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Gifting Through Institutions:

Blood Donor Population and Blood Collection Regimes of the European Union Revisited

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This thesis examines the gift relationship in blood donation and the role institutions play in this relationship. Using survey data that encompasses all countries in the European Union blood donation is approached with the blood collection regimes. New countries that haven't been categorised into regimes before are categorised and analysed in the thesis. Additionally, the donor population of the European Union is examined to uncover who donate blood.

Blood is not something that is simply donated. It is collected by organisations that affect what kind of activity donation of blood is. These organisations are in a peculiar gift relationship with the people who donate blood. This gift relationship somewhat reminds that of Maussian gift of archaic tribes. Giving gifts, receiving them, and reciprocating are all parts of the relationship.

The results showed that the gift relationship is still present in blood donation. However, blood seems not strongly connected to other altruistically activity, at least on country level. Blood collection regimes still have explanatory power in explaining blood donors of the European Union. Donor population in each regime was somewhat distinct, especially compared to other country level explanations. Blood donor population showed that the donor population differs from country to another and between regimes. Blood donors are not some unique type of people who donate people. Rather, they are people who blood collecting organisations have recruited as donors.

Keywords: *blood donation, comparative research, blood collection regimes, multilevel modeling, exploratory factor analysis, Eurobarometer*

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1 INTRODUCTION

Blood transfusions and blood products are a crucial part of Western medicine. Human blood and blood components are mainly used in surgeries and as medicine to help assist in otherwise crippling diseases such as haemophilia. Throughout Europe, blood is collected mainly from uncompensated volunteers who are known as blood donors. In most European countries payment for donation is strictly forbidden and donation of blood is considered a form of pure altruistic behaviour. Blood donation has been described as the gift of life, in which one gives a part of itself to help others in need (Piliavin 1990, p.444). After donating approximately half a liter of blood it is tested, stored, and sent to hospital blood banks. The person receiving the blood through transfusion and the person donating it never meet each other, which is said to emphasizes the altruistic motivation behind donating blood.

However, this absence of face to face relationship within blood donation conflicts with the classical explanations of gift relationship (Healy 2010, 17). Classical view of gift can be traced to Marcel Mauss' (2002 [1923]) essay *L' Essai sur le don*, which was published in the *L'Année sociologique*. Richard M. Titmuss later famously applied Mauss' theory of the gift to blood donation in his seminal book *The Gift Relationship: From Human Blood to Social Policy* (1970), and put forth the proposition that donation of blood is a gift unique to modern societies in that it is truly altruistic. As Western societies are continuing their gradual transformation to market-based exchanges, the gift of blood has remained as one of the most resilient to oppose this. Indeed, World Health Organization has declared as their objective to have 100% non-remunerated blood donation across the world by 2020 (WHO 2010, p.5).

However, blood cannot be seen only as a gift given from a person to another. It is also something that is collected by organisations that shape what kind of

activity blood donation is. Therefore, studying blood donation simply from the gift perspective is not enough because altruism and gift giving are deeply embedded in national contexts as Healy (2000) argues in his study of the European blood collection regime. The research task of this thesis is threefold. First, applying Maussian theory of the gift to blood donation. Then I apply the framework of blood collection regimes to member states of the European Union. Last task is to examine the blood donor population of the European Union to uncover of what kind of people donate blood in the EU.

The research questions of this thesis are:

1. Can blood donation be considered as a unique gift relationship?
2. Are the blood collection regimes applicable to the expanded EU, and what are the role of regimes to the gift relationship in blood donation?
3. What are the characteristics of blood donor population in the EU?

In the second chapter of this thesis, the discussion on the gift of blood is presented. I start by discussing Marcel Mauss' theory of the gift and move on to how Richard M. Titmuss famously applied Maussian theory of the gift to blood donation. Next, cases which exemplify how the logic of the gift has affected situations in blood donation are presented, cases where different kinds of shocks to the blood system brought the logics of the gift visible. The theory of the gift is not the over-reaching theory of this thesis, but because blood donation is often considered a gift, this part of the thesis examines the questions of: *what similarities and dissimilarities does the gift of blood have with the Maussian gift?* And, *how does gift exchange differ from market exchange?*

In the third chapter, the blood collection regimes introduced by Kieran Healy in his article *Embedded Altruism: Blood Collection Regimes and the European Union's Donor Population* are introduced. Healy argued that blood is not just

something that is donated by an altruistic individual; it is collected by organisations that shape what kind of activity blood donation is, and that in emphasizing the gift relation this had been largely neglected. However, as the study was made in 2000 and consisted of countries belonging to EU in 1994, the European Union has since gone through major expansion. Thus, in this chapter I apply the blood collection regimes to categorise the new countries. This section mostly consists of the typology of the countries in regards of the regimes. The reason for this is to later examine if the regimes still explain differences in blood donation across the EU.

The fourth chapter introduces the study design. First, I explain the hypotheses that will be examined later, after which the data and the variables used in this quantitative thesis are introduced. The methods used in the study, factor analysis, visualised correlation coefficients, multilevel logistic regression, and logistic regression are then explained. The hypotheses are constructed from review of the previous studies regarding blood donation.

Chapter 5 is the part where results of quantitative methods are shown. The hypotheses are revisited here, and they are confirmed or discarded. The final part of this thesis, Chapter 6, is the discussion. That is where the results are discussed further.

2 THE GIFT OF BLOOD

2.1 Maussian View of the Gift

The concept of the gift at first glimpse seems simple. A gift is usually seen as some kind of item given to another person voluntary, with no expectation of anything in return. However, the matter is more complicated. Academic study of the concept of a 'gift' is generally traced back to French sociologist Marcel Mauss, who studied gift giving behaviour in archaic societies. Mauss, who was the nephew and the intellectual heir of Durkheim, is sometimes referred to as an anthropologist, though never conducted fieldwork himself. Instead, he used data collected by anthropologists such as Bronisław Malinowski on gift exchanges in archaic societies. Mauss interpreted the gift exchange as the foundation of all exchanges in societies before formation of money-based exchange (Mauss 2002, 4–5). Therefore, the exchange of gifts served as a force that tied clans together and at the same time held the power to divide them. Moreover, the phenomenon determined the division of labour and forced individuals and groups to participate in the reciprocal exchange of gifts (Mauss 2002, p.94).

Mauss demonstrated how gifts are in principle voluntary, but in truth giving and receiving gifts create obligations. Mauss saw the fulfillment of these obligations as shrouded behind the veil of generous gifts, while in truth they were always given with effort to benefit the giver of the gift. (Mauss 2002, pp.4–5.) Mauss also proposed that the gift had remained in his contemporary French society (Mauss 2002, pp.83–84), and in Mauss' footsteps, Godbout and Caillé present in their book The World of the Gift how the gift still constitute exchanges in modern society in which forms of compulsory and voluntary mix together in variety of ways (Godbout and Caillé 1998).

On one hand, to Mauss, pure gifts that are given without creating some kind of obligation or fulfilling those obligations are non-existent. Even gifts between husband and wife, were to Mauss, part of 'constant' payment made by husband to wife for sexual services (Mauss 2002, p.93). But on the other hand, Mauss emphasized that a gift is not about utilitaristic endeavor of self-interest. Even as individuals in archaic societies collected riches, self-interest itself was different than how modern world sees it. In archaic societies, cumulation of wealth went hand in hand with expending that wealth as gifts to others to accumulate obligations and followers. (Mauss 2002, pp.96–97.) Accumulation of wealth always served to maintain or create obligations or to restrict someone outside of the circulation of gifts and the social relations they served. Mauss traced the concept of self-interest to western origin and claimed, that it was almost impossible to translate into previously wide-ranging languages, such as Latin, ancient Greek, or Arabic (Mauss 2002, p.97). A gift given to someone is part of the relationship in which the gift was given. Thus, the circulation of gifts has the power to bind people in relationships that exemplify institutions surrounding them (Douglas 2010, pp.xv-xvi). The gift was an important and integral part of people's relationships, and it determined the intensity of the relationship and the position of the participants in a given society. As Healy summarises, the gift is something much more general than an item given (Healy 2010, p.15).

In modern societies, the position in the society can be (at least to some extent) indicated with things bought with money in market-based exchanges. For this reason, it is important to show the main differences between the gift and the ever invasive[1] market exchange. At its simplest form, the market exchange is a social institution that determines how products or services are exchanged and priced by competition between offers to buy and sell said products or services (Aspers 2011,

[1] Word 'invasive' used here free without prejudice. Reason for the choice of word is the undoubted force in which market has expanded into parts of life previously determined by other logics of exchange.

p.4). Participation in the exchange is voluntary and every participant decides as an atomistic actor the price in which they participate in the exchange. These exchanges are mediated by money, which acts as relative value of the items or services and makes it possible to numerate the value of the objects. This is very simplified view of the market exchange, but it is very useful as a simplification in this case to illustrate the differences between gift and market exchanges.

According to Robert Kowalski there are three main differences between market and gift exchanges. First is the search of equivalence in things exchanged, second is the required immediacy of reciprocation of the exchange, and the third is the freedom to quit the interaction once the exchange has been made. (2011, pp.192–93.) Equivalence of things exchanged refers to competitive nature of market. As there are multiple offers on both sides of the exchange, the participants try to maximise benefit from the trade. If the items up for exchange are of similar quality individual actors choose the cheapest one. In gift exchange, however, when giving the gift both the chance you ever receive a gift in return and the exact nature of return gift are shrouded in mystery. This is where gift exchange acquires its unbalanced nature. Reciprocal gift must always return more than was received or develop the relation, and failing that, participants risk losing honor and harming the social relationship in which gifts were traded. The second main difference — the immediacy of reciprocation — is the notion that in market exchange money and products change ownership immediately or the schedule for its delivery is explicitly stated. In gift exchange reciprocity is assumed but never guaranteed.[2] The gift is given in service of the social relationship in which it was given in hope that somewhere in future other participant will do their part in turn. It is not given to gain something immediately, rather it is given to bind people together. The obligations created when giving, receiving or reciprocating occur through the

[2] The same can of course be said of market exchange, as dishonest actors may take advantage of market participants. However, the sanctions from such acts come mainly through law instead of social relations.

social relations the gift serves. Third difference is market exchanges nature of being able to quit the exchange freely. In market exchange atomistic individuals or groups constantly evaluate offers and choose which one they choose to trade with. Gift on the other hand is part of longer continuum and escaping these exchanges is not possible without consequences, be they losing honor or losing connections.

Another integral part of the gift is its informality. When the rules of the gift become more explicit, we approach the domain of a contract. A contract is binding and cannot be refused. A contract, opposed to gift, loses its value in creating or maintaining relations. (Godbout and Caillé 1998, p.188.) Market based exchange is thus closer to a contract than a gift since the terms of contract in exchange are known to participants and are fulfilled as the exchange takes place. In gift the terms for the exchange are never as clear, and the giver of the gift acquires power in the relationship that was made visible by a gift. A gift carries within the obligations and forces that can be found in the relationship. Even as both gift and market exchange are on the surface about exchange, in market exchange results are what matter most, while in gift social relations are the most important thing (Godbout and Caillé 1998, p.179).

Market exchanges are — in simplest and most atomistic view — seen as isolated acts that are not connected to each other. To understand the gift Godbout and Caillé argue that it should be seen as a cycle that can be broken to three movements, which are to give, to receive, and to reciprocate (1998, p.19). The gift is thus the whole cycle, and after each movement another should follow. This is the binding force of the gift.

In the conclusion of The Gift Mauss discussed the relationship between market forces and emerging social security systems. He believed these new systems were reappearing in French society, in a form in which the state and other organisations are part of the gift exchange (2002, p.89). It also important to note that Mauss

did not believe market exchanges free from themes of the gift. For example, he stated that *"The various economic activities, for example the market, are suffused with rituals and myths. They retain a ceremonial character that is obligatory and effective."* (Mauss 2002, p.92). He believed that the cycle of the gift was such an integral part of social human nature that it was part of all exchanges, and that market and money had replaced some important parts of it. Emerging social security systems were to Mauss reappearance of the themes of gift. However, modern social security systems are quite calculating, and their principals are based in the rights of the individual. The rules are in most cases transparent and fall more into the category of contracts, where the participants are individuals and various social security organisations that perform those contracts. For example, labour market organisations that in some countries pay unemployment benefits do not give it as a gift, or the individual who pays for unemployment insurance does not do it in the logic of the gift. Nor are taxes considered a gift to the State, as they are bindingly compulsory. Still, the logic or reciprocity is present in the social security systems. For example, Danielsbacka and Kujala (2015) show how the expectation of reciprocity between the elite and the lay people affects the relationships between these classes, and especially what happens when these expectations are not met. The themes of the gift are present, but the exchanges are not governed by the logics of the gift.

More recently Viviana Zelizer (2010) has in depth pointed out how everyday economic actions are full of actions and beliefs that serve the social connections that show the positions and status of those participating in them. One might ask, why it is necessary to look at exchanges in archaic societies — especially concerning contemporary issue such as blood donation — when the gift can be seen everywhere around us? Pyyhtinen argues that it is "*–only after reading Mauss that we were able to know that we 'already knew'.*" (Pyyhtinen 2016, p.9). As Mauss describes the magical or religious forces that take hold of individuals in archaic societies, and then using the same viewpoint to our society it soon becomes

apparent that the exchanges we make in our daily lives are not that different. Some 'magical' force makes us obliged to reciprocate when we are given gifts, to keep items given to us (even if we do not use or enjoy them), and to accept gifts given (unless the giver is someone unwanted). A gift from someone we do not want a gift from is deeply unsettling, as it binds us into a relationship between the person.

To summarise Mauss' view of the gift, it is not the single occasion in which the gift changes ownership, the gifted item itself, or the obligation fulfilled or created. The gift is the social form of all aforementioned things which creates the force that shapes communities. Even if the gift is usually made only visible when exchange of items or services occur it is always there, shaping the way in which we relate to each other as individuals and groups.

2.1 The Gift Relationship in Blood Donation

Richard M. Titmuss' *The Gift Relationship: From Human Blood to Social Policy* (1970) is the most well-known and the most influential book concerning blood donation from sociological perspective. Titmuss examined blood from Maussian perspective, and according to him it was different from the gift of archaic societies.

> "*Unlike gift-exchange in archaic societies, there is in the free gift of blood to unnamed strangers no contract of custom, no legal bond, no functional determinism, no situations of discriminatory power, domination, constraint or compulsion, no sense of shame or guilt, no gratitude imperative and no need for the penitence of a Chrysostom*"
>
> (Titmuss 1970, p.239).

Indeed, the gift of blood in which the recipient and the donor never meet each other and is given without expectation of reciprocity is different than a gift given

to serve some function in a social relationship. The main contribution of *The Gift Relationship* was however Titmuss' comparison of blood transfusion systems across the world. Titmuss showed that blood transfusion systems in countries that paid for blood were not only less efficient, but more dangerous to recipients than those systems that functioned according to principals a gift given without compensation.[3] Titmuss showed the superiority of voluntary donor system in five areas. First the commercial system was more likely to entail unethical ways in collection of blood. Second was that blood collected in commercial system was more prone to shortages and the spoilage of blood products were higher. Third was the higher cost of administration in commercial systems, and fourth was the higher cost of blood to its recipient. The fifth, and possibly the most important, was the fact that blood collected in a commercial system was of less quality and contained more infections and diseases. (Titmuss 1970, p.246.) Titmuss showed how system based on gift exchange bested market-based system in the same areas that are usually seen as the most beneficial aspects of markets.

While the most convincing of Titmuss' arguments were that of the better quality of blood in gift-based system, the most interesting in regard to gift exchange was that in a society constantly transforming into more egoistic society, blood donation gives individuals chance to act altruistically (Titmuss 1970, p.13). This led to his other point: when blood was bought from individuals, people who give it from altruistic purposes are 'crowded out' as blood donation no longer is altruistic act, which could lead to lower total donation rates (Titmuss 1970, p.157). This crowding out hypothesis is supported by a Swedish paper, in which a field experiment on donors and different types of incentives were introduced which saw decrease of female donors drop to almost half when monetary incentive was introduced (Mellström and Johannesson 2008, p.857).

[3] Main points of the study were done by comparing blood transfusion systems of US (commercial system) and UK (voluntary donor system) with large data, while other countries data were less encompassing.

2.2 The Obligations That Bind

As Titmuss pointed out, blood collected from people who give it out of altruistic motivation seems to be of more high quality than blood from paid donations. However, since Titmuss released his book in 1970 lot has changed. In addition to supplying blood to those in need, blood donation has related to more functions. As Mauss theorised, the gift could bind people together, and Titmuss further claimed that the gift of blood could bind a society together. In the following sections I examine three different cases that each in their own way exemplify the workings of a gift relationship in blood donation. This brief case study is based on cases that all garnered wide public uproar on their own. Because the view of the gift as a basis of blood donation sees the public and the recipients of blood as bound by gift relationship, these shocks reveal how the logic of the gift in blood donation functions. These cases were uncovered by literature review.

2.2.1 Poison That Seeps Through Market and Gift Alike

HIV, or Human Immunodeficiency Virus, shook transfusion systems across the western world. As Mauss stated in *The Gift* the other semantic meaning for the word 'gift' in Germanic languages was *poison* (Mauss 1999, pp.109–10). The different kinds of systems that operated the systems were wholly unprepared for the new threat. In retrospect, comparing how they reacted reveals where the responsibilities and obligations between the participants of the relation lie. Healy studied how American blood collecting system reacted and how that exemplified the gift relation in blood donation. American blood transfusion system is great to compare different types of systems of exchanges, since at the time in the early to late 1980s, it consisted of two separate systems: non-remunerated blood donation and for-profit plasma sector. (Healy 2010, pp.88, 93.) One could say that the system of exchange in blood and blood components consisted two separate economies: one based on the gift and one in market exchange (Farrugia and Starr 2016, p.225).

When the evidence of AIDS[4] being linked to blood donation started mounting, both systems received the same information. January 1983 CDC (Centres for Disease Control and Prevention) committee released their report both to plasma banks and blood donation system. The report urged to limit risk groups, including people with AIDS, gay men, haemophiliacs, intravenous drug users, and Haitians outside of any type of blood donation. (Schmidt 2011, p.339.) CDC proposed that surrogate test should be used to limit risk groups, since they had found that 80% of people diagnosed of AIDS had hepatitis B as well, so the same test could be applied to HIV screening (Bayer 1999, p.24).

The representatives of the blood donation system uniformly responded to CDC that they were not going to use the precautions proposed by CDC against the gay population, as the deed would be unnecessary, discriminatory, and costly. Gay men consisted of 15% of their donor population, because blood donation had emerged as an outlet for them to help society that discriminated them. The blood banks were linked in a gift relationship with these donors and this relationship affected how blood banks reacted. Fittingly, the blood banks had no problem limiting blood donation from the Haitians as they were not engaged in this relationship. However, the blood banks decided not to forbid gay men from donating. The blood banks did not wish to question the gift given to them (Healy 2010 pp.94, 102). According to estimates, 29,000 were infected from blood supplied to hospitals by blood banks, of which half are believed to have been contracted after CDC gave their recommendations (Bayer 1999, p.33). The American system that was reorganised after Titmuss' book emphasised that voluntary, non-remunerated donors donated blood that was pure. However, the system spread contaminated blood instead.

[4] HIV was at the time unknown and AIDS (the disease caused by HIV) was the only indicator for contradiction.

Contrary to blood banks, the plasma fractioning industry took the recommendations by CDC seriously. Even as they had a relationship between them and the people they collected blood from, the industry could more easily widen their donor population with monetary compensation. In addition, the plasma factioneers were deeply embedded in a relationship between them and their main customers, the haemophiliacs, who bought from them medicine made from fractioned blood components. (Healy 2010, pp.103-104.) Blood plasma had just recently been processed into plasma-derived factor that revolutionised the lives of haemophiliacs: otherwise crippling and deadly disease could be treated with the derivate and the patients were able to live normal lives (Feldman and Bayer 1999, p.1). Even as the gay community and blood banks criticised the factioneers decision to limit gay men, the companies felt that it was more important to protect their customers than to please other members of the relationship (Healy 2010, p.104).

The commercial interests held by the companies guided their decision when confronted by new information differently than the blood banks and their gift relationship. This, however, did not protect the customers of the companies from the contamination spreading through the country. According to Healy, the same market mechanisms that helped companies react better than the blood banks in the end caused the spread of HIV (Healy 2010, p.105). In processing of the plasma to coagulation agents used as medicine, even as much as tens of thousands of units of plasma were combined. This meant that even a single HIV-positive donor could potentially contaminate the whole batch of anti-coagulation medicine. (Feldman and Bayer 1999, p.3.)

Even before the CDC report the companies knew that many of their customers had contracted the disease. After the report was released, they reacted quickly and implemented a new and more safe way of processing the components. However, they did not destroy the inventory that they had already processed, and instead, sold it to the patients. (Healy 2010, pp.105-106.) Because the US plasma fractioning industry dominated the world market, this meant that tens of

thousands of haemophiliacs were infected. Of the patients receiving these coagulation agents, approximately 75-85% were infected. Whole families were affected, as couples infected their spouses and mothers giving birth infected their babies. (Bayer 1999, p.33; Feldman and Bayer 1999, p.3.)

Neither of these systems were able to escape this horrific situation without, from the retrospect, unnecessary infections and unsurmountable grief. The organisations made their decisions at a time of uncertain information based on the relationship and the obligations related to them: one based on gift relationship and the other based on market relationship.

2.2.2 L' affaire du Sang Contaminé

Of all European countries, France was most affected by the HIV. Approximately 60% of infections in Europe occurred in France, and dozens of high ranking were later charged in court in the case that was later known as the case of the contaminated blood. (Steffen 1999, p.96.) What could have caused such a significant share of infections in France, the home country of Mauss?

Compared to the American system, French system was very different in the early 1980s. It rested wholly on the principle of non-remuneration, and any profitmaking with blood or blood components was strictly forbidden. The system was self-sufficient and national, which was considered a guarantee of purity. After the test for hepatitis B introduced in 1976 all screening of donors was removed. They switched from screening of people before donation, to purely biological screening, which meant that anyone could donate blood. (Steffen 1999, pp.99–100.) It is likely, that Titmuss' results had strengthened the belief in purity of donated blood. But especially devastating to the spread of HIV was the notion, that the gift of blood donation binds people together and integrates them into society.

Prisons had been in France discovered as good places to collect blood. The prisoners were able to benefit society by donating blood, and it was considered a way to integrate them back into society. With one visit, blood banks could fill their stocks, as the prisoners were more than happy to break the monotony of prison sentence with blood donation. (Steffen 1999, p.105.) At the same time, the war against drugs had filled prisons with intravenous drug users, who were major risk group regarding HIV infections (Steffen 1999, pp.97-98). The belief in the purity of donated blood together with the notion of the integrating effect of the gift relationship resulted into taking risk groups into the donor pool. While in Titmuss' time hepatitis B was the most serious of the threats in blood, after the test to screen it was developed, the gift relationship finally could be universal, but national. It was the French blood, one that connected all the people in France together, no matter what they had done or what colour was their skin.

Even as prisoners consisted only 0.5% of the whole donor population, the infections caused by the blood collected from them amounted to up to 25% of all infections in France (Steffen 1999, p.106). While in the US infections caused by blood donation were relatively small portion of the whole infections, in France the belief of pure blood and the integrating force of it was the cause of large amount of infections. According to Godbout and Caillé (2005, p.55), had Titmuss compared French and US systems he might have concluded that the monetary system was better even prior of HIV. The French system was a patchwork of different kinds of systems of which the centralised English system would have probably trumped in all regards. It should be noted, however, that the French system did succeed in one way: it collected a lot of blood from a lot of people. In 1993, 44% of French of eligible age had donated blood which was the highest share in EU (Healy 2010, p.73). One might argue that the gift relationship succeeded in binding the people together, at least until the gift carried a lethal disease.

2.2.3 Donation as a Remedy for Devastated Nation

The terror attacks of 9/11 in New York and Washington resulted in nearly 3000 casualties and left approximately 4000 injured, of which 200 required hospital care. Americans reacted in a heartfelt and concrete way: they donated blood to help the victims. (Schmidt 2002, p.617; Starr 2002, p.13.) Thousands of donors lined to donate blood to the victims in need of help, and the images of the lines shown in television screens symbolised unity of the nation (Starr 2002, p.14). In the three months following the attacks, approximately 572,000 more units of blood was collected than what is usual in reference period. In truth, however, the victims of the attacks received 258 units of blood, none of which were donated after the attack. (Glynn et al. 2003, p.2246; Schmidt 2002, p.618.) Because blood has short shelf-life, one estimate states that 300,000 units of blood were discarded and as the discussion of this was public, the donation rates dropped for a long time to lower than before the attacks (Korcok 2002, p.907; Sass 2013, p.38).

Even as blood banks all over the country were overflooding with donors, only few of them asked donors to leave and return later. On the contrary, the blood banks increased the resources for collecting blood by moving employees from other responsibilities to collecting and screening the donors, in the expense of testing the blood and other supporting roles in handling it. The American Red Cross even established a special donating spot in Washington DC, in which politicians could donate blood and received a video of the occasion. (Schmidt 2002, p.618; Starr 2002, p.14.) To the politicians, this was an opportunity to indicate their solidarity with the victims, which they naturally wanted to show to voters. At the same time, however, the processing of some blood products did not function as required.

Why did the blood banks not ask the donors to leave and return in a few months, when there was again demand for blood? Donors felt that they were giving the gift of blood directly to the victims of the attacks, and blood as a universal symbol of life gave the donors means to help them concretely (Sass 2013, p.40). As a

symbol of national unification, blood donation was one of the few ways people could assist the victims (Schmidt 2002, p.617). Starr recounts a situation, in that employees of one blood bank urged the lines of donors that only those that have the universally usable O negative blood type would stay, and the rest would leave. However, not a single donor left the line. (Starr 2002, p.14) To the donors, the gift relationship was evidently strong and obligatory[5]. The petitions Red Cross and the government gave the people attached the people into this relationship, a relationship that had binding obligations along with it. The gift served as a remedy to heal the wounded nation, in a way that its was the only concrete thing many felt they could do.

In an interesting fashion, the reaction of American blood banks reminds that of a *potlach,* which Mauss spoke of, of how the chiefs of archaic tribes consumed the benefits they had received in an overflowing fashion, to create more obligations and create more gift relationships and to get more followers (Mauss 1999, p.125). In the same way, the blood banks urging people to become donors was a way to get more people participating the gift relationship even if it was clear that there was no additional need for blood, which led eventually to the destruction of vast amounts of biologically hazardous matter that the untested blood had become. The employees of the blood banks were extremely disappointed that only a small portion of the new donors reached during this period returned to give blood (Glynn et al. 2003, p.2251). Glynn et al. speculate that the discussion this matter received after the destruction of the blood angered and confused these donors, who felt that the gift they gave was not appreciated of (2003, pp.2246–2247).

[5] Not obligatory in the sense that someone enforced it, but obligatory for the donor in relation to the imagined recipient of the blood, who in this case were the victims.

2.2.4 Who Should the Relationship Serve?

In all of the cases mentioned before, the most important part of the gift of blood was in some way forgotten: the recipient of the blood, namely the patient. The risk when making blood donation into a gift made by a mystified altruist is that they are and cannot be part of the blood donation. Therefore, when something bad happens they are the ones who pay the price. If the relationship serves the donor and the organisation that collects the blood it carries the risk of the system turning against itself. A Maussian gift has three parts: giving the gift, receiving it, and reciprocating it. As gift in blood donation the patient is not the one receiving, instead the organisation that collects it receive the gift. These cases show that when the gift relationship in blood donation is too important, the patient may be the one who suffers. These cases also showed how the donation of blood is not just something that is donated, rather it is collected.

3 BLOOD COLLECTION REGIMES OF THE EUROPEAN UNION

Even as blood transfusion is being constantly standardised by European Commission through directives (cf. Hossenlopp 2005b; Faber, Boulton, and Rouger 2005; Toumi et al. 2015), the responsibility and organisation of blood collection remain the responsibility of each Member State (Hossenlopp 2005a, pp.75–76). Thus, among Member States blood and blood component collection is being carried out by variety of different types of organisations, such as nonprofit associations, for-profit corporations, and state-owned enterprises. In this thesis I demonstrate how these different kinds of organisations engage donors in a variety of ways. In each country donation of blood stand for diverse meanings, emerging from the culture of the Member State and sometimes from accidents of history.

The different ways in which blood collecting organisations engage donors is most evidently seen from the percentage of adult population that has ever donated blood. For best possible comparison (because of the variation in countries self-reported data) I use Eurobarometer survey collected in 2014 that consisted of all 28 European Union Member States (EC 2018). In Table 1 the average of each Member States percentage of population that has ever given blood is presented. Age has been restricted between 18 and 65, because that is the most common age restriction for blood donation (WHO 2012, pp.39–40). Figure 1. shows the same information mapped geographically. Donation rates vary from as high as roughly 50% of Austria, Cyprus, and France, while in Portugal only 23% have ever given blood. The total average of blood donation in European Union is 38.3%.

Table 1. Share of respondents who have ever given blood, ages 18-65

	Donors	N		Donors	N		Donors	N
Austria	53.4	714	United Kingdom	40.1	914	Malta	35.0	340
Cyprus	53.3	363	Bulgaria	39.2	783	Romania	34.4	810
France	51.8	693	Luxembourg	38.7	395	Croatia	33.1	890
Greece	50.3	792	Ireland	38.4	745	Slovakia	30.8	770
Finland	46.4	637	Germany	38.3	1109	Czechia	30.3	854
Slovenia	44.4	711	Sweden	37.8	648	Poland	28.2	855
Latvia	41.7	846	Netherlands	36.4	750	Italy	28.1	804
Lithuania	41.4	706	Hungary	36.0	807	Portugal	25.7	748
Estonia	40.9	657	Spain	35.3	715			
Denmark	40.7	664	Belgium	35.0	687			
						Total	38.3	20407

Blood collection and safety is directed by European Union by number of directives (cf. EC 2016). However, European countries have responded to the challenge of adequate blood supply in different ways. For many European countries the inception of blood collection occurred during times of conflict, mainly the Second World War (Leikola 2004, 33). After the war some countries (such as Finland) gave the responsibility of blood collection to Red Cross while other countries integrated blood donation to public health system.

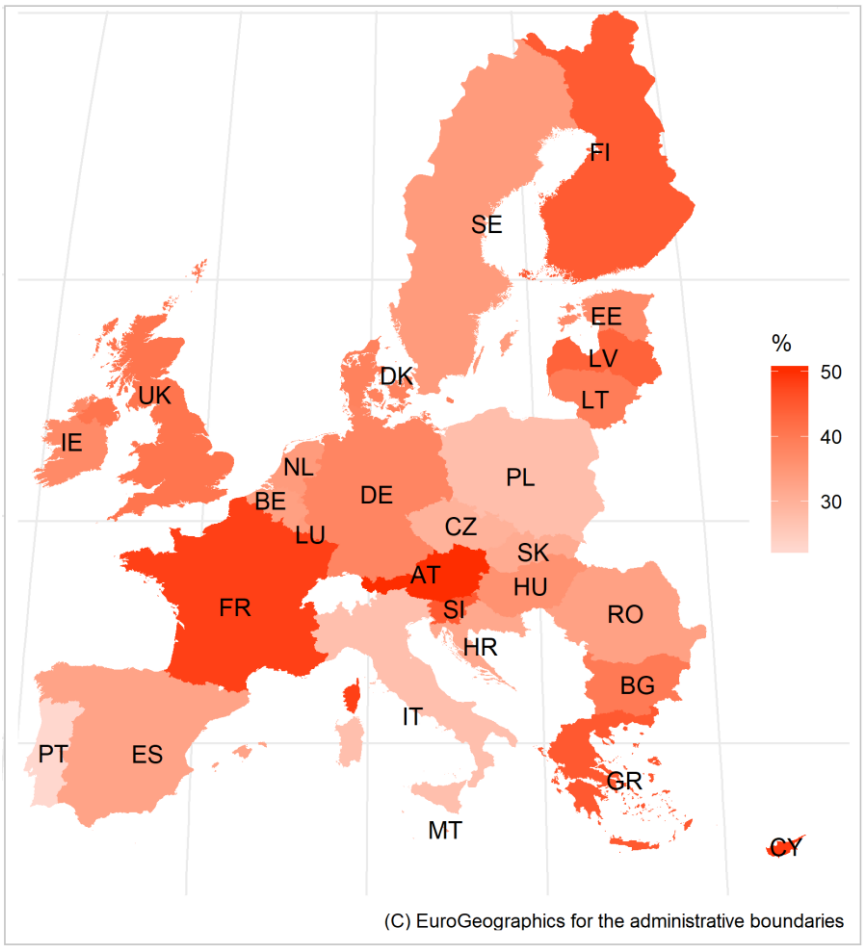

Figure 1. Share of blood donors across the EU, ages 18-65

3.1 Blood Collecting Regimes

Kieran Healy (2000) first introduced blood collection regimes to explain the cross-national variation of blood donation in Europe. He distinguished three main blood collection regimes and theorised the ways in which characteristics of collection organisations might affect the type of donors they recruit. First regime is state system, in which state has monopoly on blood collection. In state systems the collection of blood is usually in proximity (both conceptually and geographically) of state-run health care system, and the collection of blood is often performed at public hospitals. Examples of such countries are France and UK. Second is Red Cross regime which is characterised by a monopoly or a clear majority of Red Cross in donor collection organisations. Red Cross is private non-profit

organisation it does not collect at hospitals, but as a large and recognisable organisation it is quite efficient in blood procurement. Some examples of Red Cross countries are Finland and Austria. Third regime is blood bank regime. It is characterised by variety of different organisations and donor engagement strategies both nationally and between countries. (Healy 2000, pp.1638–40.)

Furthermore, state regime is characterised by a high level of centralisation and a single organisation that in the end is usually responsible for the whole chain of collection and supply of blood. State run blood services are more prevalent in countries that have extensive state-run healthcare services. The reason behind this is mainly that the demand for blood increased simultaneously healthcare systems were developing. In countries with highly expanded public health services it becomes easier to develop blood services that function near the health organisations. However, some countries that do have extensive public health service have seen the strong effect of path dependency. For example, in Finland public health system is wide ranging but the blood service is operated by the Finnish Red Cross that took the responsibility for it from Boy Scouts led blood alliance during the Second World War. After the war and during the expansion of the health system there were talks of who was to operate the system, but since the times were scarse and budgets tight the responsibility was given to Red Cross. (Leikola 2004, pp.53–55.)

Blood bank regime is quite different from state regime. In blood bank countries the system consists of many different organisations that may have state given regional monopoly but recruit donors and collect blood in a variety of ways. These countries also have the most variation in donor prevalence, as the uncentralised system is a patchwork of systems that are inefficient compared to state and Red Cross systems. Also, different kinds of volunteer donor organisations are prevalent in blood bank countries, for example in Italy which has four major volunteer organisations (AVIS, FIDAS, FRATRES, CRI) that are highly involved in collection of blood and the recruitment of donors (EBA 2019). This also affects the

kinds of people that donate blood, as the organisations may be associated with other volunteer or even nationalistic associations.

In Red Cross regime countries, the local Red Cross has the monopoly or a majority in collection and recruitment of donors. Large internationally known organisation is nationally well centralised and employs national campaigns to recruit donors. This makes them quite efficient in receiving donations of blood, but it also affects who the donors are. Blood donation in Red Cross countries is somewhat linked to religiosity (Healy 2000, pp.1649-1650).

Some countries have a mix of state and other systems, for example the military may have its own blood service while civilians donate to Red Cross or independent blood banks. Additionally, some countries have a mix of non-remunerated and paid blood donation.

The most important aspects of the regimes regarding donor populations are how and where the donors are recruited. These can be studied in a variety of ways, from the characteristics of donors to the prevalence of repeat donors. For example, we should expect that state system blood collectors have close ties to other state led organisations - such as health services - should have high prevalence of donors from more diverse parts of the society and higher overall donor share. However, this does not mean state systems have the most donations.

After Healy analysed European blood collection regimes with data collected in 1994, the number of countries in European Union has expanded from the 13 he covered (12 EU countries and Norway) to 28 Member States in the decades following Healy's study.[6] In this thesis I expand the blood collection regimes to the

[6] At the time of writing this thesis Great Britain was exiting the EU in a lengthy process widely known as Brexit (cf. Clarke et al. 2017). However, this does not affect this study as the data was collected before the process began.

new Member States and examine if the findings Healy made are still valid, and if these regimes still hold.

In this section I present how countries were divided into regimes. I use variety of sources, from European Blood Alliance web pages to journal articles, reports, and books. First, I address the countries Healy covered, and second, I will explain how other countries were divided. I begin by introducing countries that I have organised into the three different regimes introduced earlier.

However, as EU has expanded it is expected that new countries are harder to divide. This can occur for many reasons. It may be that in the country in question there has not been much research on how blood collection is organised, at least in English. Also, in most of the countries blood donation is only meant for citizens of the country who speak the official language. This means that in many cases, all the material meant for potential donors is in that language. It would be quite outside of the scope of this thesis to familiarise myself with so many languages, so I am tied only to the one I am familiar with. Even if specific studies considering the institutional basis of blood donation exists, it might be difficult to utilize them for comparative purposes.

3.1.1 State Regime

In France blood collection is and has been a state-run business. Since 2000 France has had only a single organisation, the *Etablissement Français du Sang*, responsible for the whole transfusion chain and monopoly in collection of blood in each of the provinces, including those that locate overseas (Stenholm 2015, p.11; Gorham and MacPherson 2018, p.65; EBA 2019 "France"). This is a major overhaul from the old patchwork system supposedly because the outrage that the system received after the spread of HIV in the French blood supply (cf. Steffen

1999). Because state led organisation is wholly responsible for the collection of blood, France thus falls into the state regime.

Regarding Healys' study of blood collection regimes, the Netherlands is an interesting case. When Healy studied the 1994 Eurobarometer, Red Cross had monopoly on collection of blood in the Netherlands (Healy 2000, 1639). However, nowadays the responsibility has been given to a single state approved organisation, *Sanquin* (Gorham and MacPherson 2018, 72–73). This makes the Netherlands the only country in which the regime has changed since the previous study. If Healy's hypothesis on the explanatory force of the regimes regarding donor population, we should expect some kind of shift in the population. However, this may be hard to reach with the data in question, since we are unable to distinguish those who have given before and after the regime shift. Even so, this might be an interesting thing to study in the future and would be possible to study with Eurobarometer data that has asked about blood donation periodically. According to Gorham & MacPherson (2018, p.46), the Netherlands blood programme most resembles that of France and UK. Thus, departing from Healy's study, I categorise the Netherlands into the state regime instead of Red Cross regime.

The United Kingdom has four blood transfusion services in each of the four countries, England, Scotland, Wales, and Northern Ireland, (EBA 2019 "United Kingdom") that it comprises. They are, however, coordinated from a single authority and are located and administrated close to public health services. Similarly, Ireland has a state-run system that has a single organisation responsible entirely for the collection and recruitment of donors (EBA 2019 "Ireland"; Gorham and MacPherson 2018, p.69).

Latvia has state run system that has blood banks in hospitals, but has Red Cross assisting in donor recruitment (Gorham and MacPherson 2018, p.71; EBA 2019 "Latvia"). Latvia has relatively large proportion of donors at 41.7%. Latvia does not have donor associations, and the system, like most of those in Europe, only

encounters slight shortages during holiday season (Turek et al. 2005, p.244). Because of the high state influence on all aspects of blood collection, Latvia seems to resemble France and thus belongs to state regime.

3.1.2 Blood Banks Regime

In Denmark blood collection is divided into five blood bank organisations that have complete responsibility and monopoly in each region. Blood banks operate in proximity to the hospitals they supply, and their size depends on the need for transfusions in each hospital, and there is no national level coordination of the transfusion service. (Stenholm 2015, p.6.) It should be also noted that Denmark has widespread volunteer donor organisation "The Blood Donors in Denmark" that is divided into 66 different local volunteer organisations (Gorham 2018, p.63). These organisations supply hospitals with donors, and in reciprocal manner, the hospitals pay these organisations a fee to fund publicity of donation for recruitment (Healy 2010, p.75). Even as the state has approved regional monopoly of blood establishments (EBA 2019, "Denmark"), Denmark still falls into the regime of blood banks because the recruitment of donors is not centralised under a single organisation but multiple different organisations.

In Greece the National Blood Centre is responsible for supplying blood, but the blood is collected in hospitals (Kalargirou et al. 2014, p.320). Even with single organisation in charge of parts of the supply, the system in Greece is decentralised and hospital-based blood banking system (EBA 2019, "Greece"). Collection and recruitment of donors falls mostly to the responsibility of hospital blood banks. Thus, Greece falls into the blood banks regime. One interesting fact about Greece in relation to most EU countries is that roughly 50% of the blood supply is from family or replacement donors. Replacement donors are blood donors who are

recruited by hospitals to replace the blood that was given to patient. These replacement donors may be family members or friends of the patient that received blood, or even the patient themselves after they have recovered. This type of blood donation is considered inconsistent with the principle of voluntary non-remunerated donor (EC 2016, 6; WHO 2010, 15). This is because in some cases the patient may be paying the donor, even if the hospital is not. Also, in some cases, the hospital may charge more for the blood if no replacement donation is made. This also shapes the donor population: it crowds out the altruistic donors, as Titmuss might argue. Interestingly, Greece is also one of the countries that has regular shortages in red blood cells (EC 2016, 13).

Spain also has a very decentralised system at least from the perspective of blood collection. Supply is quite centralised, but the collection and recruitment are carried out by a variety of organisations. (EBA 2019, "Spain".) The system consists of national programme but is in the responsibility of regional organisations [faber2002haemovigilance; faber2004worldwide]. The 17 Autonomous Communities (AC) in Spain have their own public blood programme that are all authorised by the regional governments (Gorham and MacPherson 2018, 76; Stenholm 2015, 28). It also seems Red Cross holds no major part in blood collection even if there are other major donor organisations (Mascaretti et al. 2004), except in Madrid where Red Cross operates a programme in addition to the publicly run programme (Gorham and MacPherson 2018, 76). Thus, just like in Healys' study, Spain belongs to the blood banking regime.

Blood collection in Italy consists of 21 regional blood centers that have a monopoly in the area and are responsible for related local networks of blood collection units. Italy also has major volunteer donor organisations that are deeply involved in the recruitment of donors and the collection of blood. (EBA 2019, "Italy"; Stenholm 2015, 20.) In some cases, volunteer organisations even manage their own transfusion centers, and the fees collected from selling the blood to hospitals are used to fund campaigns (Bani and Strepparava 2011, 642). Some regions operate

at high efficacy, but there is a lot of variation between them (Alfieri 2017, 723). Italy thus belongs, like in Healy's study, to blood banks regime.

Portugal has a system in which a large state led organisation operates approximately 60% of the blood supply, while the rest is mostly collected by hospital blood banks (Gorham and MacPherson 2018, 73–74). The system is in the process of merging and centralisation, with the Portuguese Institute of Blood and Transplantation collecting approximately 60% of the blood with the rest collected by hospital blood banks (EBA 2019, "Portugal"). This makes Portugal fall into the blood banks regime. Portugal also had the lowest percentage of donors in Healy's study at 16% in 1994 (2000, 1638), which has increased to 25.7% in 2014 according to my analysis. Still, Portugal is in the last place in all EU countries, including the ones that have joined since Healy's study. Additionally, blood transfusion system in Portugal sees regular shortages in red blood cells (EC 2016, 13).

Bulgaria is an interesting country in that it has a national blood programme that has quite high percentage of people that have donated (39%) but seems to have insufficient supply of blood. Bulgarian system regularly has shortages of red blood cells (EC 2016, 13). High reliance in replacement donors is clear in Bulgaria, and with no funds allotted for promotional work it is hard to reach more diverse donor base (WHO 2007, 86–87). Bulgaria has a problem of a black market in the trade of blood, and hospitals are unable to get blood to patients and instead urge patient's relatives and friends to find the blood themselves. Because of the insufficient supply of blood black market dealers have contacts that are waiting for a call from the dealer, after which the contact with the specific blood type goes to a legitimate blood bank and receives payment from the dealer, who receives payment from the relative. (Toshkov 2011.) In addition to this, Bulgaria also heavily does work with the Bulgarian Red Cross in donor recruitment (WHO 2007, 56). In any case, Bulgaria is one of the countries that are hard to pinpoint into which blood collection regime it belongs to, but I categorise it as belonging to blood banks regime.

Croatia has the blood collection as part of the national health system. The Croatian Red Cross, together with blood services, bear responsibility for recruitment of donors (WHO 2007, pp.56, 86, 93). However, it seems not to be that centralised, as the largest transfusion institution collects 50% of all blood (Vuk et al. 2012, p.432). This indicates that Croatia is a blood banks regime country.

Cyprus is, like Bulgaria, an interesting case in that it has encountered shortages in blood supply (EC 2016, p.13), but has quite high rate of donations at 53.3%. Cyprus as a small country seems to have some centralisation, but still seems quite uncentralised. Compared to Finland, for example, Cyprus has as of 2013 five centers that prepare blood component compared to that of one in Finland (World Health Organization 2017, p.129). With the large gap in the countries' population this would indicate quite a decentralised system. This points toward blood banking regime.

The blood collection system in the Czech Republic consists of diverse system, in which the collection of blood is hospital based with some centralisation, and the ownership of hospitals is diverse (Turek et al. 2005, pp.233–34; Zimová and Turek 2006, p.408; Mascaretti et al. 2004, p.107). With one of the lowest shares of donors in the EU (30.3%), Czhecia with its diverse hospital-based system clearly belongs to blood bank regime.

Hungary had until 1998 a diverse hospital-based system, which was reorganized with the aim towards centralisation and autonomy from the hospitals. The system is regionally operated with monopolies in each area. Red Cross also has major part in organisation and recruitment of donors. (Turek et al. 2005, pp.237–38.) According to EBA website approximately 400,000 donations take place annually (EBA 2019 "Hungary"), and according to Hungarian Red Cross they recruit annually 460,000 donors (HRC 2019). This would mean that Red Cross recruits most of the donors in Hungary even if Red Cross is not responsible for the whole chain of transfusion. Hungary also deals with regular shortages of red blood cells

(EC 2016, 13). The system is quite diverse, so even it is being centralised, I categorise it as blood banks regime.

The Maltese islands consists by population a small country with circa 430,000 people. Malta has relatively low share of donors in eligible population at 35%. Hospital blood banks and donation sites are all are managed by the Ministry of Health, and as such, Malta falls into the blood banks regime. (EBA 2019 "Malta"; Turek et al. 2005, p.250; Gorham and MacPherson 2018, p.72.)

Romania has a state operated system but has regular shortages (Gorham and MacPherson 2018, p.74). Romania some talks have been started to involve Red Cross to have a work in donor procurement (WHO 2007, p.56), but seems like they do not hold major part in recruiting donors. State led 42 independent blood establishments and 330 blood banks answer to one authority (WHO 2007, p.27), which does seem to point more towards blood banking regime than state regime.

In Sweden the blood system is regionally divided into six organisations with hospital-based donation. The university hospitals are the main coordinating organisations and cooperate with regions organisation for promotion and other activities. (Gorham and MacPherson 2018, p.77.) In the 1980s Sweden's regime would have clearly been blood banks regime (Berner 2011, p.388). Seems that quite a bit of centralisation has taken place as promotional material for blood donation in Sweden all seem to come from same source. However, behind the first page of their promotional webpage is 20 different provinces with their own webpages. (Swedish Blood Alliance 2019.) So even if there has been quite a bit of centralisation, Sweden still falls into the category of blood banks. Interestingly, Sweden is the only country in the Northern EU countries to face regular shortages in red blood cells specifically in larger cities, shortages that the system has been able to cover with collaboration with other provinces in Sweden (EC 2016). This underlines the claim that Sweden belongs to blood bank regime, since in centralised countries this

would not be considered a shortage, for the collaboration between regions is given, not an exception.

Poland has two blood services: one for civilians and one for uniformed forces. There are 21 independently managed regional centers that are responsible for the whole chain of blood donation. Promotion is regional but there are some national level campaigns like the honorary blood donor promotion. There is also a lot of variation in blood donation between these regions. (Ojrzyńska and Twaróg 2012, pp.178, 181, 187.) The system seems to be undergoing heavy centralisation (Stenholm 2015, p.25), but it is still in process. However, it is stated that blood transfusion in Poland is integral part of the public health service and that Polish Red Cross works in cooperation with Blood Donor Association (Turek et al. 2005, pp.250–51). This would point to a mixed system like in Spain. All these facts combined suggest that Poland belongs to blood banks regime even if the state has major part in the organisation of blood collection.

Lithuania is one country that explicitly states that donors are paid money for the donations, a payment of equal to 12 Euro. In 2015 the share of paid donors was approximately 15% of the whole supply (EBA 2019, "Lithuania"), which has dropped considerably from 2004, when paid donors comprised approximately 88%. In the Soviet period blood donation in Lithuania was wholly based on paid donors. After independence Lithuania passed a number of laws that tied compensation for blood donation to the salary they received, which flooded the system with high-income donors. (Buciuniene et al. 2006, 165.) The public institute is the largest in Lithuania and comprises of more than 70% of all blood collected (EBA 2019, "Lithuania"), and presumably collects from all the non-remunerated donors. However, as the rest is collected by variety of hospital blood banks, I categorise Lithuania into the blood banks regime.

Slovenia has regional system that is not funded by the government. Blood is collected in hospital blood banks and transfusion centers, with centralisation in

the process as of 2005. Red Cross primarily organises donation sessions, but the exact number of these sessions can only be estimated. The collection is not wholly organised by Red Cross, but mostly by hospital blood banks. No donor organisations are present. (Turek et al. 2005, 258–61.) It has a hospital-based system with somewhat deep centralisation, like Italy (Mascaretti et al. 2004, 107). Thus, Slovenia would most fittingly be categorised into the blood banks regime.

In Estonia unpaid blood donation has been introduced in the 1990s (Abolgasemi, Hosseini-Divkalayi, and Seighali 2010, 9). During the Soviet period the system was based on paid donation (Buciuniene et al. 2006, 165), but contrary to Lithuania, after independency Estonia steered for non-remunerated system. There are four major separated blood centers merged into hospitals (EBA 2019, "Estonia"). This points towards blood banking regime.

In Slovak Republic blood donation is performed at hospital blood banks. Even small hospitals have their own blood banks, which has led to some problems. As of 2005 10% of whole blood collected is transfused to patients without being processed due to financial difficulties within the system. The system was, however, going through major transformation while still facing major financial issues. (Turek et al. 2005, 256–58.) However, Slovakia does not report regular shortages to the European Commission (EC 2016, 13). I was unable to find other relevant information regards Slovakian blood collection system but am quite confident it should be placed into the blood banks regime.

3.1.3 Red Cross Regime

In Belgium blood is collected by two different sections of Red Cross. As a country in which language is one of the main political and ideological dynamics (cf. Blommaert 2011), it is fitting that this is evident also in collection of blood, as the two sections are Flemish speaking (Flanders) Red Cross and French speaking

(Wallonian) Red Cross. Each have centralized both collection of blood and recruitment of the donors in their respective language areas. (EBA 2019 "Belgium"; Gorham and MacPherson 2018, p.62.) Just like in Healy's analysis, Belgium belongs to the Red Cross regime.

At the time Healy wrote his piece, Germany was a system in which Red Cross held an unknown majority but also had a mix of private blood banks that even paid for blood (Healy 2000, pp.1639–40). The market share of private collection organisations has increased from 2% to 7% (Mews 2013, p.193), and it seems some organisations still pay for blood (EC 2016, p.8). Nevertheless, Red Cross is still responsible for approximately 80% of the blood collected according to Weidmann and Klüter (2013). However, more recent report by Gorham and MacPherson found that German Red Cross is responsible for 70% of the supply, while 15% is collected by university or municipality hospital blood banks and military blood programme (Gorham and MacPherson 2018, pp.66–67). Interestingly this leaves 15% unaccounted for, which then must be collected by commercial blood banks. There are 26 commercial blood centers that pay for blood or blood components in Germany (Gorham and MacPherson 2018, p.67). Germany seems today the same as when Healy discussed of it: A mixed system with rare (at least in Europe) renumeration for donors. However, as Red Cross holds a clear majority, Germany falls into the Red Cross regime.

In Finland Red Cross has been the single centralised operator of the blood programme since 1948 (Gorham and MacPherson 2018, p.64). They are in responsibility for the whole chain from recruiting donors to testing and delivering the blood to hospitals (EBA 2019 "Finland"). Finland also has completely centralised system (World Health Organization 2017, p.129; Stenholm 2015, p.17) that Red Cross operates. Finland is one of the clearest cases of Red Cross regime countries, as Red Cross holds a monopoly in blood collection and all activity related to it.

In Luxembourg Red Cross oversees the single blood center. This also consists the whole of the country's blood programme. (EBA 2019, "Luxembourg"). As a small country single center is enough to supply the whole country with blood. Since Red Cross has a monopoly Luxembourg belongs to the Red Cross regime.

90% of blood collected in Austria is collected by Red Cross (EBA 2019, "Austria"), so it should go into the Red Cross regime. In Austria it is also possible to receive payment for donation of blood (EC 2016, p.9), but it is difficult to say to what extend these payments are made. At least in the case of Red Cross, it is hard to believe they would pay for blood, and so it is likely that the for-profit organisations are the ones paying donors. At least the plasma sector in Austria pays for donors, and the Austrian Red Cross sells 50,000 liters of plasma recover from fractioning to these commercial fractionators (Gorham and MacPherson 2018, p.61). It has also been reported that Austrian private plasma establishments have been collecting plasma from Hungarian and Slovakian donors that have crossed the border to sell their plasma (EC 2016, p.7). It is hard to say what kind of effect the payment for blood would have on the donor population. This might be approached in the future by examining blood donors and plasma donors separately, which is possible with the Eurobarometer data. Austria has the highest proportion of donors in this study at 53.4%. One explanation to this might be that Austria has conscription army that works in collaboration with the local Red Cross. The army allows donors to leave earlier for the weekend (Costa-Font, Jofre-Bonet and Yen 2013, p.548), so there is clear incentive for donation for a lot of people.

3.1.4 Concluding Remarks on Blood Collection Regimes

In figure 2 the countries are divided into regimes and the share of donors is presented. The blood banks regime is the biggest of the groups with 18 countries. Red Cross and state regimes are tied with 5 countries each. There are 16 countries that I categorized not covered by Healy, and one country that I categorised

differently than Healy. By looking at the distribution of countries according to the share of donors, it looks like blood banks regime has the most variation, from Cyprus' 53% to Portugal's 23%. Except for Cyprus, Greece, and Slovenia in the top, the countries in the blood banks regime are distributed quite uniformly. In the blood banks regime, the total share of donors (calculated with population weight) across the regime is 36.3%, the lowest of the regimes. The Red Cross regime comes second, with the total share of donors being 40.9%. The highest share of donors is in state regime with 41.8% of the population in the regime that are donors.

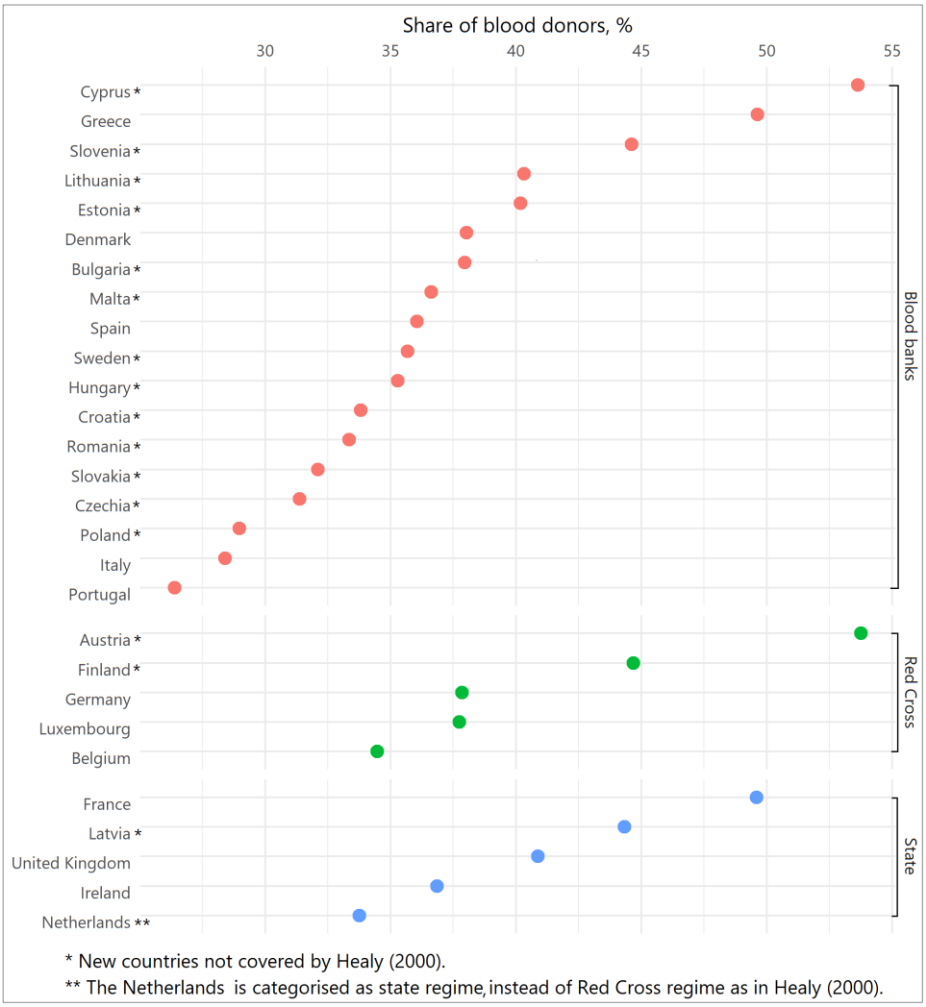

Figure 2. Share of donors across countries divided into regimes.

4 STUDY DESIGN

4.1 Research Questions

As presented in the Introduction, the research questions of this thesis are:

1. Can blood donation be considered as a unique gift relationship?
2. Are the blood collection regimes applicable to the expanded EU, and what are the role of regimes to the gift relationship in blood donation?
3. What are the characteristics of blood donor population in the EU?

The first question, which was already explored in Chapter 2, is examined further with quantitative methods when blood donation is compared with other types of giving behaviour Chapter 5. If blood donation is just another type of gift, it should be closely related to other kinds of giving behaviour. However, if blood donation is a unique gift relationship, it should influence why people donate blood and how they consider people part of the gift relationship and those who are outside of the relationship.

As was shown in chapter 2, institutions have a major impact on who donate. This is what the second research question relates to. The main function of the institution of blood donation is supplying blood to those in need. However, different ways of organising supply and collection and have major impact on what kind of people donate blood. The blood collection regimes expanded to cover all 28 EU countries presented in Chapter 3 are revisited and analysed quantitatively. If my typology of the blood collection regimes was successful, these regimes should be distinguishable from each other. Also, these institutions (blood collection regimes)

should influence the gift relationship which I examine quantitatively. In addition, the blood collection regimes should have distinguished effect in the donation rate than many other phenomena used to explain blood donation, such as religiosity, humane development, and social trust.

Third research question considers the donor population of EU. Even though blood donor population has been studied before, studies considering entire EU using large datasets are few and far between (cf. Healy 2000; Wittock et al. 2017). My aim is to bring novel perspectives and deeper understanding into who donate blood by using quantitative methods. The research questions are revisited in the discussion.

4.2 Overview of Methods

To study blood donation across the EU two main methods are used. Multilevel logistic regression is used to uncover relationships of blood donation across and between individuals and the countries they inhabit. In addition, exploratory factor analysis is used to reduce dimensionality of variables. The variables constructed from the factor analysis are used both in multilevel logistic regression model and regular logistic regression model. Main methods and what they were used for are presented in Figure 3. In addition to those shown in Figure 3, correlation graphs are used to graphically examine country level correlations. In addition, in chapter 2 a brief qualitative literature analysis was used.

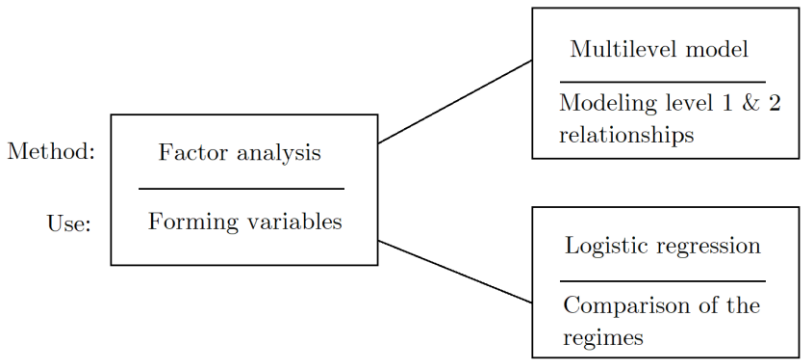

Figure 3. Illustration of main quantitative methods used in the study

In the multilevel analysis I use Stata statistical software 15 (StataCorp 2017). For visualisation, data manipulation, joining tables, and other related methods I used the open source R-statistical language (R Core Team 2018) with various packages, such as the *eurostat* package to access Eurostat data directly from R through an API (Lahti et al. 2017),[7] and a collection of packages in the *tidyverse* ecosystem (Wickham 2017).

4.3 Hypotheses

To examine these research questions, I have deduced several hypotheses that I will test in the results section of this thesis. These hypotheses are constructed from previous studies. Some of them have been found to have an effect universally, while others in some countries. Hypotheses 1-7 are individual level hypotheses, while 8-13 are country level hypotheses. Hypotheses in Table 2 are divided into level 1 (individual level) and level 2 (country level) hypotheses, which are further discussed and argued in the following pages.

[7] Application Programming Interface

Table 2. Hypotheses divided in individual and country level

Individual level hypotheses	Country level hypotheses
H1: Men are more likely to be donors	H8: HDI has positive effect on donation rate
H2: Age raises likelihood of being donor	H9: Donation rate is linked to other types of giving
H3: People with children are more likely donors	H10: Religiosiity is positively linked to donation rate
H4: Education raises likelihood of being donor	H11: Social trust is positively linked to blood donation rate
H5: Donors feel more concern	H12: Conscription army has positive effect to donation rate
H6: Donors accept compensation	H13: Blood collection regimes have effect on donation rate
H7: Network effect raises likelihood of donation	

H1: *men are more likely to have donated than women.* According to Bani and Giussani based on their review, in most European countries yearly donors consists of mostly men, with the exception of France, Netherlands and Denmark, where the share of gender is similar at 50%, and United Kingdom and Finland, where women take up larger share of the donations than men (2010, p.277).

H2: *age raises the likelihood of donation.* Even though the fact that in many countries students donate a large share of yearly donations, the opportunity window for a single donation widens with every year lived (until 65, which is the upper-age limit).

H3: *those with children are more likely to be donors than those who do not have children.* According to Wittock et al. (2017), the typical donor is (among other things) married with children. However, they did not directly test the likelihood of those who have children and instead used marital status. It would make sense that parents of children would donate blood, as the imagined recipient could very well be their children. Therefore, in this study I will test the effect of having children on the likelihood of being a donor.

H4: *people with higher education are more likely to be donors than those with lower education.* This has been reported in multiple studies (cf. Wittock et al. 2017; Healy 2000) and should be visible with the data in this question as well. For many, donating blood during college education is their first time donating.

H5: *those who participate in blood donation are more susceptible of other donors, than those who are not blood donors.* This is the first hypothesis that I directly associate with the gift relationship in blood donation. I argue, on the one hand, that because of the gift relationship's binding nature those already participating in it are more susceptible to other donors not already participating in the relationship. And on the other hand, those who are not donors do not have such feelings of suspicion (as much at least) as those who are donors, as they regard blood transfusion more as a medical procedure than a reciprocal gift relationship.

H6: *donors are more likely than non-donors to accept compensation for donation.* This is the second hypothesis regarding the gift relationship in blood donation. I argue, that due to the reciprocal nature of the gift relationship between donors and collection organisations, the donors are more likely to accept compensations for blood donation than those who are non-donors. The ones who have donated blood are introduced by the organisations into the reciprocity in the system, which vary from refreshments to non-cash items and even cash. Non-donors, however, are not included in the gift relationship and

H7: *people who personally know someone who has received blood are more likely to be donors.* This network effect has been researched in multiple studies (cf. Healy 2000; Sojka and Sojka 2008, p.59). If a person knows someone who has received blood, they are more likely to donate themselves, as they feel the responsibility to help, in this case, their relative or a friend.

H8: *the human development of a nation has positive effect on blood donation.* This has been studied by de Kort et al. (2010). They showed that HDI does have connection with the number of blood units collected, especially the Educational Index part of the three component HDI. However, it should be interesting to see what are the relationship between HDI and the share of donors in a country, as is a different measure than used previously.

H9: *blood donation is positively connected to other types of giving behaviour on the country level.* The connection between other types of volunteering and gift giving have been studied by many researchers, especially using psychological explanations (cf. Houston 2005; Lee et al. 1999; White et al. 2017). However, if blood donation is related to these other types of behaviours, then it should also be evident at the country level.

H10: *religiosity is positively connected to blood donation.* The connection between religiosity and blood donation has been showed to be positive (cf. Pessi 2011; Heineck 2017; Beyerlein 2016). If this is true, then it should be visible on the country level as well. It should be noted that Healy discovered that there was no significant relation between religiosity and blood donation except in Red Cross regime countries.

H11: *social trust is connected positively to blood donation on country level.* The trust that people have in blood collection organisations increases the likelihood to donate (Andaleeb and Basu 1995, p.44). However, I am interested in whether general social trust is connected to country level donation rate. As blood is donated to an unknown recipient, I argue that general social trust affects the donation rate across countries.

H12: *in countries where army conscription is compulsory, the rate of blood donation is higher.* In the case of Austria and Finland, as explained in chapter 3, I found that conscripts of the armed forces have been used as a source of blood quite systematically. My argument is that because such large share of the population is presented with incentivized opportunity to donate it should reflect in higher donation rate so that in those countries the donor share is larger.

H13: *blood collecting regimes have an effect in the rate of donors, in that state regime collects most effectively, Red Cross regime comes second, and the blood banks regime is third.* This hypothesis is from Healy's study (2000), in which he

found this effect. The interesting part regarding my study is whether this is still apparent, with the expansion of the EU.

4.4 Data

Main data for this study is the Eurobarometer 82.2 survey that was collected in 2014 in which citizens over 15 years of age in all 28 European Union Member States were questioned about matters concerning e.g. transport, cyber security, taxation, public health, and blood donation (EC 2018). Sampling procedure consisted of a multi-stage random probability sampling design. In most countries the aimed sample size was 1000 respondents per country, except the United Kingdom that had separate samples for Great Britain (1000) and Northern Ireland (300), and Germany, which had separate samples for Eastern Germany (500) and Western Germany (1000). Furthermore, some smaller countries (Luxembourg, Cyprus & Malta) had 500 interviews each. Total number of respondents was 27868. Because Eastern and Western Germany do not significantly differ regarding blood donation, I have combined them together as well as Northern Ireland and the Great Britain (which together make United Kingdom). I also limited anyone not aged between 18 and 65 out from analysis because those are the most common limits to age regarding blood donation (WHO 2012, pp.39–40). Table 1, presented earlier in the study, shows the remaining respondents and the percentage of them that have ever given blood (weighted by population weight) after these changes.

4.3 Variables

4.3.1 Individual level variables

The response variable in all the analyses is if the respondent has ever donated blood. In the Eurobarometer, the respondents were asked the following: *During*

the lifetime of a person it is possible to donate different body substances (blood or cells) to help other people. Could you please indicate which ones you have or would be prepared to donate yourself? This was followed by several different human-based products, one of which was blood. This question had four-level categorical answer which was coded into 1 or 0, whether the respondent has ever given blood[8]. The recategorized variable signifies if the respondent has ever donated blood. This means that in the analyses using this as response variable the comparison is made between those who have donated and those who have not, or donors and non-donors.

For the multilevel model I use seven individual level independent variables. The summary statistics of the individual level variables (and the response variable) are presented in tables 3 and 4[9]. The first individual level variable is gender. It is coded 0 for men, and 1 for female. This means that in the analysis men are the reference class to which women are compared to. Second variable is age. Only respondents between ages 18 and 65 are included because that is the most usual age limit to blood donation (WHO 2012, pp.39–40). Third is if there are children in the household aged less than 15. To code this I used two variables from the Eurobarometer: if there are children between 10 to 14, and if there are children under 10 years of age. If either of these were 1, I coded the new variable 1, else it was coded 0. Fourth variable is education. In the Eurobarometer, the only measure for education is the age that the respondent stopped full-time education. This is somewhat problematic measure as this at least in some cases measures the differences between countries' educational system. However, the education index used as a country level variable should somewhat take this into account in the

[8] The original four categories are: "*Yes, have donated in the past and would be prepared in the future*"; "*Yes, have donated in the past but would not be prepared to donate in the future*"; "*No, have not donated in the past but would be prepared to in the future*"; and "*No, have not donated in the past and would not be prepared to in the future.*" The first two were coded into 1, and the last two into 0.

[9] Age that the respondent stopped full time education is shown in this table as continuous, even as it is categorised in the actual analysis.

multilevel model. Next two variables are compensation and mistrust variables, which are explained in chapter 4.4.1. The final individual level variable is the network effect. This is whether the respondent personally knows someone who has ever been given blood.

Table 3. Summary statistics of individual level variables

	Mean	SD	Min.	Max.
Blood donation	0.3831	0.486	0	1
Female	0.5577	0.497	0	1
Age	43.66	13.413	18	65
Children in HH	0.3355	0.472	0	1
Education, age stopped	19.61	4.956	0.00	63.00
Mistrust	0.107	0.222	0	1
Compensation	0.381	0.275	0	1
Network	0.472	0.499	0	1

Table 4. Row percentages of educational scale

	Freq.	Percent	Cum.
Up to 15 years	2,185	10.89	10.89
16-19 years	9,390	46.80	57.68
20 y. and older	7,168	35.72	93.41
Still studying	1,323	6.59	100.00
Total	20,066	100.00	

4.3.2 Country level variables

Summary statistics of the country level variables are presented in Table 5. Human Development Index is a ranking that aims at measuring human development. It comprises of three different measurements: Life expectancy index, Education index, and GNI index[10]. (UN 2018.) Much like De Kort et al. (2010), I use the three different factors independently to study their relation to blood donation. The data

[10] GNI index used by UN is calculated with purchasing power parity and is often referred as PPP. However, in this thesis I simply refer to it as GNI index.

was acquired from *Human Development Report 2014* (Malik 2014) and was appended to the main data.

Table 5. Summary statistics of country level variables

	Mean	SD	Min.	Max.
GNI	72.87	5.847	63.20	83.40
Education index	84.96	5.277	75.50	93.60
Life expectancy index	91.14	4.234	83.40	96.60
World Giving Index (%)	33.35	12.135	18.00	60.00
Religosity	0.648	0.170	0.321	0.925
Trust	0.671	0.159	0.239	0.910
Conscription	0.314	0.464	0	1

Religiousness is measured with a question *how important in your life: religion,* from another survey. Only data that had surveyed results of importance of religion in all the countries in EU that I could find was European Values Study (EVS) fourth wave collected in 2008 (EVS 2011). Over 70,000 citizens in Europe were interviewed. The data has been criticised for quality differences between some countries because of the uneven methods used (McAndrew and Voas 2011, 11). Furthermore, there is a six-year gap between the Eurobarometer data that I use and the EVS data. To test if the 2008 data is comparable to more accurate ones, such as European Social Survey (ESS 2014), I tested it in two ways: first, I tested how the 'importance of religion' variable in EVS is correlates with the 0-10 scaled 'How religious are you?'. To test this, I recoded the four categorised religion variable in EVS to two categories, after which I calculated country averages using population weights. With the ESS round 4 (ESS 2008), I calculated weighted means for the 0-10 scaled variable after which I tested the correlation between them. As stated previously, there were some missing countries between these datasets as all EU countries do not participate in the ESS. This left me with 18 countries of the whole 28. The correlations are shown in Table 6, which indicates quite linear relation. Second, I tested if there has been major change between 2008 and 2014. For this I similarly compared the EVS 2008 religion variable to ESS round 7 (ESS 2014) religion. With the 2014 data only 16 of the 28 countries were

available. Between these, the correlation coefficient is 0.846, which indicates that some accuracy has been lost during the six-year gap, be it for the missing countries or the change that has happened between these years. However, I find that regarding this study, the EVS data is the best possible available to investigate the relationship between the relatively slow changing blood donation and religiosity. As the only even remotely accurate data consisting of all countries in my analysis, I decided to include EVS 2008 religiosity. The country level means were appended with the Eurobarometer data.

The next country level variable is trust. Similarly, as with religiousness, I used EVS 2008 as the source for the trust variable. The variable is binary in the data, and was recoded as 1 for "Most people can be trusted", and 0 for "Cannot be too careful", similar to what Köneke did in her study (2014), and for all countries the mean was calculated using the EVS population weight after which the means were appended to the Eurobarometer data. The correlations between EVS and ESS trust are shown in Table 6.

Table 6. Pearson correlation coefficients between EVS and ESS

	ESS2008 (18/28 countries)	ESS2014 (16/28 countries)
Religion (EVS2008)	0.870 p <0.001	0.846 p <0.001
Trust (EVS2008)	0.943 p <0.001	0.924 p <0.001

World Giving Index is an index calculated by Charities Aid Foundation to measure giving behaviour by three measurements: giving money, giving time (working for charities), and helping strangers. The measure is calculated by averaging and each country is given a percentage and ranked according to it (CAF 2011.) Instead of the index, which ranks countries, I use the percentage of people that engage in giving behaviour that is used for the ranking process. This country level percentage was appended to the Eurobarometer data.

Since Blood donation is historically in many countries connected to the armed forces, it would seem logical that countries with ongoing conscription have higher donation rates. At least in the case of Austria and Finland I found evidence of close relations between blood services and armed forces. In Austria, donors in the armed forces get to leave for holidays earlier (Costa-Font, Jofre-Bonet, and Yen 2013, p.548), and in Finland conscripts, at least in past, had the choice between blood donation and a loaded march (Leikola 2004, p.272). If the country has ongoing conscription, it is easy to imagine that the large share of population in service are an easy target for the blood services to aim at. Conscripts are conveniently packed in barracks where the recruitment is easy to do, especially with incentives like in the aforementioned cases. I did not locate any studies that take this into consideration. Countries in the data that had ongoing conscription as of 2010 were Austria, Bulgaria, Cyprus, Denmark, Finland, Germany, Greece, Lithuania, and Sweden (CIA 2019). I then tested the relationship between blood donor rate and conscription using Spearman's rank correlation coefficient. Correlation coefficient (ρ =0.55; p=0.002) indicates that conscription does have connection to blood donation rate. This makes sense, since binominal "has ever given blood" requires a single donation time. For many conscripts the time of their service marks the first (and possibly only) time they have given blood (Leikola 2004, p.272). Regime, explained in Chapter 3, is the final country level variable.

4.4 Methods

This study has two main methods: multilevel logistic regression and logistic regression. Additionally, the countries country level variables are examined with simple correlations. Two depended variables used in the logistic regression models are constructed with exploratory factor analysis. In this part, I explain the methods and how they were used. The results of the models are presented later in the fifth chapter.

4.4.1 Exploratory factor analysis

The exploratory factor analysis was used to reduce the dimensionality of two types of questions. I began exploratory factor analysis by choosing the variables for it. I chose all variables concerning two types of questions in the data. First was question about *'For donating blood or plasma during someone's lifetime, do you consider it acceptable...?'* from which I chose variables qe5a_1 to qe5a_8.[11] Second question type was *'Which of the following concerns would you have if you were treated with donated blood, cells or tissues?'*. From these I chose qe8_1 to qe8_8. For more detailed explanation of these variables see questionnaire in the Appendix. All these variables were binominal variables: either the respondent considered the questioned thing acceptable or they had concerns (1 = mentioned, 0 = not mentioned). Because the variables are dichotomous, tetrachoric correlation coefficients are used to explore the relationships between these variables (cf. Bock, Gibbons, and Muraki 1988). I then used as criterion that the loadlugs should be higher than 0.3 and removed all variables that did not meet the criterion. After that I ran tetrachoric correlations again and ran the promax rotated factor loadings to consider eigenvalues (Hendrickson and White 1964). Thereafter, I decided by using the Kaiser-criterion that there should be two factors as only two of them had eigenvalues above 1 (Cliff 1988).

From the variables that loaded into these factors, I created sum variables standardised between 0 and 1. First factor was named as 'compensation'. It consists of 8 different variables that concern different types of compensation considered acceptable for blood or plasma donor.[12] The second factor consisted of three factors

[11] The variables are presented in more detail in the appendix.

[12] The variables in the acceptable compensation group of questions are: travel cost, time off work, refreshments, non-cash item, free physical check, free testing, free medical treatment, and cash compensation.

concerning concerns regarding receiving blood or other tissues[13]. I named this factor "mistrust", since all these variables concern lack of trust in the possible donor.[14]

To summarise, the compensation variable denotes how much the respondent believes different types of compensations to be acceptable in blood donation. I argue that this is different between donors and non-donors. Donors are already embedded into the gift relationship and have experienced the reciprocal nature of it. Blood collecting organisations often give small tokens of appreciation to donors and refreshments are routinely given after donation. Donors feel these are natural part of the relationship because they are already part of the exchange. Non-donors, however, who are not part of the relationship are not familiar with the exchanges in the relationship and should be less inclined to accept these same compensations.

The mistrust variable, I argue, tells of how the respondent considers those who are not part of the gift relationship. The concrete way in which donated blood circulates in the recipients own body may be connected to feelings of what kind of person the blood comes from. The phrasing of the questions in the variable alludes that the person giving blood is from an outside group. Those, who are part of the gift relationship, should feel differently about these questions than non-donors who consider the relationship more in the sense of a medical procedure. As such, I predict that those who are donors feel more concern than non-donors.

[13] These variables were: concern that the donor is from other EU country, concern that the donor is paid, and concern that the donor is from outside of EU.

[14] Factor loadings and screeplot are presented in the appendix.

4.4.2 Country level correlations

Before moving onto more advanced methods, I examine and visualise the relationships between country level variables. To make sense into the relationships between the country level variables even before moving into the multilevel model, I make sure that all the relationships between these variables are accounted for. The reason I choose to visualise these correlations is based on the argument that Healy and Moody (2014) made that sociology lags behind other sciences in statistical visualisation. Especially with correlations, simple numeric values may hide the fact that the variables are correlated when in fact they are not, or vice versa[15].

The correlations are calculated in Pearson's correlation coefficients (PCC), which is the measure of the strength of linear association between variables. I check the correlation between countries with all countries, and then with each regime separately. In addition, I calculate the *p*-values for these correlations. A linear line is drawn to visualise the linear association. The visualisation is presented in Figure 5.

4.4.3. Logistic Regression

Logistic regression model is a generalization of the linear regression model, in which the outcome variable is not linear but binomial. The idea is to predict the likelihood that one or the other of the possible outcomes (1 or 0) occurs. (Nummenmaa 2004, pp.319-321.) The equation of logistic regression can be written as such:

$$Logit(odds) = B_0 + B_1 * X_i$$

[15] For more, see the four correlation graphs later widely known as Anscombe's quartet, in Anscombe 1973.

The $Logit(odds)$ is the conditional probability of the outcome 1 divided by the outcome 0. B_0 is the intercept, and B_1 is the slope of X_i, which is the independent variable. Compared to the multilevel logistic regression introduced next this has only one level.

It should be noted that the log odds are transformed into average marginal effects (AME) to compare the effects across models because odds ratios (OR) or log-odds-ratios used in logistic regression do not take account the unobserved heterogeneity that may vary across models or groups (Mood 2010, p.80). In addition, AMEs have the advantage of allowing an intuitive interpretation, for they are an average effect on the probability of the response variable. AMEs quantify the absolute differences between the probabilities across groups. This means that it can be used to compare the probability across groups. The equation for AME is presented below (as explained in Mood 2010, p.75).

$$\frac{1}{n}\sum_{i=1}^{n}\beta_{x_1} f(\beta x_i)$$

β_{x_1} is the estimated log odds ratio for the variable x_1, and βx_i is the value of the logit for the i-th observation. The $f(\beta x_i)$ is the logistic probability distribution function. The AME makes it possible to compare the effects across models and interpret the effects in percentages, so it was chosen for this study.

4.4.4 Multilevel model

Multilevel models are used to take into account processes that have an influence on the variable of interest at multiple levels by modeling the effects at each level. This means that instead of single coefficient (slope), multiple coefficients will be used. Even if the equations for all levels are computed simultaneously, it is conceptually easier to break them as series of equations in which coefficients from

another level are passed to the other level of analysis (Nezlek 2011, p.9). This means that instead of analysis on one level we can use aggregated data on other levels. Non-multilevel models depend heavily on assumption of independency of the observations. When this is not the case – as is usual with hierarchical data – it might lead to significant results that actually are caused by the un-accounted hierarchy in the data. (Nezlek 2011, pp.4-5.) Multilevel models take into account the dependencies of the observations withing groups.

Multilevel in data means that the observations are collected in at multiple levels, thus comprising a hierarchical data. The observations must be nested together in at least two levels to make the data multilevel. (Nezlek 2011, pp.8-9.) In the case of this thesis, the most evident levels are individual (respondent) level and country level (see Figure 4). Other levels could be for example regime, city, state, and so on. For this analysis, I use two levels: individual level and country level, since e.g. regime does not have sufficient number of groups.

The number of observations after removing respondents with missing variables in the data at the individual level is 20,407. At the country level there are 28 groups, one for each country. The number of observations in each country is shown in Table 1. None of the continuous variables are centered, and the reference categories of the categorical variables are presented clearly in the model tables.

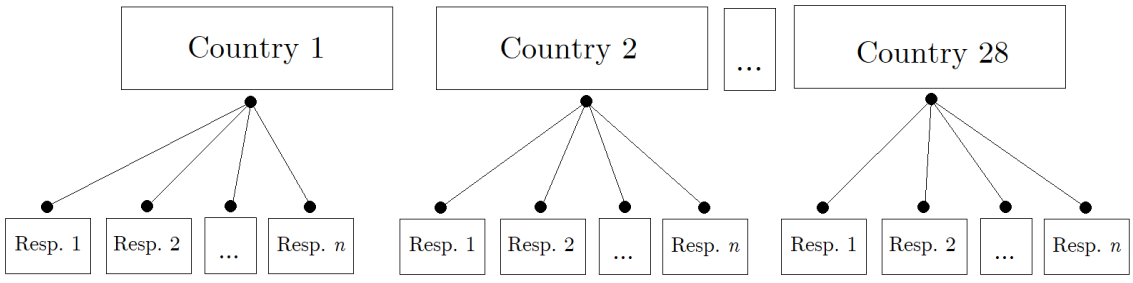

Figure 4. Illustration of the hierarchy in the data

Because the response variable (has ever donated blood) is in this case binominal, I use multilevel logistical regression. The model is mixed effects logistic regression,

to be specific. It is used to model binomial response variables in which the outcomes are modeled as linear combinations of the independent variables (cf. Sommet and Morselli 2017).

First, the intraclass correlation coefficient must be calculated. To calculate it, it is necessary to first calculate the log-odds between clusters or, to be more precise, between countries. In the empty model I estimate the log-odds of ever giving blood without any predicting variables. This empty multilevel logistic regression equation is presented below.

$$\text{Logit(odds)} = B_{00} + u_{oj}$$

In this equation, Logit(odds) represent the log-odds that the response variable is 1 instead of 0. It is allowed to differ between countries, or in other words the slopes are allowed to vary. B_{00} is the fixed intercept and u_{oj} is the country level residual. Now the intraclass correlation (ICC) can be calculated. The equation for the ICC is presented below.

$$\text{ICC} = \frac{var(u_{oj})}{var(u_{oj}) + (\pi^2/3)}$$

The $var(u_{oj})$ represents the random slope variance, which in this case is the country level variance. On the lower side of the equation, the $(\pi^2/3)$ is the standard logistic distribution, which equals ≈ 3.29.

Intraclass correlation (ICC) serves as the degree of similarity of the outcome (is a donor) between countries. It is the proportion of between-country variation $var(u_{oj})$. In this case, it is the between-country variation of the probability of being a donor. It ranges from zero to one, in which zero is perfect independency of the residuals in which case the country does not affect the probability of being a donor. Furthermore, if ICC is 1, there is perfect interdependency of the residuals, which would mean that the observations only vary between countries. In this

case, it would mean that either no-one or everyone has donated in a country, and there is no within country variation.

In the case of this study, the empty model ICC is calculated thus: $\frac{0.0890784}{0.0890784+3.29} = 0.0263628$.[16] This means that only $\approx 2.6\%$ of the propability of being donor is explained by differences within-country. Thus, according to the empty model, values within-countries are not similar. According to Nezlek, contrary to some recommendations, this does not mean that multilevel model is inappropriate. ICC tells very little about how relationships between variables vary between groups, and because this data is undoubtedly hierarchical, Nezlek recommends multilevel model. (Nezlek 2011, p.32)

I now add variables to the model. In model 1, I add all individual level variables and the three country level variables that amount to HDI. For the sake of simplicity, in the equation below I have only added one independent variable for each level. Let us say that these variables are "Female" for individual level, and "GNI" for the country level. This simplified model is shown in equation below.

$$Logit(odds) = B_{00} + B_{10} * x_{ij} + B_{01} * \boldsymbol{X}_j + u_{oj}$$

In this equation, $Logit(odds)$ is the log odds of being a donor. $Logit(odds)$ is actually $Logit(P(Yi = 1)/(1-P(Yi = 1))$, which is the logit of the (conditional) probability that the outcome variable, in this case being a donor, equals 1, which is divided by the probability that it equals 0, that is not being a donor. B_{00} represents the fixed intercept.

The x_{ij} is the individual level variable, which is if the respondent is female. B_{10} is the fixed slope of x_{ij}. The $\mathbf{X}_j$ is the country-level variable, in this case the GNI. B_{01} is the fixed slope of country level variable $\mathbf{X}_j$. In the actual model (presented

[16] Empty model is not further reported in this study.

later) all individual level variables are present from the first model, and additionally so are the three variables that constitute the Human Development Index. The deviance of the model 1 equals 22944.985. After the first model, more country level variables are added step by step.

Next, I show the model 1 equation in full, adapting the equation shown in Hox et al. (2017, pp.111-112), using the variable names to simplify the interpretation. This equation differs somewhat from the ones shown previously, as it does not show every slope separately. However, this should make it clear what the model consists of.

$$\pi_{ij} = \text{logistic}(B_{00} + B_{10} * Female_{ij} + Age_{ij} + ChildrenHH_{ij} + Education_{ij} + Mistrust_{ij} + Compensation_{ij} + Network_{ij} + GNI_j + EduIndex_j + LifeExpIndex_j + u_{oj})$$

The variables followed by $_{ij}$ are individual level variables, and the variables followed by $_j$ are country level variables. In the additional models, more country level variables are simply added to this equation and compared to the other models. It should be noted that the results of the multilevel model are transformed into AMEs for more intuitive interpretation.

5 RESULTS

In this chapter results are presented. The country level correlations graphed are first, followed by the multilevel model, in which the whole European Union's donor population is examined. After that blood collection regimes are compared side by side with logistic regression.

5.1 Country Level Correlations

The country level correlations are mainly used to illuminate the relationship between blood donation and country level variables. But I will briefly discuss the results of the examination where it is relevant regarding the hypotheses. Figure 5 shows the relationships between country level variables.

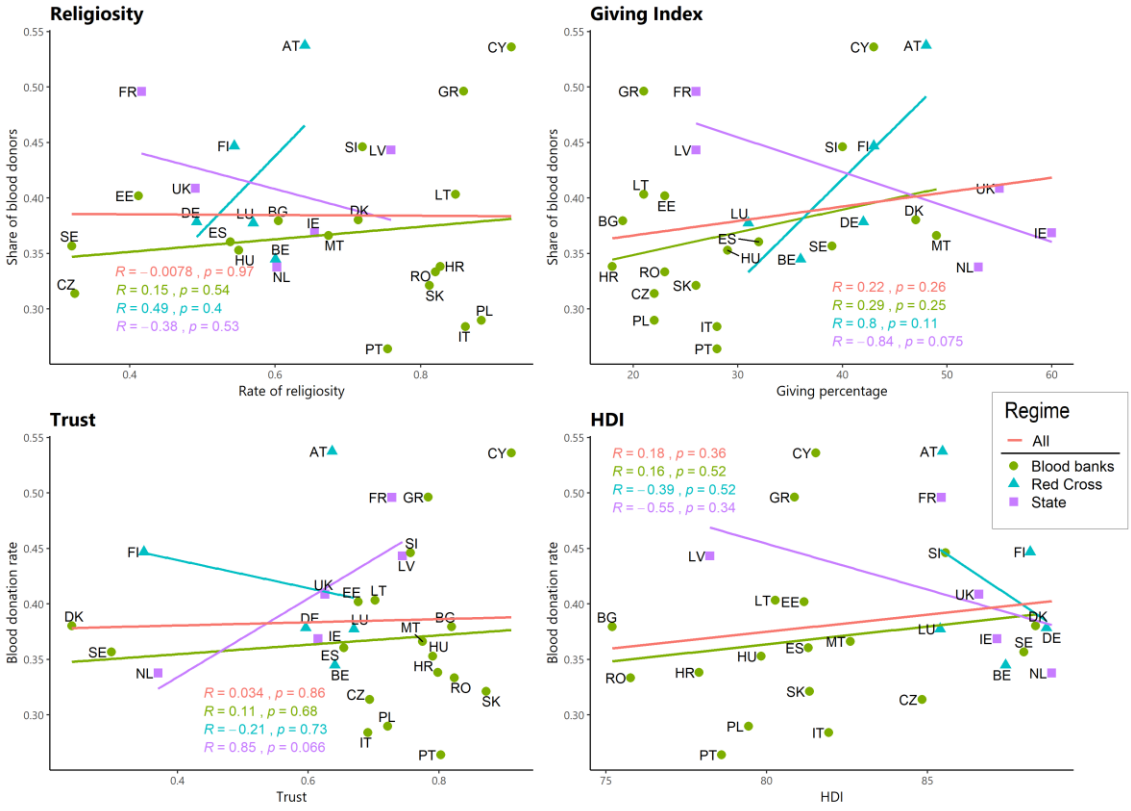

Figure 5. Scatterplots of country level variables against blood donation rate

In each of the four subgraphs, the PCC values (represented by R) and p-values are embedded into the graphs. The arrangement corresponds to the one in the legend of the graph on the right side of the figure in that the top one is the correlation with all the countries combined and after which are the values for each of the regimes. It should be noted that the statistical significance is closely related with the sample size. In this case, the sample consists of only 28 countries, and with the regimes singled out even lower. Nevertheless, I include the statistics here if only to show that they were accounted for.

In the case of religiosity, there are no statistically significant correlations. The Red Cross regime comes the closest, but that is affected by Austria which seems like an outlier. This seems to conflict with hypothesis 10, which was that religiosity is connected to blood donation rates, at least at the country level. However, as according to Healy's results (2000, pp.1649-1650), religiosity is related to blood donation at the individual level at Red Cross regime countries. So there seems to be some connection, but it is not statistically significant.

The next subgraph shows the relationship between share of donors and other types of giving behaviour. Again, there is no significant correlation, but as before, the Red Cross regime stands out, even as it is not statistically significant. Also, in the state regime, the correlation is strongly negative, but again is not statistically significant. These findings would indicate that the hypothesis 9 (that blood donation is related to other types of giving behaviour) does not get support at least at the country level.

In the lower left subgraph, the relationship between trust and blood donor percentage is shown. There are no statistically significant correlations, but the state regime comes closest in that with trust, the donor rate increases ($p=0.066$). This does seem to indicate, that in state regime countries, where the collection of blood is more related to public health services, the general trust in other people does raise the donor share. However, as the test result is not significant, this kind of

interpretation is not valid. Last is the subgraph in the lower right. It shows the relationship between HDI and blood donation share of a country. Again, there are no statistically significant correlations. HDI seems not to have connection with donor share, at least when not fractioned into its sub-pieces.

The results in Figure 5 cannot be used to either dismiss or support the theses. Correlations are too simple method to examine this data that is constructed hierarchically. However, the graphs do give insight into the relationships between regimes.

5.2 Multilevel Model

In the Table 7 the multilevel logistic regression is presented. The response variable is whether the respondent has ever donated blood. Models are constructed in stepwise method, in which more variables are added in each model. I report the models from left to right (from 1 to 6), starting with individual level variables and moving from top to bottom. In cases where the individual level variable does not change from model to model, I state it in the first model and do not repeat it unnecessarily afterwards[17].

[17] It should be noted that the models were tested in different arrangements and by removing those that did not have effect (not reported here). However, these approaches did not change the results in a meaningful way, so no variables are removed after introducing them.

Table 7. Multilevel logistic regression of blood donation with AMEs

	M1	M2	M3	M4	M5	M6
Individual level variables						
Female	-0.110***	-0.110***	-0.110***	-0.110***	-0.109***	-0.109***
	(0.00683)	(0.00683)	(0.00683)	(0.00681)	(0.00674)	(0.00671)
Age	0.00411***	0.00411***	0.00411***	0.00413***	0.00410***	0.00411***
	(0.000313)	(0.000313)	(0.000313)	(0.000313)	(0.000310)	(0.000308)
Children in household	0.0329***	0.0329***	0.0329***	0.0329***	0.0330***	0.0328***
	(0.00782)	(0.00781)	(0.00781)	(0.00782)	(0.00776)	(0.00775)
Age stopped full time education (ref. 20 & older)						
Up to 15 y.	-0.114***	-0.114***	-0.114***	-0.115***	-0.114***	-0.114***
	(0.0122)	(0.0122)	(0.0122)	(0.0122)	(0.0120)	(0.0120)
16-19 y.	-0.0689***	-0.0689***	-0.0689***	-0.0698***	-0.0696***	-0.0696***
	(0.00798)	(0.00797)	(0.00797)	(0.00797)	(0.00791)	(0.00789)
Still studying	-0.0408*	-0.0408*	-0.0408*	-0.0408*	-0.0408*	-0.0402*
	(0.0171)	(0.0171)	(0.0171)	(0.0171)	(0.0170)	(0.0169)
Mistrust	0.0638***	0.0637***	0.0637***	0.0641***	0.0645***	0.0647***
	(0.0156)	(0.0156)	(0.0156)	(0.0156)	(0.0155)	(0.0155)
Compensation	0.0538***	0.0539***	0.0540***	0.0544***	0.0533***	0.0532***
	(0.0129)	(0.0129)	(0.0129)	(0.0129)	(0.0128)	(0.0128)
Network effect	0.160***	0.159***	0.159***	0.159***	0.158***	0.158***
	(0.00684)	(0.00684)	(0.00684)	(0.00680)	(0.00671)	(0.00665)
Country level variables						
HDI — GNI index	-0.00183	-0.00255	-0.00244	-0.00112	-0.00102	-0.00167
	(0.00313)	(0.00319)	(0.00329)	(0.00315)	(0.00260)	(0.00262)
HDI — Education index	0.00242	0.00138	0.00156	0.00512	0.00405	0.00179
	(0.00297)	(0.00316)	(0.00340)	(0.00363)	(0.00301)	(0.00268)
HDI — Life expectancy index	0.00202	0.000548	0.000670	0.00257	0.00305	0.00318
	(0.00380)	(0.00411)	(0.00420)	(0.00403)	(0.00332)	(0.00282)
World Giving Index		0.00139	0.00132	0.00129	0.00158	0.000476
		(0.00157)	(0.00164)	(0.00153)	(0.00127)	(0.00117)
Religiosity			0.0128	-0.00285	-0.0581	-0.0384
			(0.0914)	(0.0858)	(0.0724)	(0.0618)
Trust in others				0.226*	0.324***	0.291***
				(0.111)	(0.0955)	(0.0827)
Conscription army					0.0820***	0.0991***
					(0.0228)	(0.0223)
Regime (ref. state)						
Blood banks						-0.0896**
						(0.0297)
Red Cross						-0.0366
						(0.0378)
Number of countries	28	28	28	28	28	28
Observations	19529	19529	19529	19529	19529	19529
AIC	24533.0	24534.3	24536.2	24534.4	24525.9	24520.7
ICC (empty m. = 0.0264)	0.0261	0.0254	0.0254	0.0219	0.0146	0.0101

Standard errors in parentheses

*$p < 0.05$, **$p < 0.01$, ***$p < 0.001$

Model 1 has all the individual level variables gender: age, presence of children in household, age that the respondent quit full-time education with 20 and more as reference category, the two variables that were constructed with factor analysis, named mistrust and compensation, and lastly network effect. In addition, model 1 includes the three variables that together make Human Development Index: gross national income index, education index, and life expectancy index. The intraclass correlation (ICC) of model 1 is 2.61%, which is very slightly lower than the empty model ICC. In the model 1, Akaike's Information Criterion (AIC) is 24533. When moving to other models, this should lower, implicating a better model.

According to model 1, females are 11 percentage points less likely to be blood donors than men ($p<0.001$). This supports hypothesis 1. It should be noted that the data used does not concern the composition of the yearly donations, but of people who have ever donated.

Age increases the probability of being a blood donor by 0.4 percentage points per year of age ($p<0.001$), which supports hypothesis 2. This makes sense, since the possibility window for ever donating blood raises with each year lived. It would be, however, incorrect to say that older people donate blood more, because this dependent variable is 1 when there is a single occurrence of donation. The age ranges from 18 to 65, so no outliers are present to skew the results. The effect of age does not significantly vary between models, and because of that it is not discussed further in this chapter.

Having children in the household increases the likelihood of being a donor by 3.3 percentage points ($p<0.001$). The effect is relatively low but is statistically significant. As the marital status is not considered in this model, it is hard to say compared to previous findings if this truly means that that people with children are more likely to be donors, as stated in hypothesis 3. This effect does not change when moving from model to another, so it will not be further discussed here.

The effect of education on blood donation is as expected. The reference category, those who stopped full time education at 20 or older, are more likely to be donors than the three other categories, with the gap in likelihood increasing each step. Those who sopped education at up to 15 are less likely to be donors than reference category ($p<0.001$), and so are those who stopped at 16-19 years ($p<0.001$). This supports the hypothesis 4, which was backed by previous studies as well. Interestingly, those who are still studying are only slightly less likely to be donors than reference category ($p<0.05$), and they are closest to highly educated. This might indicate that during the time spent studying many become donors. However, a more thorough examination would be required to further explain this. In any of the categories, the effect does not change from model to another, so it will not be discussed here anymore.

The mistrust variable (consisting of the variables explained in the factor analysis) does have a positive effect on blood donation ($p<0.001$).The hypothesis 5, that those who participate in the gift relationship are more likely to feel lack of trust regarding those who they regard outside of the relationship, gets some support. These effects do not significantly vary from model to model, so for now, they are not discussed further.

Compensation does have a positive relation to likelihood of being a donor ($p<0.001$), which supports the hypothesis 6. As explained in the part dealing with exploratory factor analysis, the variable consists of different types of acceptance of compensation related questions. The effect of compensation does not vary from model to model, so it is not discussed further here.

Perhaps not surprising, the network effect of knowing a recipient of blood raises the likelihood of being a, donor by 16 percentage point compared to those who do not know recipient of blood ($p<0.001$) according to model 1. Hypothesis 7 is supported by this result. As with the previous individual level variables, the network effect does not change from model to model, so it is not discussed here further.

Of the country level variables, the components of the HDI are present in the model 1. There are no statistically significant correlations between the components and blood donor rate. This is somewhat surprising, and conflicts with hypothesis 8. It should be noted, that de Kort et al. (2017) study which examined HDI had more countries outside of EU as well, so there is more variation in the components of the HDI. But still, it is surprising that none of the components of HDI are related to the donor rate of the countries. This does indicate, that blood donation does not follow the regular measurements of a society's development. The effects of the components of HDI do not vary from model to model (at least in statistically significant way), so in this chapter they are not discussed further.

In Model 2, another country level variable is added, the World Giving Index (or to be more precise, the percentage that is used in the ranking process by CAF). The AIC in Model 2 is slightly higher than in Model 1, which indicates a worse model, but I chose to keep this as the variable is theoretically sound and relevant. The ICC is slightly lower, which indicates that less variation is left unexplained in the country level. However, the effect WGI has on blood donation is not statistically significant. This conflicts with hypothesis 9. The rate of other types of gift giving behaviour seem not be related to blood donation on the country level. The effect of WGI does not significantly change from model to model, so it is not discussed here further.

In Model 3, the effect of country level religiosity is added. The model AIC is again slightly higher than in the previous model, indicating a worse model. Again, however, I decided to keep this variable as its connection with blood donation has been discussed in the previous literature. ICC is identical to that in Model 2. The hypothesis 10 does not get support, as there is no statistically significant effect between religiosity and blood donation on the country level. Again, Healy (2000) discovered this as well, by using as a variable church attendance. The correlations later presented in Figure 5 also indicate the same result, even when countries are divided into regimes.

Model 4 adds another country level variable, trust, into the analysis. AIC lowers from previous model, which indicates a better model. The ICC also is lower from the previous model. The effect of trust is statistically significant and positive ($p<0.05$). It means that in countries where general trust is higher, the likelihood of donation rises. The hypothesis 11 does get support from this result. General trust in other people may raise the donation rate because the imagined stranger that receives the blood seems more trustworthy and worthy of the blood. It may also mean that the general trust also applies to the organisations that collect blood, and because of this the likelihood of donation increases. However, this should be examined more carefully.

In Model 5, whether country has armed forces that conscripts from the general population is added. AIC lowers quite a bit from the previous models, and so does ICC. This indicates a good addition to the model. The effect of conscription is positive in that in those countries that have conscription, the likelihood of donation is 8.2 percentage points higher ($p<0.001$). Thus, hypothesis 12 does get supported. It does seem, that armed forces give the blood collection organisations a convenient way to collect blood. This might not be surprising but is a novel addition in the comparison of the institutionalized basis of blood donation across countries.

Furthermore, the addition of conscription positively changes the effect that trust has. Because trust is scaled between 0 and 1, if scaled to more used scale of 1-10, this would mean that in Model 5 the likelihood of individual in a country being a donor is increased by roughly 3.2 percentage points when country level trust is increased by 1, compared that of Model 4 in which the effect was roughly 2.3 percentage points.

In the final model, Model 6, the blood collection regime is added, with the state regime as the reference category. The AIC is lowest of all the models and so is ICC, which means that this model is the best fit of the models. The regimes do

have connection to blood donation: in blood banks regime the share of donors is 9% lower than in state regime ($p<0.01$), and in Red Cross it is 3.7% lower, but not in a statistically significant way. Thus, the hypothesis 13 does get supported by this finding, at least between state and blood banks. The effect of conscription raises in the model to 10%. ($p<00.1$). It seems there are some differences in how the conscription affects blood donation in the different regimes.

5.3. Comparison of the Blood Collection Regimes

The multilevel model illuminated interesting characteristics of the donor population. However, some questions remain on the specific differences between the blood collection regimes. Table 8 presents the logistic regression of ever donating blood with countries pooled into the regimes and compared side by side.[18]

[18] Logistic regression was made for each country separately as well (presented in Appendix)

Table 8. Logistic regression of the different regimes using AMEs

	State	Red Cross	Blood banks
Female (ref. men)	-0.0137	-0.0721***	-0.134***
	(0.0173)	(0.0179)	(0.00875)
Age	0.00601***	0.00362***	0.00367***
	(0.000735)	(0.000807)	(0.000400)
Children in household	0.0391*	0.0563**	0.0169
	(0.0191)	(0.0210)	(0.0103)
Education, age stopped (ref. 20 and over)			
Up to 15 y.	-0.152***	0.00590	-0.128***
	(0.0314)	(0.0321)	(0.0142)
16-19 y.	-0.0937***	-0.0290	-0.0614***
	(0.0184)	(0.0199)	(0.0103)
Still studying	-0.0260	-0.0498	-0.0483*
	(0.0439)	(0.0437)	(0.0225)
Mistrust	0.142***	0.00482	0.0170
	(0.0335)	(0.0372)	(0.0220)
Compensation	0.0667*	0.138***	0.0214
	(0.0314)	(0.0350)	(0.0162)
Network effect	0.139***	0.174***	0.158***
	(0.0165)	(0.0171)	(0.00862)
Observations	3803	3415	12311
Pseudo R^2	0.048	0.047	0.051
AIC	5208.8	4832.1	16146.6

Standard errors in parentheses
$^{*}p < 0.05$, $^{**}p < 0.01$, $^{***}p < 0.001$

The likelihood of a donor being female shown in the multilevel model is clearly not universal. In the state regime, women are roughly as likely as men to be donors, while in Red Cross regime, women are 7.2 percentage points less likely to be donors than men ($p<0.001$). In the blood banks regime, the difference is clear: women are more than 13 percentage points less likely to be donors than men ($p<0.001$). Now the hypothesis 1 is again visited, and clearer picture is uncovered. Men are more likely to be donors than women, except in state regime. This is somewhat surprising, as women have multiple restrictions regarding blood donation that affect them more than men and are more often deferred from donations (Madrona et al. 2014, p.11). This might be explained by the fact that in the state regime, the blood collection is organised near the public hospital system. Because women make up most of the workers in hospitals (nurses etc.), the opportunities they have for donating are increased. The fact that in blood banks regime women

are the least likely to donate might be explained by the fact that in many blood bank regime countries there are volunteer donor organisations. Some of these organisations are linked to organisations such as boy scouts, which might explain the lower prevalence of female donors. Furthermore, according to Bani and Giussani (2010, p.278), women are more inclined to donate for altruistic reasons than men. These results might indicate that in state regime the donation opportunities are more linked with general altruism. However, the more probable explanation is the fact that women simply are closer to blood collection in state regime than others.

Age has, in all the regimes, a positive effect on blood donation. The biggest effect is found in state regime, where each year raises the likelihood of being donor by 0.6%, compared to that of Red Cross and blood banks, at 0.4% each. Hypothesis 2 is then confirmed, as this is universal in all the regimes as well as in the multilevel model.

Whether there are children in the household does have a statistically significant positive effect in state and Red Cross regimes. This is most clear in the Red Cross regime, in which the probability of those who have children against those who do not have children is 5.6 percentage points higher. In state regime the effect is also positive and statistically significant. In blood banks regime the effect is not statistically significant. This means that hypothesis 3 gets conditional support.

The effect that education has is universal across the regimes. In state and blood banks regimes education does have a positive effect on blood donation, much like in the multilevel model. In the Red Cross regime, however, education has no statistically significant effect on blood donation. This finding is quite remarkable. It means that Red Cross seems to be able to collect blood from a wider population of people from different educational background. The effects are, in some cases, contrary than those in the other regimes. However, they are not statistically significant, so no further analysis is possible with this model.

Regarding the mistrust variable, it is only statistically significant in the case of the state regime. That is, only in state regime those who feel mistrust are more likely to be donors. This result somewhat does not support hypothesis 5. It might be argued that the mistrust effect does not function the same way across the regimes. In state regime, it is possible that the donation of blood is more related to notions of a national blood supply, as explained in the part dealing with the French project of national blood. The mistrust might, in this light, be more related to the regime than the gift relationship. However, it might be said that the gift relationship in these regimes is different. But this is something that cannot be confirmed with this data.

The effects of the compensation variable are interesting across the regimes. In state and Red Cross regimes the effect is statistically significant in that those who feel that compensation is acceptable are more likely to be donors. Hypothesis 6 seems to only apply in some regimes. In Red Cross regime the effect is quite high compared to others, but because the AMEs are the absolute probabilities between groups (inside a regime in this model) the between regime effect sizes cannot be interpreted across models. One thing, however, is certain: the effect is not universal.

The network effect, on the contrary, does have a universal effect across regimes. In all the regimes knowing someone who has received blood increases the likelihood of being donor by over 10 percentage points compared to those who do not personally know a recipient of blood. Hypothesis 7 is confirmed.

5.4 Conclusions

The simple correlation examination did show interesting patterns about the relationships between countries, and especially the regimes. This type of graphing should be used more often when dealing with any type of comparative research, as they allow for a more precise construction of hypotheses before moving on to more sophisticated methods. Even better, now that we have both the correlation graph and the multilevel model, it is possible to further reflect on the results.

Even if women donate in some countries more often the fact that women are also more affected by biological limits regarding donation. These factors that make the donation opportunity window for women smaller are pregnancy, as pregnant women are not allowed to donate, and the usual body weight limit, that is 50 kg, affects women more often than men. Also, the haemoglobin screening affects women more than men as women have, for various reasons, usually lower haemoglobin than men. (WHO 2012, pp.41, 43, 46.) This means that the likelihood of donor being a female should be significantly lower than that of men. The biological and social barriers are present at the whole EU level. It would be fruitful to study the specific countries in more detail to examine how the possibilities to donate differ in each country, and further, in each regime. Because the effect of gender does not notably change from model to model, I will not discuss it further when dealing with the other models.

The variable constructed with exploratory factor analysis consists of variables consisted of concerns in the case the respondent were being treated with donated human matter. This result indicates that the gift relationship in blood donation for the donors also functions as a way of barring people from the relationship, and the lower probability of the non-donors indicates that those who are not donors do not share the same concerns as deeply. It is hard to say how much this result reflects the actual gift relationship, but it undoubtedly shows that regarding it there are differences between donors and non-donors.

This result is congruent with the one Healy (2000, p.1649) discovered. This does seem to point toward the argument that blood donation is more related to how it is collected than general giving behaviour. So even if in some studies the relationship between blood donation and other types of giving behaviour has been shown at the individual level, at the country level something else should explain blood donation.

The results of the multilevel model can be summed up as follows: the individual level variables tested had clear effect on the likelihood of being donor even with country level variables accounted for. The country level hypotheses of the effects of human development, other types of giving behaviour, and religion did not have effect when examined at the country level. It should be added, that logistic regressions made without any other variables (not reported in this thesis) showed that all variables except trust and religiosity had, on their own, a positive (though small) effect on blood donation, so the multilevel model was required to show what the effects truly were. The effect of the country level trust only became significant in the multilevel model so even as some recommendations warn against using multilevel model when the ICC is low, these results indicates that multilevel models should still be considered.

While the multilevel model showed the whole EU's donor population the comparison of the regimes side by side did illuminate the donor populations further and allowed for the discarding of hypotheses that seemed to be confirmed in the multilevel model, or at least the hypotheses universality was shown not to be correct.

Many of the hypotheses constructed from the previous studies were confirmed. However, especially those that considered country level variables were more often discarded. This emphasizes that blood donation should be examined with more comparative design, and that the relationship between blood donation and human

development, giving behaviour, religiosity, and trust should be examined further. Conscription was introduced as a novel and significant effect on blood donation. However, as more countries are leaving conscription army behind, its effect will surely diminish. However, in these countries the close organizational ties between blood collectors and the armed forces are expected to affect the donor population in the future.

5.5 Limitations

Main limitations of this study regarding the typology of the countries into regimes is the fact that there is no reliable source that has the available information to divide these countries confidently into said regimes. All available information of how blood collection is structured in each country does not cover all countries. Furthermore, sources regarding some countries are not very recent. In fact, one could say that the sources I have been able to uncover are snippets and only expose a small portion of the whole picture. Even so, I believe that my arrangement of these countries into regimes is somewhat accurate. I have tried to use best available data, ranging from peer-reviewed articles to publications authored by international organisations. Another approach would have been leaving out countries that were of mixed regime or hard to categorise otherwise, however, I decided to include all countries just like Healy did. I categorised the Netherlands to state regime since it had undergone major shift in blood collection organisation. However, it might very well be that it should have been categorised into Red Cross regime like Healy did, since it takes time for it to really show in the donor population. Another notable possible approach not covered in this study would have been adding another regime to the typology. With so many new countries (especially Eastern European countries) new regime might make sense.

6 DISCUSSION

The first researc question was: Can blood donation be considered as a unique gift relationship? As was shown in Chapter 2, the gift relationship in blood donation does have effect on how the actors that are part of the relationship act. Blood donation is a relationship between the one donating the blood and the organisation that collects the blood. Even if the receiver of blood is the one who receives the end product, they are in no direct contact with the donor. Blood circulates through complicated system that pre-processes it, after which it is a medical product like any other. However, as the effect of the variable dubbed network effect showed, that those who have donated are significantly more likely to personally know someone who has received blood. Even as the gift of blood is not personal, it might be that ones who know someone who has received are in a way giving to that someone, at least giving the gift to the system that provided the blood for their family member or a friend. Blood donation can be in a modern society seem to be quite distanced from our everyday experiences. However, if you know someone who has received blood or uses blood derived medicine, the recipient is no more an imagined stranger, but an actual human being. The need for blood is only revealed to the ordinary citizen by marketing campaigns made by blood collecting organisations or when someone close to them receives it. The recipient of the blood this donor donates is of course not for the relative/friend, instead the recipient is, in a way, represented by that person.

The fact that those who are donors are more likely to feel that compensations for donating blood are acceptable demonstrates that those who participate in the gift relation of blood donation do accept the reciprocal nature of the relation. The blood collecting organisations underline the nature that it is a gift, and that the (small but present) compensations are part of it. The ones not participating in the gift relation, namely the non-donors, have not been socialized into the gift exchange of blood donation, and as such, do not understand the reciprocal nature

of it. If one would say that s/he gives blood to get the sandwich and the cup of coffee donors are usually given afterwards (or, more extreme example, that they use donation to get possible STIs tested), it would seem odd and selfish. But when one donates and gets the same compensation, it does seem fitting for the sacrifice made.

Blood donation does seem like quite a unique kind of gift relationship. No link between blood donation and other type of gift giving behaviour was not found, which indicates that it is unique. However, it is hard to know whether the uniqueness is related to the nature of the gift relation itself or in how the blood collection organisations have organised the collection of the blood.

The quantitative examination revealed that those who are donors are more wary of those not part of the gift relationship. Just as Mauss realized studying archaic tribes, the gift relationship in blood donation limits other people out. When asked how they feel if people from other nations or ones who are paid the gift relationship is threatened: if the new donor is from another country or paid, the gift made by the would be donor is not the same or appreciated in the same way. In summary, blood donation is a type of gift relationship that does have its unique character. However, since in many ways blood is collected rather than donated, the examination of only the gift and the donor is not enough.

The second research question was: are the blood collection regimes applicable to the expanded EU, and what are the role of regimes to the gift relationship in blood donation? It does seem that the expanded regimes did hold explanatory power into blood donation. It is hard to tell if all the countries are in the right regime, or even if the number of regimes are correct now that so many more countries have joined the EU. The fact that HDI, other gift giving behaviour, and religiosity did not have an effect on blood donation rate does support the claim that regimes still hold explanatory power into blood donation. However, a more

thorough investigation into the regimes and how blood collection is organised in each country should be made.

In the third research question I asked, what are the characteristics of blood donor population in the EU? I found that most sociodemographic claims made in research literature regarding blood donors was correct. However, a more detailed view was uncovered. Two novel findings were uncovered, namely the fact that in those countries where army conscription was recent blood donation rate was higher and that those who have children are more likely to have donated blood. In addition, it is clear that the regimes have a major effect on what kinds of people donate blood, which must be taken into account when EU wide interpretations of the donor population.

Blood donation is a gift relationship, albeit an odd one. Because the gift is given to someone the giver does not know, the relationship is between the collector of the blood and the donor. Therefore, the institutions which have formed around blood donation play such an important role. Giving a gift of blood is not something that some especially altruistic people do. Altruism does play major role, but how the altruism is channelled through the institutions that in each country make it distinct activity than donating in another county do have a big effect. The altruism is being channelled in different ways in different countries and regimes.

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Appendix

Factor analysis and variables used

Question: For donating blood or plasma during someone's lifetime, do you consider it acceptable...?
QE5A_1 ...to receive refreshments (e.g. coffee, soft drinks, snacks, etc.)
QE5A_2 ...to benefit from a free physical check-up (e.g. blood pressure, pulse, body temperature)
QE5A_3 ...to receive free testing
QE5A_4 ...to receive free medical treatments
QE5A_5 ...to receive non-cash items (e.g. first aid kits, etc.)
QE5A_6 ...to receive reimbursement of travel costs
QE5A_7 ...to receive cash amounts additional to the reimbursement of the costs related to the donation
QE5A_8 ...to receive time off work (for the time needed for the donation and/or for recovery)
All the above were retained after preliminary correlation matrix examination.

Question: Which of the following concerns would you have if you were treated with donated blood, cells or tissues?
QE8_1 - It is against your religion
QE8_2 - Complications as a result of the medical procedure (e.g. rejecting a tissue, etc.)
QE8_3 - The risk of contracting a disease (e.g. HIV, hepatitis, etc.)
QE8_4 - Lack of effectiveness of the treatment
QE8_5 - Medical errors (e.g. being administered the wrong blood type)
QE8_6 - Receiving a donation from a paid donor
QE8_7 - Receiving a donation from another EU Member State
QE8_8 - Receiving a donation from a country outside the EU
Of these QE8_7, QE8_8, and QE8_6 were retained after preliminary correlation matrix examination.

Rotated factor loadings (pattern matrix) and unique variances

Variable	Factor1	Factor2	Uniqueness
concern_EU		0,7436	0,4587
concern_paid_donor		0,5966	0,6487
concern_ouside_EU		0,7935	0,3759
travel_cost	0,6937		0,5162
time_off_work	0,5823		0,6541
refreshment	0,4343		0,6742
non_cash_item	0,8223		0,3060
free_physical_check	0,6207		0,5201
free_testing	0,6545		0,5515
free_treatment	0,6746		0,5646
cash	0,6387		0,6156

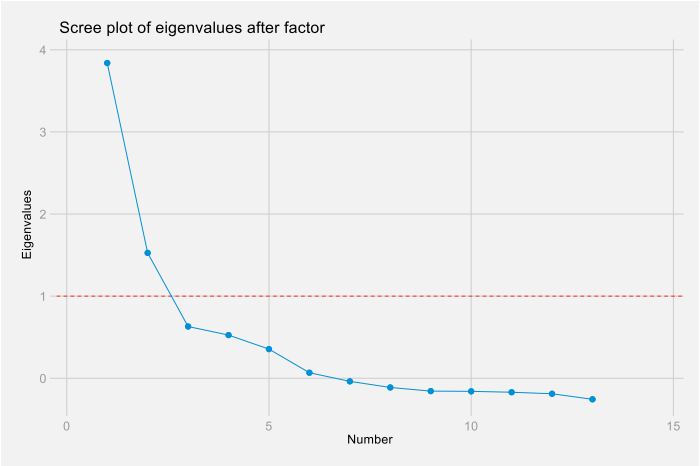
(blanks represent loading<0.3)

Factor analysis/correlation

Method: principal factors Retained factors = 2

Rotation: oblique promax

Factor	Variance	Proportion
Factor1	3,66085	0,6242
Factor2	2,12802	0,3628



Logistic regression of blood donation across all countries individually (AMEs)

	State regime					Blood banks regime								
	FR	IE	LV	NL	UK	BG	CY	CZ	DK	EE	ES	GR	HR	HU
Female	-0.0911*	0.00131	-0.143***	0.0939**	0.0183	-0.187***	-0.265***	-0.135***	0.00705	-0.0661	-0.0497	-0.224***	-0.218***	-0.121***
	(0.0407)	(0.0359)	(0.0422)	(0.0355)	(0.0345)	(0.0322)	(0.0450)	(0.0320)	(0.0387)	(0.0428)	(0.0370)	(0.0311)	(0.0327)	(0.0318)
Age	0.00595***	0.00723***	0.00616**	0.00802***	0.00563***	0.00784***	0.00265	0.00237	0.00569**	0.000360	0.00138	0.00129	0.00470**	0.00393**
	(0.00167)	(0.00154)	(0.00193)	(0.00191)	(0.00138)	(0.00140)	(0.00246)	(0.00142)	(0.00184)	(0.00194)	(0.00177)	(0.00167)	(0.00148)	(0.00139)
Children in household	0.0282	0.0190	0.0399	0.0699	0.0500	0.0183	0.0847	0.00851	0.0790	-0.0315	0.0567	0.0831*	-0.0291	0.0303
	(0.0455)	(0.0382)	(0.0480)	(0.0430)	(0.0375)	(0.0383)	(0.0606)	(0.0368)	(0.0439)	(0.0486)	(0.0411)	(0.0396)	(0.0376)	(0.0377)
Up to 15 y.	-0.173	-0.167**	-0.380***	-0.0283	-0.171**	-0.228***	0.0114	-0.174*	-0.0982	-0.150	-0.0690	-0.0508	-0.0724	-0.167***
	(0.0906)	(0.0593)	(0.0745)	(0.0735)	(0.0574)	(0.0605)	(0.0834)	(0.0822)	(0.0865)	(0.111)	(0.0532)	(0.0505)	(0.0650)	(0.0505)
16-19 y.	-0.211***	-0.146***	-0.0756	-0.0226	-0.122**	-0.128***	-0.0296	0.0161	-0.0135	-0.0576	-0.0388	-0.0624	-0.106*	-0.0515
	(0.0428)	(0.0396)	(0.0462)	(0.0380)	(0.0394)	(0.0387)	(0.0593)	(0.0415)	(0.0650)	(0.0448)	(0.0468)	(0.0415)	(0.0434)	(0.0420)
Still studying	-0.0548	-0.0891	-0.0172	0.178	-0.0757	-0.0909	0.0487	-0.108	-0.116	-0.0932	-0.0352	-0.104	0.102	-0.112
	(0.114)	(0.0846)	(0.103)	(0.101)	(0.0809)	(0.103)	(0.135)	(0.0800)	(0.0776)	(0.0899)	(0.0795)	(0.0859)	(0.0821)	(0.112)
Mistrust	0.117	0.215**	0.0663	0.0792	0.121	-0.125	0.286	0.0902	0.0157	0.115	0.0744	-0.0416	-0.232*	-0.228*
	(0.0733)	(0.0666)	(0.103)	(0.0701)	(0.0717)	(0.224)	(0.169)	(0.0747)	(0.0558)	(0.0751)	(0.137)	(0.119)	(0.104)	(0.0886)
Compensation	0.000297	0.0161	0.106	0.148*	0.0401	0.0339	-0.270*	0.0253	-0.110	0.0594	0.117	0.0711	0.229***	0.108*
	(0.0915)	(0.0644)	(0.0711)	(0.0699)	(0.0594)	(0.0552)	(0.119)	(0.0558)	(0.0792)	(0.0654)	(0.0922)	(0.0741)	(0.0655)	(0.0521)
network_blood	0.105*	0.164***	0.121**	0.154***	0.180***	0.193***	0.183***	0.200***	0.186***	0.158***	0.176***	0.293***	0.0617	0.263***
	(0.0420)	(0.0337)	(0.0412)	(0.0335)	(0.0324)	(0.0317)	(0.0534)	(0.0314)	(0.0376)	(0.0402)	(0.0347)	(0.0363)	(0.0351)	(0.0286)
Observations	674	709	809	726	885	739	348	833	635	624	701	779	843	791
Pseudo R^2	0.058	0.082	0.067	0.070	0.059	0.125	0.096	0.074	0.078	0.034	0.039	0.114	0.078	0.114
AIC	986.8	953.1	963.1	935.4	1298.5	878.6	489.9	955.9	940.5	978.0	982.8	932.8	979.9	962.5

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Continued from previous page

	Blood banks regime (cont.)									Red Cross regime				
	IT	LT	MT	PL	PT	RO	SE	SI	SK	AT	BE	DE	FI	LU
Female	-0.110***	-0.0648	-0.111*	-0.175***	-0.0809*	-0.154***	0.000150	-0.260***	-0.183***	-0.140***	-0.00181	-0.0725*	-0.0838*	-0.0589
	(0.0323)	(0.0396)	(0.0538)	(0.0316)	(0.0324)	(0.0317)	(0.0471)	(0.0331)	(0.0338)	(0.0408)	(0.0381)	(0.0302)	(0.0396)	(0.0565)
Age	0.00409*	0.00678***	0.000877	0.00288	0.000785	0.00384**	0.00400	0.00644***	0.00257	0.00311	0.00291	0.00151	0.00958***	0.00206
	(0.00164)	(0.00175)	(0.00245)	(0.00152)	(0.00160)	(0.00134)	(0.00218)	(0.00167)	(0.00176)	(0.00185)	(0.00166)	(0.00132)	(0.00164)	(0.00267)
Children in household	0.105**	-0.0237	0.203***	-0.0115	-0.0539	-0.0636	0.0669	0.0108	0.00392	0.0385	0.0179	0.0544	0.111*	0.0986
	(0.0342)	(0.0498)	(0.0541)	(0.0395)	(0.0386)	(0.0372)	(0.0519)	(0.0445)	(0.0409)	(0.0479)	(0.0438)	(0.0367)	(0.0442)	(0.0601)
Up to 15 y.	-0.213***	-0.129	-0.180*	-0.0470	-0.129*	-0.147*	-0.150	-0.0498	-0.220**	0.0117	-0.0275	-0.117*	0.207*	-0.127
	(0.0461)	(0.110)	(0.0909)	(0.0761)	(0.0511)	(0.0574)	(0.112)	(0.0699)	(0.0739)	(0.0665)	(0.0828)	(0.0554)	(0.0913)	(0.0759)
16-19 y.	-0.0893*	-0.0111	-0.0518	-0.0102	-0.0830	-0.166***	-0.0172	-0.0263	-0.0676	0.0737	-0.176***	-0.117**	0.0565	-0.105
	(0.0419)	(0.0414)	(0.0699)	(0.0364)	(0.0496)	(0.0405)	(0.0535)	(0.0438)	(0.0442)	(0.0499)	(0.0395)	(0.0375)	(0.0454)	(0.0655)
Still studying	-0.0983	0.0436	0.0872	0.119	-0.0664	-0.251**	0.00258	-0.0348	0.00334	0.0745	-0.0849	-0.225**	0.0253	0.0327
	(0.0823)	(0.0925)	(0.159)	(0.0970)	(0.0811)	(0.0847)	(0.102)	(0.0910)	(0.0980)	(0.0993)	(0.108)	(0.0711)	(0.0814)	(0.160)
Mistrust	0.0600	-0.0884	0.119	0.102	0.446***	0.191*	-0.0368	0.141	0.00663	0.118	0.0609	-0.0303	0.0990	-0.0996
	(0.106)	(0.129)	(0.106)	(0.117)	(0.105)	(0.0921)	(0.0921)	(0.0957)	(0.0738)	(0.102)	(0.0747)	(0.0714)	(0.0770)	(0.0905)
Compensation	0.0413	0.0605	-0.0132	0.153**	-0.107	0.0620	0.0410	-0.00336	-0.0592	0.304***	0.135	0.305***	-0.104	-0.148
	(0.0741)	(0.0910)	(0.114)	(0.0555)	(0.0652)	(0.0535)	(0.0955)	(0.0752)	(0.0637)	(0.0753)	(0.0804)	(0.0568)	(0.0719)	(0.114)
network_blood	0.121***	0.0470	0.170**	0.0619	0.158***	0.152***	-0.0170	0.0892*	0.174***	0.160***	0.166***	0.161***	0.206***	0.123*
	(0.0315)	(0.0399)	(0.0534)	(0.0338)	(0.0301)	(0.0328)	(0.0483)	(0.0384)	(0.0357)	(0.0406)	(0.0363)	(0.0295)	(0.0365)	(0.0547)
Observations	741	662	309	766	718	751	630	682	759	687	671	1074	599	384
Pseudo R^2	0.078	0.034	0.092	0.061	0.080	0.091	0.011	0.092	0.068	0.070	0.071	0.067	0.134	0.037
AIC	786.0	972.5	439.5	861.7	789.1	883.5	967.1	1011.4	1029.7	981.8	907.5	1405.4	878.6	505.3

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$