Three ways to Tap a Vein: Blood collection regimes and the European Union's donor population

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Abstract

Does the way a country organizes its blood collection system affect the size and shape of its donor population? In this paper I analyze data from the Eurobarometer survey carried out in 14 European countries in 1993. I test the predictions of existing research about blood donors in a large–scale comparative context. I describe the organizational differences between blood collection systems within the E.U. and report results showing that these differences significantly affect both donation rates and typical donor profiles. The results broaden our understanding of the relationship between economic institutions and individual altruism. I suggest further avenues for research, arguing that more fine–grained information on organizational histories, legal environments and institutional arrangements will better explain the observed variation.

Introduction

Blood donation is an understudied phenomenon. The giving of blood is both a fascinating social practice in itself and an empirical touchstone for a number of long–standing problems in economic sociology. Sociologists think of markets as socially produced and embedded in other institutions rather than subject to abstract laws derived from universal economic forces (Granovetter 1985). This argument seems more forceful for some transactions than others. The market for paperclips is probably subject to direct forces of supply and demand, but the market for human bodies (or parts of them) is likely to be a more complicated affair. It is easy to see how traffic in human tissues, organs and blood might be caught up in a complex web of cultural practices and institutional arrangements.

Exotica such as clones, commercially farmed embryos and illegally obtained kidneys gives the subject a ghoulish tinge. But the largest and most widespread activity by far in this area is also the most mundane: blood and blood products change hands all the time, with little comment. Surprisingly, we know very little about the social organization of this market.

All industrialized countries have a strong and permanent demand for blood. Large parts of their medical systems would very quickly collapse without it. Everything from emergency paramedical care to routine operations would become difficult or impossible. In addition, many people's lives depend on a constant supply of blood products. But different countries choose to meet this demand in different ways. Some countries manage to collect much more blood per capita than others. Different sorts of organizations collect this blood; different kinds of people come forward to give it. Patterns of donation also vary: some countries have a relatively small pool of regular donors, others a large group of occasional suppliers. There has been next to no empirical investigation of these cross–national differences.

In this paper I analyze a large survey that contains information on patterns of blood donation in the European Union. Previous studies of blood donor populations have ignored or been unable to properly address the question of cross–national institutional variation and its effect on the blood supply. Instead, they focus on a group of donors and aim to find out what motivates them to give. Because giving blood is awkward and inconvenient, these studies assume that there must be something special about people who take the time and make the effort to give blood for free. They then try to find the demographic profile that fits this 'altruistic personality.' But while the structure of individual motivation is important, I argue that it must be understood in the context of institutional opportunities. Wide cross–national variation in donation rates suggests that there is more at work than individual motives. Different collection systems may shape the supply in interesting ways. Some authors, most notably Richard Titmuss (1971), recognized this potential for institutional variation and tried to investigate it. Although Titmuss's argument is often cited in passing, his lead has not been followed in any systematic way.

I describe and discuss blood collection practices within the E.U. and identify three relevant sources of variation: (i) The organization in charge of collecting blood. There are three kinds, namely the State, the Red Cross and Blood Banks. (ii) The presence or absence of a volunteer Donor Group within a country. (iii) The presence or absence of a commercial plasma sector. I develop a number of hypotheses relating these variables to expected differences collection rates and test them against the survey data. My analysis shows that there are stable patterns of variation across different systems. State–run systems appear to do the best job of collecting blood. Countries where the Red Cross is in charge do worse. Blood banks exhibit a wide range of variation, generally doing better than the Red Cross but worse

than State–run systems. I offer a number of arguments for why this might be the case.

Sociology and the Giving of Blood

Why is blood sociologically interesting? We can divide the literature in this area into two broad strands. The first tries to find out what makes blood donors different from everyone else. Its motivating question is, why would someone voluntarily (and literally) give of themselves in the way that blood donors do? Giving blood is time consuming and generally involves no reward. This is the traditional problem of altruism. Why should someone do something for nothing? The traditional answer to the problem has been that gifts entail the promise of reciprocity, and are thus a cryptic form of payment (Mauss 1954). But, in general, blood donors do not know who will benefit from their kindness, and so there is no prospect of being directly reciprocated. Even if we generalize our concept of reciprocity, the chances that a blood donor will ever need a blood transfusion seem too low to justify repeated giving. Studies have therefore tried to find what it is (if anything) that makes donors special people.

The second strand of research investigates the social prerequisites for and consequences of voluntary blood donation. The motivating question can be put in different ways. Does the institution of voluntary donation have an effect on the quality of the supply? Will a particular system tend to attract particular kinds of people? Here the paradigmatic study is Richard Titmuss's *The Gift Relationship* (1971). Titmuss's book was the first cross–national study of its kind. He argued that the link between kinds of blood collection systems and the sorts of supplier they attracted had consequences for society in general. For Titmuss, countries with an open market for blood were likely to have unsafe and inefficient supplies, in contrast to countries

where blood was freely given by donors. These findings shaped debates throughout the 1970s.

This paper speaks to both these research questions. First, it takes findings from smaller studies of donors and replicates them on a much wider scale than before. Second, it tries to establish whether or not institutional variation in collection systems produces parallel variations in the donor population. In following two sections, I outline what we already know about these two questions.

The Elusive Altruist: Studies of Blood Donors

Studies of individual blood donors generally try to establish their demographic characteristics and their motivation for giving. Much of this work has *homo economicus* in its mind's eye: *he* wouldn't give blood unless he was paid enough money. Why should anyone else? The answers given may tend to mislead us about the special character of donors. When asked, most donors will give some altruistic reason for giving, often citing feelings of community attachment or some commitment to the common good as their motive. These motives are then related back to the demographic characteristics of the donor. Many studies do show that the typical donor is a white male in his thirties with above–average income and educational attainment (for a review see Oswalt 1977).

This misleadingly 'suggest[s] that there is a class of people that makes donations and another class that does not' (Roberts and Wolkoff 1988: 170). More often, 'many people with the characteristics of the typical donor are unlikely to be donors. Many with the characteristics of the typical nondonor do in fact donate' (Roberts and Wolkoff 1988). This should make us suspicious of simply thinking that the social basis of altruism is to be found in the personal characteristics of the donors. After all, why should this par-

ticular brand of voluntary giving be concentrated amongst younger, better educated men?

Men give blood more often than women for medical reasons: in addition to being lighter than men on average, women are more prone than men to anemia and pregnancy. Each of these conditions disqualifies one from donating, and so there are fewer women in the pool of potential donors. Older people are also more likely to be excluded from the donor pool for medical reasons. This does not explain why the better–off and better–educated give more. Nor does it explain why relatively few eligible people give in the first place. The motives of donors are clearly an important part of the story. But the validity of individual–level explanations should not turn us away from asking how the institutional setting — the organization of recruitment, collection and publicity — might make it more or less difficult for some kinds of people to donate blood.

Studies of donor motivation do sometimes recognize the role of institutions, although they have not been in a position to investigate them properly. Asking how more blood might be collected, Roberts and Wolkoff (1988) recommend that the structure of incentives offered to donors be changed, as opposed to searching ever harder for elusive altruists. Piliavin and Callero's (1991) study of donors and non–donors focuses mainly on individual motivations. They develop an analysis of how a person grows into a 'donor–role'. But they also recognize that other, non–individual factors are important. Although they do not treat organizational variables in depth, they do give evidence that both personal networks and simple organizational differences have important effects on donation rates. If many of your friends are donors, you are likely to be a donor as well. The accessibility of blood centers — whether collection points are mobile or fixed, for example — also affects whether people give. However, their research design confines them to the

United States, and so the effect of large–scale institutional variation is outside the scope of their study.

Hypotheses about Individual Donors

The findings from the individualist literature are easy to summarize. The data analyzed here allow us to replicate previous work in this area on a large scale. Studies have found a reliable 'modal profile' for blood donors and a similarly typical pattern of altruistic motives (Oswalt 1977, Oswalt and Hoff 1975, London and Hemphill 1965). The link between the two is not so clear, however. The modal donor is not the archetypal altruist. On the basis of these studies, the expected demographic characteristics of individual donors can be summed up in the following hypotheses:

HYPOTHESIS 1 *The modal donor is a male in his thirties.*

HYPOTHESIS 2 *The odds of donating blood increase with educational attainment.*

HYPOTHESIS 3 *The odds of donating blood increase with income.*

Piliavin and Callero's (1991) work with samples of donors and non–donors also suggests that people are more likely to donate blood if they know other donors, or if they know people who have received transfusions (or other blood products). We should expect typical network effects here: if all your friends are blood donors, you are likely to be one too. If you know a hemophiliac, you should also be more likely to have given blood at some point.

There are no data in the survey about networks of donors. However, respondents were asked to say (separately) whether they themselves had ever received a blood transfusion, or whether they knew of a family member or a friend who had ever gotten one.

Hypothesis 4 *The odds of donating blood increase if you know anyone (including oneself) who has received a blood transfusion.*

I already noted that strictly medical reasons do not explain why the better–educated and the better–off are more likely to give. Arguing that such people are more likely to be altruistic does not seem to take us much further. It seems plausible to suggest that, independently of motivations, institutions play an important role in selecting blood donors. Individual motives may be less important than institutional mechanisms. I now examine this possibility in more detail.

Beyond Individual Motivation

Collection Systems and Donor Populations

Titmuss (1971, 1997) conducted a comparative study of the social organization of the blood supply in England and the United States. He argued that the largely commercial, market–driven system of the United States was demonstrably inferior to England's voluntary system. In the U.S., hepatitis was a chronic problem in the blood supply, whereas in England it was almost entirely absent. Titmuss argued that, when blood is a commodity, some individuals will have an incentive to lie about their health. Money–hungry suppliers will come forward to sell their blood. These will also be the people most likely to transmit disease. Titmuss referred to them as 'skid row' suppliers (Titmuss 1971: 113–114), by which he meant the unemployed and manual workers. In addition to contaminating the supply, these commercial blood suppliers tend to drive volunteer donors out of the supply. If blood is paid for, an altruist (by definition) has no reason to come forward. By contrast, there are no such incentives to lie in an altruistic system; no–one from 'skid row' will donate blood and the supply will stay clean. More importantly, a voluntary system brings out the best in people. Titmuss argued

that once people had the chance to give their blood as a gift, they would do so, to the benefit of society. His argument was as much about the moral health of the community as it was about the physical health of suppliers.

Titmuss drew a sharp and often compelling contrast between Britain and the United States. The book is often cited and was recently reissued in a second edition which contained new material reaffirming the importance of his argument (Titmuss 1997). But the evidence Titmuss presented to support his claims is not so clear cut. He relied on a survey of about 3,800 donors which he carried out in 1967 (Titmuss 1971: 120–141). The survey attempted to get a good picture of the characteristics and motivations of donors. Unfortunately, it suffers from having no non–donors in the sample. Titmuss sampled on his dependent variable. Questionnaires were sent to blood banks and blood collection points, but no attempt was made to sample those who might have donated blood, but did not do so. He did compare his results to census figures, finding (as we would expect from the individualist literature) the middle and upper classes were overrepresented. This only reinforced his tendency to think of altruism as a class–based virtue. In addition, he did not carry out a parallel survey for the United States, but relied instead on secondary data of various kinds.

In spite of these weaknesses, Titmuss's study remains the only attempt to examine the effects of cross–national institutional variation on patterns of blood donation. Critics of his argument have sometimes pointed to cross–national differences, but no–one has systematically investigated them (Culyer 1976, Sapolsky 1989, Sapolsky and Boswell 1992). Titmuss's general approach points us away from individuals and towards the workings of health systems. If he was right, then institutional variation influences who comes forward, and how often. In order to make any predictions, we first need to know how the blood supply is organized in Europe.

Table 1: Percentage of respondents who have ever given blood, by country (Reif and Marlier 1994)

Country	*Donors*
France	44
Greece	38
Denmark	34
Britain (excl N.I)	32
Germany	30
Netherlands	28
Ireland	27
Spain	24
Italy	21
Belgium	20
Norway	16
Portugal	16
Luxembourg	14

Cross–National Variation in Giving

How is the collection of blood organized in Europe today, and what effects might we expect it to have on the European donor population? Neither question admits of a straightforward answer. *The Gift Relationship* casts a long shadow over European blood policy. In 1989, a European Community directive committed the European Union to securing its entire supply of whole blood and plasma from voluntary, unpaid donors within member states (Hagen 1993: 129). For most countries, this directive rubber–stamped the practices of existing organizations. It is obvious that a universally voluntary system makes it difficult to test Titmuss's central claim about the pernicious effects of commercialism. With the partial exception of Germany, no E.U. member state pays people for their blood.

Nevertheless, commercialism is not the only axis on which systems vary, and in spite of a common E.U. policy rates of donation and methods of collection differ considerably across countries.

Table 1 shows the percentage of people in each country who have ever given blood. This varies from a minimum of 14 per cent in Luxembourg to a maximum of 44 per cent next door in France. The relatively wide variation in donation rates is interesting. Why should there be as much as twenty or thirty percentage points difference between France and Greece, on the one hand, and Luxembourg and Portugal on the other? If we think of donation as purely a question of individual motivation, it seems unlikely that the general propensity to altruism should vary quite so sharply across Europe. At the same time, we should be unwilling to write the difference off to cultural variation — particularly given that countries which we might expect to fall together culturally (France and Luxembourg, Denmark and Norway) have dissimilar donation rates.

I suggest that individual–level explanations cannot account for this variation, and argue that we should instead look to institutional factors to explain the differences. Following Titmuss, I expect the particular organization of the collection system to have a strong effect on patterns of donation. Given that, in general, E.U. citizens do not receive cash for blood, we cannot expect as stark a contrast as Titmuss drew between Britain and the United States. But if organizations vary, my argument is that donor populations will vary with them in some way. Specifically, I examine three institutional features that vary across Europe: the *collection regime*, the presence of a *commercial plasma sector*, and the presence of *volunteer donor organizations*.

Cross–National Variation in Organization

Three collection regimes. In Europe, blood is collected by three kinds of organization (Hagen 1993: 34ff).[1] First, in some countries a National Health Service or nationally run blood organization collects all of that country's

[1] Unless otherwise cited, information in this section comes from this Council of Europe White Paper (Hagen 1993).

Table 2: European Blood Collection Regimes (information from Hagen 1993)

System Type	Country
State Run	Britain
	France
	Ireland
Red Cross	Belgium
	Luxembourg
	Netherlands
	Germany
Blood Banks	Denmark
	Greece
	Italy
	Norway
	Portugal
	Spain

blood. Countries with this sort of system have no other collection agencies. Second, the Red Cross may have a monopoly on collection, or control a majority of it (with a minority held by hospital or community blood banks). Third, blood banks may have a monopoly on collection, or have control a majority of it (with a minority held by the Red Cross). European countries fall into these categories as shown in Table 2.

The British, Irish and French National Health Systems have a monopoly on blood collection in their respective countries. Denmark is the only country where blood banks have a monopoly; all other banking systems are majorities. While precise data on market shares would have been ideal, information was available only about the relative predominance of the Red Cross and Blood Banks in those countries where they share responsibility for the supply (*i.e.* Germany, Greece, Italy, Norway, Portugal and Spain). On the basis of exploratory data analysis, I have categorized countries with

mixed systems according to the organization that controls the majority of the supply, rather than (for example) keeping a special 'mixed' category.

Germany is the only mixed system where the Red Cross holds a majority. It is an unusual case in several other respects also. First, it is the only E.U. country which obtains some of its blood from paid suppliers. Second, there is a mixed system of paid and unpaid donation within the non–profit sector. Most hospital and community blood banks pay between 30 and 50 DM (about $18 to $30) per donation. (Government policy limits payment to a 50 DM maximum.) In some areas Red Cross collection centers also compensate their donors. Third, regional governments (the various *Länder*) have different collection policies. There are also significant differences between Eastern and Western *Länder* (Hagen 1993: 74–75).

The for–profit plasma sector. The collection and processing of plasma overlaps with that of whole blood in complicated ways. Plasma can be extracted from whole blood or obtained separately through a process known as plasmapheresis.[2] In general, although non–profit organizations may collect plasma from voluntary donors, they do not process it any further. It is either used directly (as with whole blood) or sold to commercial plasma fractionators.

There are exceptions to this rule. Denmark, for example, has a state–run fractionation plant (although its capacity is small compared to the other, commercial, plant in the country). The only exceptions of interest here are those countries where plasma is bought directly from individual suppliers (rather than being sold on by non–profits who have obtained it from volunteer donors). Spain and Germany both have such a system.

[2]Plasmapheresis takes longer than donating a unit of blood and is more uncomfortable. It can also be done much more often: the body replaces lost plasma much faster than it does lost blood.

Volunteer donor organizations. Donors are organized in one or more national groups in Denmark, France, Greece, Italy and Spain. For example, Denmark's organization 'was founded in 1932 when a boy–scout movement established a corps of young adult boy–scouts who on a voluntary non–remunerated basis were willing to be called to hospitals to donate blood' (Hagen: 58). The Voluntary Blood Donors of Denmark supply 88 hospitals with donors. In return, hospitals pay the local organization a small fee per donation, which is used for publicity and further recruitment efforts.

Italy has a slightly different form of organization. It resembles a community blood bank model rather than a hospital blood bank. The difference is that, instead of sending donors to hospitals the organizations collects the blood itself and sends it to hospitals. The majority of blood banks in Italy are run by one of three donor organizations. The largest is called AVIS and claims about 800,000 members. The others are the Fratres (100,000 members) and FIDAS (300,000 members). They are organized in different parts of the country and do not compete with one another.[3]

By contrast, although France and Spain have a national and a bank–based system respectively, important donor organizations also exist in these countries. In my analysis, therefore, I distinguish between a blood–banking system and the presence of a voluntary donor group, even though in some countries the donor groups may have a hand in running the blood banks.

Hypotheses about Institutional Effects

Except insofar as a streak of commercialism exists in a particular system, we cannot rely on Titmuss to predict how donor populations will vary with the European collection systems. In the absence of a straightforwardly profiteering system, does any previous sociological work guide our expectations

[3]Interestingly, this apparently strong voluntary activity contradicts the charge that Italy has no voluntary sector worth speaking of. See, for example, Perlmutter (1991).

about the possible effects of different collection regimes?

Two issues should be distinguished here. In general, blood is collected by (i) *public or non–profit organizations* which (ii) *solicit voluntary donations* from individuals. The very large literature on non–profit organizations is largely concerned with why these organizations appear in some sectors of the economy and not others, and whether they outperform competing for–profit organizations (DiMaggio and Anheier 1990). Comparative work in this area is rare. Countries vary widely in their definition and treatment of the non–profit sector. Historical contingencies, differences in legal traditions and the varying organizational role of religions further complicate cross–national comparisons (DiMaggio and Anheier 1990, Wuthnow 1991).

The most recent work in this area tries to estimate the size and composition of the non–profit sector in a number of countries. Salamon and Anheier (1998) present intriguing preliminary data from a large cross–national survey of the non–profit sector. They sketch a theory that explains the 'social origins' of different non–profit regimes. This promising approach bears directly on the study of blood supply systems. The size and social origins of the bloos supply may well be bound up with the development of the non–profit sector as a whole. Unfortunately, Salamon and Anheier's data do not much overlap with the cases discussed here. They report results for four countries in the sample: France, the U.K., Germany and Italy. Their data are suggestive. France and the U.K. have the largest nonprofit sectors, and similarly have large donor populations, for example. But in the absence of more cases, this work does not allow us to make any strong predictions here.

If we focus on the second issue, the question changes slightly. Why might some organizations be better than others at actively soliciting donations from individuals? We can think of blood donation as a special kind of volunteering that involves more than just money or time. Research on mon-

etary donations shows that rates of giving tend to increase with age. People who are married and have children give more than single people. Educational attainment usually has a positive effect (Clotfelter 1993, Hodgkinson and Weitzman 1992, Jencks 1987). But perhaps the most consistent finding in this literature is that being asked to contribute is one of the most important determinants of giving in general (Hodgkinson and Weitzman 1992, Piliavin and Charng 1990). Larger, better funded organizations may well be in a position to publicize their needs more than smaller, more disaggregated ones. The publicity efforts of large organizations also benefit from economies of scale, and perhaps also from name recognition and the trust they engender. Large organizations may also find it easier to co–ordinate effective recruitment drives. Costs can be redistributed from easy–to–recruit to costly–to–recruit regions. For these reasons, in our case, I expect the Red Cross to be better than Blood Banks at attracting donors.

If reaching potential donors is important, then countries where the state has a monopoly on collection should do best of all. Other things being equal, a national system is more likely to be better funded, have a wider coverage, and have more recruitment options open to it than other kinds of organization. Operating within a National Health System, the blood–collection organization should find it easier to integrate its activities into the general package of benefits provided by the state. Giving blood might more easily be seen as part of a general *quid pro quo*, part of the individual obligation incurred by the public goods provided by the State. State systems might also be more likely to have an easier time getting access to other state organizations where donors might be found (such as Universities, the civil service, and so on). Opportunities for cost–reduction and redistribution may also be most easily available to state run collection agencies.

If we integrate these ideas with Titmuss's arguments about the effect of

commercialism, the following hypotheses emerge:

HYPOTHESIS 5 *National Health Systems will attract the most donors, followed by Red Cross systems. Blood–Banks will do worst.*

We expect that the shape of the donor pool will vary along with the size. If an NHS really does cover the most ground, then it should also encourage a wider variety of people should be donors. The contrast with the Red Cross and Blood Banking alternatives is less clear, but we might perhaps expect variation to decline with the size of the donor pool. Under this hypothesis, blood banks should attract the least varied population of donors.

HYPOTHESIS 6 *National Health Systems should dampen the effect of differences in sex, age, education and income.*

What about commercialism? Examining the effect of a commercial plasma sector is the closest we can come to evaluating the strongest of Titmuss's claims. In addition to a general dampening of donation, we also expect the socio–economic status of the typical donor to change.

HYPOTHESIS 7 *People living in countries with a commercial plasma operation will be less likely to donate their blood.*

HYPOTHESIS 8 *In countries with a commercial plasma operation, the better–educated and the better–off will be less likely to donate their blood.*

Conversely, five countries in the sample (Denmark, France, Greece, Italy, Spain) have voluntary organizations of blood donors, committed to the ideal of altruism. I expect that the presence of such an organization will increase the size of the donor population without changing its shape.

HYPOTHESIS 9 *People living in countries with a volunteer donor organization will be be more likely to donate their blood.*

The positive effect of donor organizations should be concentrated on those who are already likely to donate. If donors are generally male and well–educated, the presence of a donor group should further increase the chances that well–educated men will be donors. However, donor organizations will not increase the odds of atypical individuals giving blood. They may even further reduce their chances.

Hypothesis 10 *Where a donor organization exists, (a) people already likely to donate blood will be even more likely to do so and (b) those already unlikely to donate will be less likely to do so.*

Data and Methods

The Survey

I analyze the Eurobarometer survey carried out in the E.U. (with Norway and Finland) in 1993 (Reif and Marlier 1994). The survey contains data on blood donation across Europe. Such large–scale comparative social survey data provide a unique opportunity to study how blood donation is pattern by institutional context. Respondents were asked a battery of questions about blood and plasma donation. People were asked for their opinion about the way blood and plasma are collected and handled, their reasons for donating and not donating, their understanding of the differences between blood and plasma, their attitudes about buying and selling blood, and their perception of the risks involved in donating blood given the possibility that they might contract HIV.

The survey sampled persons aged fifteen years and over residing in the twelve member states of the European Union, as well as Norway and Finland. It was carried out through multistage national probability samples and national stratified quota samples during March through June of 1994. The complete dataset contains 540 variables and 19,477 cases. In all, there

are thirty one questions about blood donation and related issues. Finland is not included in the analysis because all blood-related data for this country were missing.

Models and Variables

I present the results of a number of logistic regression models. In each case, the dependent variable is whether the respondent has ever given blood (coded 1 for Yes, 0 for No). The independent variables in the models represent characteristics of individual donors and institutional environments. The former are recoded from the survey. The latter were obtained from Hagen's (1993) report and attributed to each observation *via* the country codes in the dataset.

My argument is that the propensity of individuals to give blood is related to their personal characteristics and their networks. However, the effect of these characteristics is in turn sharpened or muted by the institutional setting, that is, by the way the collection system is organized.

The institutional setting is represented by three variables. First, the kind of collection system a country operates. The omitted category is NHS — countries with state–run systems. The coding corresponds to table 2. Second, a binary variable registering the presence of a volunteer donor group in a country. Individuals from countries with such groups (Denmark, France, Greece, Italy and Spain) are coded 1, others get a 0. Third, a binary variable for the presence of a commercial plasma operation (where individual suppliers are paid for plasma). Only Germany and Spain qualify. Respondents from these countries are given a 1 for this variable. The individual–level variables are described in table 3. They have been coded with reference to the 'modal donor' reported in the research studies described above. I included squared term for age to capture its expected declining effect. The variables have also been centered in order to give a substantive

Table 3: Description of Individual–Level variables.

Variable	Description
Female	Coded 1 for Female, 0 for Male.
Age	Age in Years. Centered on 35 year-olds.
Age^2	Squared Term for Age.
Education	Years of full–time education. Centered on respondents with 16 years of full–time education.
Income	Coded into Quartiles. The first (highest) quartile is the reference category.
Network	A four–category code measuring contacts with transfusion recipients (including oneself). It has a range from 0 (no ties) to 3 (ties to self, relative and friend).

interpretation to the intercept term in the models. Age has been centered on 35 year olds and education on those with 16 years of full–time education. The intercept therefore represents a thirty–five year old male in the top income quartile, with (roughly) a college education and no network ties to transfusion recipients.

I first specify a model with individual–level variables only, which I apply to each country in turn. Under this model, the log odds of individual i in country j ever having given blood are:

$$log(\frac{p_{ij}}{1-p_{ij}}) = \beta_{0j} + \beta_{1j}F_{ij} + \beta_{2j}A_{ij} + \beta_{3j}A^2_{ij} + \beta_{4j}E_{ij} + \beta_{5j}Q_{ij} \quad (1)$$

where p is the probability of ever having given blood, F, A, E and Q are scores for Female, Age, Education and Income Quartile variables, and the βs are unknown regression coefficients. In this equation, the subscript j on the βs indicates that a the effects of the individuals are allowed to vary by country.

In order to capture the different institutional effects, I estimate a second model for the pooled sample. The three institutional variables are added, along with a group of interaction effects between them and the individual variables. The interaction effects show how different institutional mecha-

nisms shape the effects of individual characteristics on donation.

Results

Individual Variation by Country

Table 4 shows the results from a series of logistic regressions where five individual–level variables were regressed on the donor variable for each country in the sample. Countries are grouped by system type. The variables test a range of predictions from previous studies about the individual characteristics of blood donors. The data broadly confirm Hypothesis 1. Men are everywhere more likely to donate than women, and the odds of donating first increase with age and then decline. The strength of these effects vary considerably across countries. Greece and Portugal stand out for the size of the gap between their male and female donors.

Hypothesis 2 receives slightly more qualified support. Education significantly increases the odds of donating in six countries (France, Ireland, Belgium, Germany, Denmark and Norway) and has a positive but insignificant effect in a further six. Only in the Netherlands does education have a negative (but insignificant) effect.

Hypothesis 3 predicts that the odds of donating increase with income. The results are mixed, perhaps in part because no continuous income data are available. Dividing income into quartiles may make the results overly sensitive to particular cutpoints (although if the relationship between income and donation is linear, this would not be the case). Nevertheless, we find there is no country where any of the three lower income quartiles are significantly more likely to donate blood than the highest quartile. There is also some evidence that the negative income effect increases across quartiles. France, Greece, Spain and (to a lesser extent) Germany all show this pattern. The bottom income quartile is significantly negative in six countries

Table 4: Logistic Regression on Donor Variable: Individual Effects by Country

Country	Intercept	Female	Age	Age^2	Educ	Q2	Q3	Q4	Net	N
National Systems										
UK	-0.540	-0.182	0.030	-0.001	0.022	0.023	0.012	-0.057	0.038	694
	(-2.99)	(-2.19)	(3.27)	(-2.83)	(0.86)	(0.21)	(0.15)	(-0.93)	(0.31)	
France	-0.034	-0.360	0.032	-0.001	0.116	-0.101	-0.092	-0.113	0.315	829
	(-0.25)	(-4.76)	(4.25)	(-3.75)	(4.73)	(-1.01)	(1.55)	(-2.21)	(3.03)	
Ireland	-0.563	-0.229	0.045	-0.001	0.116	-0.423	-0.170	-0.118	0.182	542
	(2.00)	(2.24)	(3.69)	(3.29)	(2.37)	(-3.09)	(-2.18)	(-1.33)	(1.15)	
Red Cross Systems										
Belgium	-1.600	-0.306	0.035	-0.001	0.038	0.239	0.058	0.034	0.377	528
	(-7.76)	(-2.64)	(2.90)	(-2.70)	(2.15)	(1.28)	(0.64)	(0.47)	(2.35)	
Luxembg	-2.090	-0.331	0.025	-0.001	0.011	0.182	-0.063	-0.446	0.130	382
	(-6.05)	(-2.12)	(1.62)	(-1.32)	(0.31)	(0.94)	(-0.46)	(-2.35)	(0.67)	
Nethlds	-1.152	-0.404	0.028	-0.001	-0.002	0.049	-0.093	0.005	0.278	856
	(-8.62)	(-5.00)	(3.16)	(-2.61)	(-0.08)	(0.48)	(-1.31)	(0.11)	(2.40)	
Germany	-1.032	-0.305	0.011	-0.001	0.044	0.016	-0.037	-0.117	0.514	1707
	(-9.31)	(-5.54)	(1.85)	(-3.28)	(3.61)	(0.24)	(-0.73)	(-2.26)	(6.43)	
Banking Systems										
Denmark	-0.753	-0.312	0.057	-0.002	0.037	0.010	-0.065	0.015	0.151	908
	(-5.93)	(-4.20)	(6.43)	(-5.24)	(2.71)	(0.10)	(-0.98)	(0.29)	(1.44)	
Greece	-0.311	-0.963	0.036	-0.002	0.022	-0.010	-0.115	-0.117	0.312	763
	(-1.63)	(-10.41)	(4.17)	(-5.67)	(0.97)	(-0.07)	(-1.64)	(-1.75)	(2.18)	
Italy	-1.178	-0.582	0.045	-0.002	0.030	-0.154	0.042	0.056	0.250	707
	(-5.58)	(-5.53)	(4.40)	(-4.52)	(1.27)	(-1.02)	(0.56)	(0.79)	(1.52)	
Norway	-2.044	-0.188	0.051	-0.001	0.030	-0.270	-0.067	-0.331	0.312	869
	(-11.84)	(-1.98)	(4.33)	(-3.43)	(2.54)	(-2.22)	(-0.96)	(-3.62)	(2.56)	
Portugal	-2.050	-0.802	0.045	-0.001	0.021	-0.173	0.009	-0.116	0.411	864
	(-7.34)	(-7.31)	(4.11)	(-3.44)	(0.99)	(-1.40)	(0.10)	(-1.24)	(2.35)	
Spain	-1.051	-0.303	0.048	-0.002	0.030	-0.013	0.099	-0.148	0.166	679
	(-5.11)	(-3.13)	(4.56)	(-4.33)	(1.27)	(-0.11)	(1.22)	(-1.92)	(1.09)	

T-values are given in parentheses below coefficients.

altogether. On the other hand, this is by no means as strong a pattern as might have been expected by the likes of Titmuss. Although patterns are to be found in standard socio–economic variables, donors are often spread quite widely through the population.

Hypothesis 4 is strongly confirmed by the data. Knowing people who have received a transfusion has a positive effect on the odds of donating in all countries in the analysis, with significant effects in seven countries.

Table 4 also allows us to gauge something of the effect of different systems on rates of donation. For each country, the intercept measures the log odds of giving for a 35 year old male in the top income quartile, with 16 years of full–time education. Three of the four largest values for the intercept term are for Britain, France and Ireland, the three countries with a nationalized system (Hypothesis 5). The fourth is Greece, which runs a banking system. We also expected National Systems to dampen the effect of individual variables (Hypothesis 6). This is true for Britain right across the board. Apart from sex and age, none of the individual variables are significant. But it is not true for France or Ireland, which both show strong education and income effects.

Banking systems in general show a wider variance in their coefficients than either Red Cross or National Systems. The intercepts for National Systems are clustered amongst the higher values, those for the Red Cross amongst the lower. By contrast, the second–highest (Greece) and second–lowest (Norway) intercept values are found in banking systems.

Institutional Effects

In order to better examine the effect of particular institutional and organizational arrangements on the rate of donation, I analyzed the pooled sample, keeping the individual–level variables as before and adding a number of institutional–level ones. I first specified a model with eight variables (the

five individual characteristics described above, plus terms for System Type, and the presence or absence of donor groups and commercial plasma operations). I then added interaction terms between each of the organizational variables and the individual ones. The results from this interactions model are reported in Table . The first column of coefficients shows the main effects of each of the variables in the model (reported in logits, as before). The other four columns show the interaction effects. (Thus, -0.072, the first number in the second column, shows the additional effect of being female in a Red Cross system.)

Each of the individual–level characteristics show the same directions, magnitudes and significances as those reported in Table 3. The income coefficients are once again suggestive of the general pattern predicted by Hypothesis 3, but certainly do not offer unwavering support for it.

The model suggests that institutional factors are an important part of what determines rates of blood donation, over and above individual characteristics. The coefficient for each individual variable shows how that characteristic changes the odds of someone giving blood. But the importance of these characteristics varies depending on the institutional arrangement. The interaction terms capture this latter effect.

The individual variables are affected in different ways. The main age effect is significantly enhanced under Banking systems but, conversely, significantly dampened by the Red Cross. The gender gap in blood donation is significantly increased under both systems, with the gap being slightly larger under the Red Cross. The positive effect of education found in National Health Systems is dampened in both the Banking and Red Cross alternatives. Once again, Red Cross countries do worst. The two panels in Figure 1 give a picture of these effects. In the first panel, the odds of donating are plotted against the respondents' years of education. The graph

Table 5: Full Model of Individual and Institutional Variables

System Types and Donation Rates

		Interaction effects			
Variables	Main Effect	Red Cross	Blood Banks	Donor Groups	Pay Plasma
(Intercept)	-0.787 (-14.53)				
Female	-0.399 (-13.53)	-0.072 (-2.08)	-0.069 (-3.32)	-0.038 (-1.12)	0.090 (1.52)
Age	0.033 (10.87)	-0.005 (-1.45)	0.007 (3.31)	-0.002 (-0.46)	-0.004 -0.62
Age^2	-0.001 (-10.21)	0.000 (0.14)	-0.000 (-2.46)	-0.00 (-0.93)	0.00 (0.15)
Yrs Educ	0.042 (5.80)	-0.016 (-1.74)	-0.011 (-2.56)	0.021 (2.79)	0.025 (1.95)
Income Q2	-0.004 (-0.11)	0.147 (3.27)	-0.011 (-0.43)	0.040 (0.92)	-0.120 (-1.62)
Income Q3	-0.052 (-2.21)	0.011 (0.38)	0.020 (1.22)	0.010 (0.37)	0.017 (0.34)
Income Q4	-0.053 (-2.61)	0.051 (1.95)	0.012 (0.73)	0.012 (0.46)	-0.126 (-2.69)
Network	0.218 (5.13)	0.084 (1.68)	-0.037 (-1.25)	0.083 (1.71)	0.210 (2.44)
Red Cross	-0.185 (-2.71)				
Bl. Banks	-0.240 (-6.22)				
Donor Group	0.441 (6.91)				
Pay Plasma	-0.059 (-0.52)				

N = 10,480. Null Deviance: 12513 on 10479 df
Residual Deviance: 11401 on 10435 df
T-values are given in parentheses below coefficients.

shows the predicted odds for male donors of average age in the top income quartile under each of the three systems. The Network, Donor Group and Pay Plasma variables are set to zero. The second panel shows the effect of different systems across age, with education held constant (at the mean level, once again). For education, the general upward trend is the same across the three systems but National Health Systems are shown to do better across all education levels. For age, National Health Systems also do better than either alternative. The age panel also clearly shows the diminishing postive effect of age on donation.

Income interacts with System type in a strong but inconsistent fashion. In contrast to the sex and education variables, the Red Cross and Blood Banks seem to do better than National Health Systems when it comes to attracting donors from different income groups. The negative main effects of the income coefficients are offset under these systems in all but one case. The patterns suggested by the T-statistics are not so clear, however. There is no consistent pattern of improvement across quartiles.

This pattern (or rather its absence) is repeated with the Donor Group and Pay Plasma variables. The interactions between the Donor Group variable and the various individual characteristics suggest that these organizations reinforce the typical donor profile. Although they increase the number of donors, they do this by bringing more of the same people into the donor pool rather than expanding its scope (Hypothesis 10). Thus, women are less likely to donate where these organizations exist and better educated people even more likely. Donor groups also enhance the effect of personal networks.

The Pay Plasma effects are weak, and must be suspected given that only Spain and Germany are coded under this variable.[4] But even if we

[4]Although, because the former East and West Germanies were sampled separately, the German sample is twice as large as that of other countries.

Figure 1: From left to right, the additional effect of Collection Systems on the Education and Age variables.

treat the reported coefficients with some caution, they offer no support for Titmuss's claim that commercialization drives away donors and increases the number of poor and less–educated suppliers. The main effect is negative but insignificant. In fact, under commercial plasma operations, people in the bottom income quartile are significantly *less* likely to donate than otherwise. The coefficients reported for Spain and Germany in Table 3 confirm this overall negative effect. Disaggregating the German sample into its Eastern and Western parts does not change this picture either. Germany is the only country in Europe where whole blood can be bought from individuals. In West Germany, all the income coefficients are negative (with T-values of -0.03, -1.92 and -1.32) and the education coefficient is positive. More or less the same applies to East Germany (the three income coefficients have T-Values of 0.26, 0.81 and -1.51). The effect of education is also positive and significant (T=2.87). As far as the data allow, then, we seem to be in a position to reject Hypotheses 7 and 8. There is no strong evidence from this survey that a market for plasma — or even for blood — significantly reduces either the rate of donation or the well–established tendency of the better–educated better–off to give.

Finally, the institutional variables interact with the network variable in a very suggestive fashion. On other variables, as we have seen, Red Cross countries do the same or significantly worse than the other systems. But for netowrks, the data suggest that Red Cross countries are able to capitalize on people's ties to transfusion recipients significantly better than either National Health or Banking systems.[5]

[5]If the regression coefficients were sensitive to the presence of particular countries in the sample, my institutional arguments would be suspect. It was not possible to fit country dummies because of the resulting singularities in the model. Instead, I carried out a jackknife analysis in order to evaluate the problem. Each country was dropped from the analysis in turn and the model reported in table tested on the reduced sample.

Discussion

Rates of blood donation in the E.U. vary widely across countries. There has been no study of the extent of or reasons for this variation. My analysis of collection regimes countries shows that National Systems have a strong, stable donor base, larger than the average and concentrated in a male population of relatively high socio–economic status. Countries with Red Cross systems, by contrast, tend to have fewer donors than average. Finally, countries operating a blood–banking system show the widest range of variation, containing both the highest and the lowest donation rates.

This is not altogether surprising. Operating within the E.U., large, state–run health systems are more likely to display cross–national similarities than smaller, private organizations. In addition, the administrative infrastructure of two of the three NHS systems share obvious historical roots. Similarly, the Red Cross is a large international organization with a strong sense of its own distinctiveness and particular mission. It has developed a clear set of rules and protocols defining the way that its blood collection branch should operate in any particular country. The consequences of this organizational identity are visible in the data. Blood–banking systems are by definition more disaggregated and variable than either of these larger, bureaucratic alternatives. They are more likely to have grown up in an *ad hoc* manner; they may be affiliated with hospitals or be community based; their relationship to the state varies, as do their links to voluntary donor

Comparing the coefficients of the resulting 14 models indicates how sensitive each variable is to the presence of any particular country. This diagnostic showed that the variables of interest were stable. All the significant main effects and interactions were robust (their values did not change sign). Germany exercised a greater force than average (lowering their values slightly in each case), but this is largely explained by the large sample size for this country (2,838 over an average of 1,340 everywhere else). Insignificant variables were more unstable, but this is to be expected.

groups. All of this means that we require much more detailed information about the history and present form of these organizations before we can be sure of their role in structuring the E.U.'s donor population.

The hypotheses I outlined about the effect of different kinds of organization have been partly confirmed by the analysis. National Health systems do best on the average. The original nationalized, voluntary system — Britain's — appears not to discriminate on the basis of education or income when it selects its donors. Donor Groups have their expected effect everywhere. Commercial plasma operations do not. In addition, a number of effects appeared that were not predicted in the theoretical discussion. Under Red Cross and Blood Banking systems, the positive effect of education is reduced, suggesting that these systems may be less selective than state organizations. But non–state systems also accentuate the negative effect of being female.

The picture is mixed, but the underlying structure is clear. How you collect blood affects how much you collect and who you get it from, over and above the willingness of individuals to donate. We cannot properly understand variation in the size or shape of the donor population without paying attention to its social organization. Future research should try to bring together the two strands of investigation mentioned above. Studies of donor motivation should be located within an institutional setting, where individual dispositions are related to collection organizations. This might be done in two complimentary ways. First, more detailed case–studies of arrangements in particular countries might be carried out. Why is Belgium so different from France? Why have 38 per cent of Greeks given blood but only 16 per cent of Norwegians? Rich information on blood regimes has yet to be collected. This line of research would carry on Titmuss's intellectual project in the largely non–commercial contemporary environment. He was

convinced that institutional differences drove individual behavior, at least in part, and he seems to have been right. For a better theory of why this happens in contemporary Europe, we need more information than we have at present.

Second, the literature on individual motivation seems restricted. Titmuss saw the giving of blood as a unique action, surrounded by a sacred penumbra of altruism. This is probably misleading. If we think of blood–donation as a special kind of giving or volunteering, we can see whether blood donation lines up with other such behavior. Good cross–national data has become available only quite recently. For example, one preliminary analysis of the European Values Survey (Greeley 1997) presents data on cross–national rates of volunteering, broadly defined. Salamon and Anheier's (1998) work is also directly relevant in this regard. Europeans vary in their willingness to take part in all kinds of voluntary activities. Any explanation of this variation will have a strong bearing on our understanding of blood donation. It may turn out that volunteering one's blood is akin to volunteering one's time.

Blood donation varies strongly by institutional setting in Europe. It remains for us to discover exactly how the details of this medically indispensible and culturally resonant practice are organized and negotiated. Although individual characteristics and motivations obviously play an important role, richer information on institutional differences should go a long way towards explaining the variation we observe.

References

Clotfelter, C. (1993) 'On trends in private sources of support for the US non–profit sector' *Voluntas* 4 (2): 190–195

Culyer, A.J. (1976) 'Blood and Altruism: an economic review' in David B. Johnson (ed)*Blood Policy: Issues and alternatives* Washington: American Enterprise Institute for Public Policy Research pp39–58

DiMaggio, Paul and Helmut Anheier (1990) 'The Sociology of Nonprofit Organizations and Sectors' *Annual Review of Sociology* 16: 137–59

Granovetter, Mark (1985) 'Economic Action and Social Structure: The problem of embeddedness'*American Journal of Sociology* 91: 481–510

Greeley, A.M. (1997) 'The Other Civic America: Religion and Social Capital' *The American Prospect* 32 (May–June) pp68–73

Hagen, Piet J. (1993)*Blood Transfusion in Europe: a "white paper"* Strasbourg: Council of Europe

Hodgkinson, V. and M. Weitzman (1992) *Giving and volunteering in the United States: Findings from a national survey* Washington DC: Independent Sector

Jencks, Christopher (1987) 'Who gives to what?' in Walter W. Powell (ed) *The Nonprofit sector: a research handbook* New Haven: Yale University Press

Kessel, Reuben (1974) 'Transfused Blood, Serum Hepatitis and the Coase Theorem'*Journal of Law and Economics* XVII (2) October 1974 pp 265–289

London, P. and B. M. Hemphill (1965) 'The motivations of blood donors' *Transfusion* 14: 559–68

Mauss, Marcel (1954) *The Gift* London: Routledge and Kegan Paul

Oliner, Samuel and Pamela Oliner (1988) *The Altruistic Personality: rescuers of Jews in Nazi Europe* New York: Free Press

Oswalt, R. M. (1977) 'A review of Blood Donor Motivation and Recruitment' *Transfusion* 17: 123–135

Oswalt, R. M. and T. E. Hoff (1975) 'The motivations of blood donors and non–donors: a community survey' *Transfusion* 15: 68–72

Perlmutter, Ted (1991) 'Italy: Why no voluntary sector?' pp157–188 in Wuthnow (ed) *Between States and Markets: the voluntary sector in comparative perspective* Princeton: Princeton University Press

Piliavin, Jane Allyn and Hong–Wen Charng (1990) 'Altruism: a review of recent theory and research' *Annual Review of Sociology* 16: 27–65

Piliavin, Jane Allyn and Peter L. Callero (1991) *Giving Blood: The development of an altruistic identity* Baltimore: Johns Hopkins University Press

Reif, Karlheinz and Eric Marlier (1994) Eurobarometer 41.0 Ann Arbor: Inter–University Consortium for Political Research (Machine-readable data file.)

Salamon, Lester and Helmut Anheier (1998) 'Towards a Comparative Theory of the Nonprofit Sector' Paper presented at the Annual Meetings of the American Sociological Association, San Francisco, August 1998.

Sapolsky, Harvey M. (1989) 'AIDS, Blood Banking and the Bonds of Community' *Daedalus* 118 (3) pp145–163

Sapolsky, Harvey M. & Stan N. Finkelstein (1977) 'Blood Policy Revisited —

A new look at *The Gift Relationship*' *The Public Interest* 46 (Winter) pp15–27

Sapolsky, Harvey M. & Stephen L. Boswell 'The History of Transfusion AIDS: Practice and Policy Alternatives' in Elizabeth Fee & Daniel M. Fox (eds) *AIDS: The making of a chronic disease* Berkeley: University of California Press pp 170–193

Titmuss, Richard (1997) *The Gift Relationship: From Human Blood to Social Policy* Expanded and Updated Edition, edited by Ann Oakley and John Ashton. New York: The New Press

Titmuss, Richard (1971) *The Gift Relationship: From Human Blood to Social Policy* New York: Vintage

Wuthnow, Robert (ed) (1991) *Between States and Markets: the voluntary sector in comparative perspective* Princeton: Princeton University Press

Zelizer, Viviana (1988) 'Beyond the Polemics of the Market: Establishing a theoretical and empirical agenda' *Sociological Forum* 3 (4) pp614–634