not always creates high willingness to donate is the limited knowledge people have about the attitude of religion towards organ donation (Skowronski, 1997). The low impact of some religions in a country show that a lot of people are not known with the point of view their religion has, or people do not act according to the religious principles. The former gives religious leaders an important task to provide correct information.

The difference between the two legislation systems is insignificant when knowledge of legislation is not included; no significant relation to the willingness to give consent and only a small negative affect to personal willingness is found. Including knowledge of legislation increases the probability of personal willingness to donate in a presumed consent system only when people have knowledge of the legislation system. However, this relation seems to be mostly explained by the knowledge people have.

After inclusion of more years, religion, family structure and other possibilities to obtain knowledge (like access to internet), less evidence is found for a direct relation between legislation system and willingness to donate, which was the case for Mossialos et al. (2008). Results did not support the idea that countries with a presumed consent system are countries with a higher willingness to donate. Knowledge of legislation is important regardless. Further research is needed to examine this relation between legislation systems, knowledge of this system and willingness to donate.

To conclude, more knowledge and a certain political placement (more commitment to society) are strongly related to the personal willingness to donate, while health status (good or bad, as well as having a longstanding illness) is closely related to the willingness to give consent. Religion performs quite well, but there are chances to utilize the positive attitude of religion more in better provision of information by religious leaders. An important conclusion is that the willingness to donate is not directly influenced by a certain legislation system. Therefore a change to a presumed consent system

is not the solution to improve the willingness to donate. When such a change is eventually considered, the ethical objections of this system should be included in the discussion.

To improve the willingness to donate, and thus organ donation rates, public policy and religious leaders have two important roles: 1) Utilize and stimulate commitment to the society in an appeal to solve this problem as community. 2) Providing correct information; not only an appeal on the need for organ donation is needed, accurate information on different levels is important as well.

6. Limitations & Further Research

The most important limitation is that this research is about *willingness* to donate only. Even if this willingness increases, this might not cause a similar increase in actual organ donors. This is especially true in the case of willingness to consent for a relative. The final choice will be made after the death of a relative; this emotional setting might change the intended ideas. It would be interesting to combine the findings with actual registration and family consent rates in countries. The former could be used to find out whether the difference between willingness and actual registration is caused by registration costs. The difference between willingness to consent and actual family consent rates could be used to examine the role of the procedure in a hospital.

The role religion plays is discussed on the national level, with data based on 2010. Better insights in the effect of religion on willingness to donate would arise as information is used at individual level.

Important and interesting, though underexposed in this thesis, are the ethical values behind the legislation systems. The role relatives have in these systems can be doubted –why would a relative get a veto? (Den Hartogh, 2012)-, as well as a legislation system where government make presumptions about human bodies not belonging to them (Verheijde et al., 2009).

Not included in this study though still relevant, is information related to knowledge about the wish of the relative. Marital status proxies this knowledge, but is not enough to capture this need. The amount of knowledge related to organ donation a person has is relevant as well, though difficult to measure. No information for example, is included about campaigns related to organ donation done in countries. Knowledge about the legislation system is included, but does not per se give information about knowledge of procedures and other factual knowledge related to organ donation.

The role a legislation system plays is still difficult to examine. Knowledge of the legislation seems to be relevant, but other variables related to knowledge -like access to internet- were not together involved in the model, since none of the dataset includes both access to internet and knowledge of the legislation system. Further research should be done by including more variables to proxy the influence of knowledge and the consequences for the differences between the legislation systems.

Finally one must acknowledge that the decisions people make are not necessarily based on linear and rational thought processes (Morgan, 2008). Fully understanding the decisions people make is difficult to achieve. However, every contribution to more knowledge in this field can lead to better

understandings of people's behavior, which can be used to find possibilities to increase the number of available donor organs.

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Appendix

Table A1 : Overview of the means of variables per sample										
Variables	Response %	Value	Mean					Std dev	Min	Max
			Full sample	Willing to donate	Not willing to donate	Willing to consent	Not willing to consent			
Personal willingness*	82,21	1=Yes 0=No	0.6806	1	0	0.9148	0.1921	0.4662	0	1
Willingness for relative*	76,28	1=Yes 0=No	0.6828	0.9108	0.1845	1	0	0.4654	0	1
Discussed with family	99,10	1=Yes 0=No	0.3798	0.5178	0.1961	0.5021	0.2203	0.4853	0	1
Marital status	98,50	1=Partner 0=Single	0.6222	0.6325	0.5994	0.6397	0.5929	0.4848	0	1
Gender	100,00	1=Male 0=Female	0.4437	0.4442	0.4505	0.4476	0.4510	0.4968	0	1
Finishing fulltime education at age...	98,79	≤ 16 years old 17-18 years old 19-20 years old ≥21 years old Still studying No fulltime educ	0.3130 0.2468 0.1315 0.2160 0.0863 0.0064	0.2712 0.2355 0.1390 0.2556 0.0943 0.0042	0.3837 0.2636 0.1215 0.1520 0.0707 0.0087	0.2756 0.2366 0.1386 0.2582 0.0864 0.0046	0.3659 0.2620 0.1257 0.1556 0.0828 0.0080	0.4637 0.4311 0.3380 0.4115 0.2808 0.0796	No educ	age ≥21
Age	100,00	15-24 years 25-39 years old 40-54 years old ≥ 55 years old	0.1295 0.2438 0.2525 0.3743	0.1365 0.2597 0.2633 0.3405	0.1157 0.2116 0.2321 0.4407	0.1261 0.2547 0.2647 0.3545	0.1300 0.2149 0.2319 0.4232	0.3357 0.4294 0.4344 0.4839	15	98
Community type	99,77	1=Town 0=Village	0.6346	0.6461	0.6146	0.6412	0.6201	0.4816	0	1
Smoking	99,59	1=smoker 0=non-smoker	0.3073	0.3186	0.2992	0.3103	0.3051	0.4614	0	1
Law system	100,00	1=Presumed	0.6786	0.6763	0.6967	0.6809	0.7007	0.4670	0	1

		0=Informed								
Health state	61,20	1=Good 0=Bad	0.6818	0.7204	0.6049	0.7147	0.6163	0.4658	0	1
Longstanding illness	60,86	1=Yes 0=No	0.3069	0.2969	0.3380	0.3091	0.3284	0.4612	0	1
Political placement	46,49	Left Centre Right	0.3103 0.4225 0.2672	0.3252 0.4147 0.2601	0.2832 0.4296 0.2872	0.3194 0.4137 0.2669	0.2928 0.4218 0.2854	0.4626 0.4940 0.4425	1	3
Knowledge legislation	58,24	1=Yes 0=No	0.2941	0.3815	0.1716	0.3797	0.1886	0.4556	0	1
Internet access at home	77,80	1=Yes 0=No	0.5061	0.5864	0.3753	0.5725	0.3975	0.5000	0	1
Drinking Alcohol	75,69	1=Yes 0=No	0.6492	0.6966	0.5763	0.6878	0.5855	0.4772	0	1
Household members	77,80		2.6976	2.7399	2.5995	2.7282	2.6141		1	20
GDP	-		18.282	19.573	16.437	19.176	16.934	10.495	2.331	53.7017
Pop	-		22.466	22.1081	22.3766	21.5949	22.1310	25.763	0.4064	82.4885
Hcexp	-		8.7110	8.8244	8.5881	8.7748	8.6938	1.6818	4.9894	11.9782
Christians	-		0.7881	0.7853	0.7857	0.7873	0.7828	0.1253	0.4390	0.9849
Orthodox	-		0.1262	0.0992	0.1656	0.1080	0.1552	0.2746	0.0001	0.9092
Protestants	-		0.1635	0.1873	0.1346	0.1830	0.1444	0.2598	0.0018	0.8161
Catholics	-		0.4525	0.4529	0.4396	0.4496	0.4406	0.3581	0.0020	0.9461
Jews	-		0.0019	0.0019	0.0019	0.0019	0.0020	0.0025	0.0000	0.0100
Muslims	-		0.0350	0.0353	0.0333	0.0350	0.0341	0.0420	0.0001	0.2191