

The Law and Economics of Organ Procurement

*Een Rechtseconomische Analyse
van Orgaanverkrijging*

Firat Bilgel

The Law and Economics of Organ Procurement

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Dedicated to those who fight death every day.



Illustration: Emel Bozkurt

Preface

I have always been intrigued by medicine. When I was a 9-year old kid my father used to come home exhausted after a night-long kidney transplant with blood on his scrubs whose memory still haunts me today. The idea of working on the economics of organ donation and transplantation came to me seven years ago while I was nearing to finish my graduate studies in economics in Canada. I remember sharing my ideas with Harry Chartrand at the time, one of the most eccentric and brilliant economists I've known, in long discussions over coffee.

At the beginning my intention was to work on technical areas which, I presume, would be understood only by the few who are not interested in the most appalling and heartfelt issues of the gift of life. As time passed by I was taken hold by the more practical issues and decided to contribute to resolve the organ shortage conundrum by compiling my ideas and knowledge of law and economics. This monograph is written over many sleepless nights. As I kept reading and writing the contemplation of death settled in my life; not my own but those of others. Writing and thinking about the dead made my journey a dark one through which I occasionally abandoned myself to despair.

Organ donation and procurement is literally and metaphorically a matter of the heart. Working on this subject has shaped the way I look into the transplant medicine. My journey to write this thesis is filled with dualities. On one hand I am deeply troubled by the hypocrisy of the status quo that eventually had to let thousands of patients die just because the current system of gift giving cares more about the moral permissibility than about the life transplant patients were striving for. On the other hand I think altruism is out there waiting to be tapped. At the end, despite the statistical facts and allegedly happy transplant stories I was convinced that transplant is only exchanging one medical condition for another which I thought I would not exchange. Most would disagree with me on this matter.

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List of Abbreviations

3SLS	Three-stage least squares
AMA	American Medical Association
AUPKE	Altruistic Unbalanced Paired Kidney Exchange
BMA	British Medical Association
CDC	Centers for Disease Control and Prevention
CIA	Central Intelligence Agency
CIHI	Canadian Institute for Health Information
CNT	Centro Nazionale Trapianti (Italian National Transplant Center)
COE	Council of Europe
CSA	Cyclosporine-A
DAPTA	Dialysis and Transplant Patients Association
DNR	Do not resuscitate
DSO	Deutsche Stiftung Organtransplantation (German Organ Transplantation Foundation)
ECD	Extended criteria donor
ESRD	End-stage renal disease
FE	Fixed effects
FEVD	Fixed effects vector decomposition

GDP	Gross domestic product
HIV	Human immunodeficiency virus
HUCH	Helsinki University Central Hospital
IDHL	International Digest of Health Legislation
IKA	The Irish Kidney Association
IV	Instrumental Variable
KST	Koordinační Středisko Transplantací (Czech Transplantations Coordinating Center)
MoH	Ministry of Health
NEAD	Non-simultaneous Extended Altruistic Donor
NHS	National Health Service
NOTA	National Organ Transplant Act
NTS	Nederlandse Transplantatie Stichting (Dutch Transplant Foundation)
OLS	Ordinary Least Squares
ONT	Organización Nacional de Trasplantes (Spanish National Transplant Organization)
OPO	Organ Procurement Organization
OPP	Organ Procurement Policy
OPTN	Organ Procurement and Transplantation Network
PKE	Paired Kidney Exchange
pmap	per million adult population
pmp	per million population
RE	Random effects

Contents

SCOT	Slovenské Centrum Orgánových Transplantácií (Slovak Center of Organ Transplantation)
SCOTD	The Swedish Council for organ and tissue donations
SST	Sundhedsstyrelsen (The Danish National Board of Health)
SUR	Seemingly Unrelated Regression
TOC	Transnational organized crime
TPM	Transplant Procurement and Management
UAGA	Uniform Anatomical Gift Act
UK	United Kingdom
UN	United Nations
UNGIFT	United Nations Global Initiative to Fight Human Trafficking
UNOS	United Network for Organ Sharing
US	United States
USRDS	United States Renal Data System
WHA	World Health Assembly
WHO	World Health Organization
WHOSIS	World Health Organization Statistical Information System

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1. A Global Chronic Organ Shortage Problem

“Transplant technology may be compared to an evil genie let out of a bottle and now won’t return.” Nancy Scheper-Hughes

1. A Global Chronic Organ Shortage Problem

1.1. The Demand for Transplantable Organs

Kidney transplantation is a well-known and routine treatment today for patients with ESRD. At the beginning of the twentieth century, experiments in transplantation were conducted in dogs by Emerich Ullmann and Alexis Carrel. Following these efforts few attempts have been made in France by Mathieu Jaboulay to transplant kidneys from animals to humans, called xenotransplantation. A number of transplants into humans were reported by Jaboulay in 1906 using pig and goat kidneys, followed by Ernst Unger in 1910 using kidney from a monkey and by Harold Neuhof in 1923 using kidney from a lamb, all of which failed immediately afterwards (Chavers, 2003; Papalois et al., 2003). The first human-to-human kidney transplant in the history was performed in Russia by Yu Yu Voronoy in 1936 from a cadaver. But the patient died few days after the transplant. During the early years of human-to-human kidney transplantation the organs were obtained from cadavers. Between 1951 and 1953 a dozen of cadaveric kidney transplants were performed in France and the US. On December 1952, the first but unsuccessful living donor kidney transplant in the history was performed in Paris, France. The recipient died after 21 days due to graft rejection. The series of transplants in the early 1950s indicated that human-to-human transplantation was bound to fail due to genetic mismatch and high incidence of organ rejection. It was not until 1954 that the first successful living donor kidney transplant in the history was performed by the 1990 Nobel laureate Joseph Murray between genetically identical twins. The operation is considered to be the first of long-term success. Following Murray's success six similar transplants between monozygotic twins were reported in 1958 (Chavers, 2003). However the long-term success of transplants from dizygotic or unrelated donors was unattainable.

1.1.1. Immunosuppressive Therapy

The rejection of the transplanted organ by the immune system became a serious concern because patients were dying after the transplant. In the late 1960s the inhibitor known as Azathioprine was approved and used as the primary immunosuppressive agent to prevent organ rejection. The development of Azathioprine was a breakthrough towards successful kidney transplantation for patients with irreversible renal failure. However, for patients with complicated kidney or other solid organ failures such as heart, liver or lung, transplantation was not a viable option. Azathioprine either did not provide adequate immunosuppression at

reasonable doses or became toxic, resulting in serious kidney damage. Despite its limits the first pancreas, liver and heart transplants were performed by Richard Lillehei (1966), Thomas Starzl (1967) and Christiaan Barnard (1967) respectively.

The research on transplant immunology aimed at finding a compound that could adequately inhibit rejection while preserving other functions of the immune system. In the early 1970s, Dr. Jean Borel developed an effective drug called CSA that inhibits the rejection response without damaging other functions of the immune system. CSA was used in pilot studies in transplant patients who received cadaver kidneys. In these pilot studies CSA was found to be toxic for the kidneys but contrary to Azathioprine provided adequate immunosuppression. The routine use of CSA was initiated after its approval in the US in 1983 and enabled heart and liver transplantation which were not possible a decade ago. During the early 1990s, the research has focused on finding other compounds with similar immunosuppressive properties such as Tacrolimus and Sirolimus which were approved in 1993 and 1999 respectively (Kamps, 2003). They have been used as the primary drugs in immunosuppression therapy today. The discovery of suppressive agents made it possible to perform transplants without using blood-related donors and greatly increased the number of transplants from biologically unrelated donors and the survival rates. But the recipients were subject to post-transplant health risks such as mild infection, common flu-like diseases and intoxication due to the administration of immunosuppressive drugs.

1.1.2. Determination of Brain Death

The extensive research and development on immunosuppressive therapy and advances in transplantation would not be possible unless the concept of brain death is defined. The determination of death is thus important for medical reasons as well as for personal, social, religious, moral and legal reasons (Ott, 1995). For centuries death was regarded as the cessation of cardiorespiratory functions. According to this traditional definition death occurs by the irreversible cessation of spontaneous respiration and circulation (Ott, 1995). Transplantation of solid organs from cardiac-dead donors was not possible because heart, liver and lungs suffered from irreversible damage caused by long periods of warm ischemia¹. Advances in the medical technology allowed the maintenance of cardiac and respiratory functions artificially

¹Warm ischemia is the period an organ remains at the body temperature after its blood supply has been cut off but before it is cooled or reconnected to a blood supply.

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through life-support machines even there is irreversible loss of brain function (Papalois and Matas, 2003). The second definition of death is the death of the whole brain which is defined as the irreversible cessation of all functions of the entire brain including the brain stem. In 1968, the ad hoc committee of Harvard Medical School declared this new criterion of brain death (heart-beating donor) as *the state of irreversible coma* which stems from serious brain hemorrhage. A similar criterion endorsed by the Conference of Royal Colleges and Faculties was later adopted in the UK (Papalois and Matas, 2003). The definition of brain death was officially ratified in France in 1968 followed by Finland in 1971, UK in 1976, US in 1981, Sweden in 1988 and Japan in 1997. To this date, brain death has been a controversial issue although it is unanimously accepted as certain death by the medical community. With the emergence of the concept of brain death organ transplantation has become the hope of many patients experiencing heart, lung, liver and pancreas failure.

1.1.3. Medical Technology

After 50 years of experience and knowledge transplantation of solid internal organs has become a routine procedure performed in hundreds of transplant centers in western countries. While the surgical techniques progressed as far as performing split liver transplants, recent attempts have even succeeded in transplanting appendages such as hand and partial face in the US and France in 1999 and 2005 respectively and penis in China in 2006. The determination of brain death, the intensive research on immunosuppressive therapy and organ preservation together with the advances in surgical techniques have largely led to the soaring of the demand for transplantable human organs. At the root of this demand lies an increasing burden of disease leading to organ failure, prevalent in developed western cultures and peculiarly pandemic in the US.

1.1.4. Burden of Disease

Although there are many lifestyle-related, genetic or idiopathic factors that might lead to the failure of a particular organ, certain known causes of organ failure are associated with today's challenging public health issues such as obesity, diabetes and malnutrition. In the US where data are readily available from the CDC, 2.5 percent of the US population was diagnosed

with diabetes in 1980². In 2007, this share has doubled. Similarly, obesity continues to be a public health concern in the US. More than 72 million people in the US were obese by 2006 and the prevalence of obesity has doubled since 1980. Higher incidence of obesity led to adult diabetes and caused kidney failure in certain population groups. Rising incidence of obesity further led to irreversible cardiovascular problems whose sole treatment is to receive a heart transplant. Abuse of alcohol and narcotics leading to organ failure has largely contributed to the increasing burden of disease and the rising demand for transplantable organs.

1.2. The Supply of Transplantable Organs

While the rise of the demand was unprecedented the supply of organs on the other hand remained stagnant partly due to an inherent scarcity of donors and partly due to other factors. These factors could be marshalled as natural scarcity, altruism, organizational problems, subjective judgments and governmental or policy problems.

1.2.1. Natural Scarcity

Elster (1992) distinguishes between three types of scarcity: *strongly or weakly natural*, *quasi-natural* and *artificial scarcity*. Strong natural scarcity arises when there is nothing that can be done to increase the supply. Weak natural scarcity arises when there is nothing that can be done to increase the supply to the point of satiating everybody. Quasi-natural scarcity arises when the supply could be increased possibly to the point of satiating the demand, but only without imposing coercion. Finally artificial scarcity arises when the supply could be increased to the level of satiating all the demand if the government allows so. In the case of transplantable organs the type of scarcity depends on the source of human organs. Under deceased donation the supply of organs represents a weak natural scarcity. The reason is that the supply of cadavers cannot satiate the entire demand for transplantable organs simply because the likelihood of dying under circumstances that would render an individual's organs suitable for transplantation is very low³. On the other hand under living organ donation the supply of organs (kidney) represents a quasi-natural scarcity because it could be increased

²<http://www.cdc.org>

³Howard and Byrne (2007) estimate that the probability that a person will become a potential donor at some point during her lifetime is 0.0028.

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by a set of different strategies without taking coercive actions. The supply of transplantable human organs, living or deceased, thus represents a quasi-natural scarcity (Koch, 2002)⁴.

1.2.2. Altruism

Altruism can be broadly defined in two ways. The first definition has been adopted by evolutionary biologists who define it entirely in terms of survival and reproduction. Accordingly, an altruist is someone who increases the fitness of others at the expense of decreasing his own. The second definition has been adopted by sociologists and psychologists who define it in terms of the motives which do not necessarily require a cost to the giver (Healy, 2006). Healy (2004) posits that altruism seeks to increase another's welfare, not one's own; it is a voluntary and intentional action meant to help someone else without expecting external rewards. According to Piliavin and Charng (1990), different definitions of altruism from a wide range of disciplines have been presented so far, some of them sharing the emphasis only on the costs of the actions to the altruist and some of them emphasizing both the costs and the motives of the altruist. It is acknowledged that there are many kinds of altruism⁵. Although altruism is believed to have some hereditary components, much of the literature suggests that it cannot be described solely by individual behavior or by innate components but it also depends on the social context in which it is highly institutionalized.

In the book on the effects of organ transplantation, Simmons et al. (1987) found that the decision to premortem donate a kidney is often made instantaneously as an impulsive response to urgency. It is documented that situational factors of altruism play an important role in donation such that the likelihood of donating a kidney, knowing the presence of others who might donate, decreases almost linearly with the number of potential known donors. When a donor believes that there are others (bystander effect) who can donate, the urge or the pressure to help the patient diminishes.

⁴If governments could provide monetary or otherwise incentives for organ donation the supply of organs could be increased to the point of meeting the entire demand and the distinction between quasi-natural and artificial scarcity becomes blurry (Elster, 1992).

⁵Hill (1984) states that altruistic behavior arises in response to perceived social expectations; Wilson (1976) postulates *hard core altruism* as the irrational and unilateral act regarding others; Sober (1988) differentiates between *evolutionary altruism* which emphasizes the consequences to the altruist and the recipient, arisen as an impulse in cases of emergency and *vernacular altruism* in which the altruist is motivated to benefit others.

1.2.3. **Organizational Problems**

Organ procurement is a very complex phenomenon that enhances altruism and treats it as a resource-extraction problem (Healy, 2006). Organizational problems initially emerge in the efforts of hospital and physicians in identifying potential donors. This identification is contingent upon an individual mostly going through a violent accident and being brought to a hospital by law. Converting an accident victim into a donor therefore requires the hospital and the procurement teams to overcome tight schedules and other organizational challenges (Healy, 2006). First, a group of doctors who are unrelated to the procurement process must determine if brain death has occurred based on explicitly defined medical criteria. This process can take from seconds to few days depending on the medical criteria of brain death, related protocols and on the type and severity of brain injury. During this period the body cannot breathe on its own and it is kept alive on life-support machines in order to preserve the organs. Once brain death is confirmed the physician who is responsible from the brain-dead patient is required to inform the OPO or the relevant authority about a potential donation. Sometimes patient referral becomes uncomfortable for the physician because of the reluctance to give away the organs of the patient they were trying to save and to engage in more work by doing so (Thorne, 1998).

Hospitals, physicians and organ procurers are not only delegated to solve the logistic problems of preserving and transporting suitable organs but they must also obtain consent from the next-of-kin (Healy, 2006). Numerous studies have shown that medical professionals fall inadequate in obtaining consent from the next-of-kin either because they do not know how to obtain permission in a competent manner or they ask for permission in such a way that causes refusal or they do not have the sufficient knowledge of the procurement process. The incompetence of physicians in obtaining consent lies in the manner they approach the family. Therefore questions like “do you have any reason to think the donor would have objected?” or “can we have your permission to collect the decedent’s organs?” or “you don’t want to give away any of his parts, do you?” make a substantial difference in obtaining consent from the donor’s family (Healy, 2004). On the other hand, asking permission for organ removal is extremely difficult for physicians who are responsible for the treatment of the brain injured patient (Matas et al., 1985; Breyer and Kliemt, 2007). This problem becomes compounding upon the pressure exerted by transplant teams to hasten the declaration of brain-death and

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the consent phase (Barber, 2007). The bereavement and mourning of the family is exacerbated when physician broaches the subject of donation. Most importantly there is an insurmountable resistance, not only from the families but also from nurses, even doctors against the concept of brain death although it has been medically accepted as certain death.

Once the family consents to donate the donor's medical history must be known. This includes history of malignancy, alcohol and drug abuse, incidence of diabetes, HIV, hepatitis B and C and other risk factors or diseases pertinent to the organ under consideration. For each donor that passes the medical clearance potential recipients are ranked on the waiting list according to the blood type, histocompatibility of the donated organ, the size of the organ, the medical urgency of the patient, the time on the waiting list, the distance between the donor and the recipient and other specific case-by-case criteria. Once a potential recipient is located and matched to a recipient, the doctor who is in charge of the recipient should quickly decide whether to accept or reject the offered organ. If the organ is turned down the next most suitable patient is contacted. If the organ is accepted the donor must be transported to a hospital for the transplant where two transplant teams must be ready for the extraction and the transplantation of organs. These steps must be completed in a very short period to keep the donor's organs viable. A poorly managed procurement process is likely to compromise the transplantation and will keep the procurement rates down. Organizational problems that are associated with artificial scarcity could be reduced by efficient, if not socially acceptable, policy measures (Koch, 2002).

1.2.4. Subjective Judgments

An equally powerful factor contributing to the paucity of the supply of transplantable human organs is the subjective judgments of individuals. While the medical community contends that amending the organizational deficiencies of organ procurement could substantially increase procurement rates, such a strategy would be conditional upon identifying why people are reluctant to donate. When the concept of brain death has become the key for non-renal transplantation, the public debate was surrounded by the controversial issues in the definition and in the determination of brain death. Among others, potential donors feared that their organs can be procured prematurely before brain death occurred. This fear of premature determination of death discouraged potential donors to sign up for organ donation and was

largely associated with the failure to contemplate with one's own death and the wide spread tendency to avoid the discussion of post-mortem donation with the relatives. Most of the research on attitudes towards donation finds that refusals happen because of irrational beliefs and unarticulated fears about organ donation which may be responsible for low donation rates (Healy, 2006).

Although the extent of the negative impact of religious beliefs on organ donation was relatively small, certain religious groups refused to donate in particular or opposed transplantation altogether. For instance, Jehovah's witnesses' opposition to blood transfusion has become an obstacle for a successful transplantation even though they do not oppose transplantation. Christian Scientists on the other hand refuse medical treatment altogether. Similarly the Shinto tradition in Japan and the views of the Orthodox Judaism towards deceased donation rendered transplantation of cadaver organs impossible.

Surveys of Gallup showed that extremely low donation rates in the US have also been associated with the lack of trust in the health care system especially among ethnic minorities. African-Americans in the US are known for their mistrust in the health care system because it treats minorities unfairly and discriminates in favor of white population. A general mistrust in the health care system causes ethnic minorities and other vulnerable strata of the population to oppose donation even transplantation.

1.2.5. Governmental/Policy Problems

In economies run by in-kind transactions severe restrictions and transaction costs are imposed by the double coincidence of wants problem caused by the improbability of the wants, needs or events that motivate an exchange. Therefore in the absence of money, a necessary condition is that the service each party is willing to exchange must be exactly what the other party is demanding or supplying at the same time and the same place. Because of these transaction costs money tends to emerge naturally as a medium of exchange in in-kind economies. Current organ procurement systems are no different because they are based on altruism and gift-giving. A sale prohibition imposed by the government on the mediation of wants and needs, amplified by an increasing demand for transplants caused patients to seek organs through illegal means. This government prohibition on the mediation of wants and needs further led to the emergence of a growing body of policy proposals.

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The policy proposals in the exchange of human organs have polarized in a considerable number of mutually exclusive policy prescriptions in lieu of a system based on pure altruism. These proposals ranged from conscription on one hand to competitive markets on the other and enabled the growth of a prolific literature on the financial incentives and their economic, legal and human consequences. The majority of economists and legal scholars contends that a zero-price policy imposed by the government has been responsible for low donation rates and rent-seeking in secondary markets (i.e. dialysis); thus if liberalization was allowed by introducing money organ shortages and the suffering of the many could have been reduced greatly if not completely eliminated. On the other hand, a handful of economists argue that the government prohibition is a mere reflection of the underlying causes of shortages which may be rectified without resorting to markets. These causes are mostly related to organizational problems and ineffective management of the procurement processes. Market reforms have also been criticized by many non-economists in terms of justice, fairness, issues of morality and legal and political reasons.

1.3. The Emergence of Organ Shortage

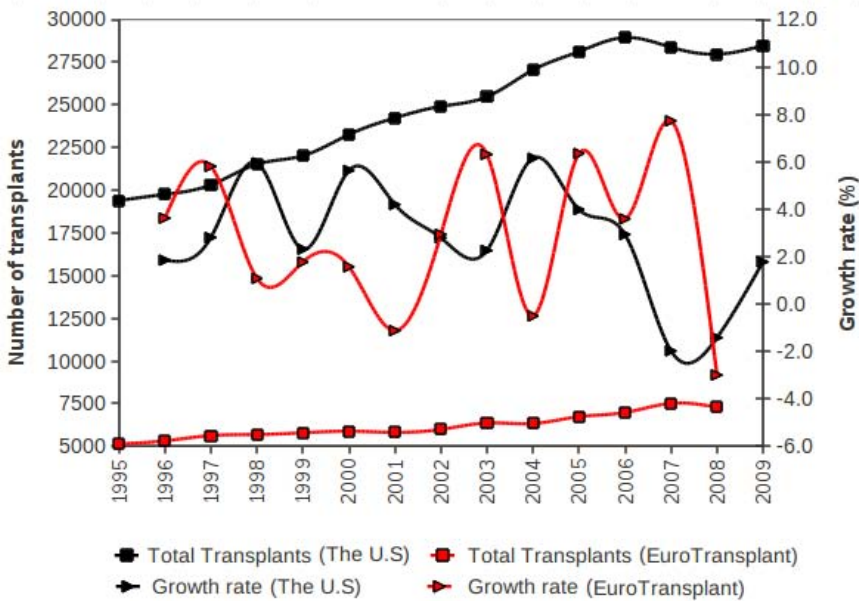
During the early years there was no apparent discrepancy between the number of organ donors and the number of recipients. Advances in the transplant technology caused a boost in the demand for transplants. Let alone brain death, the medical conditions necessary to be eligible for a cadaveric organ donation were strict and the supply of organs has fallen short of the demand as more and more people were experiencing organ failure. The supply of and the demand for organs moving in opposite directions caused long waiting lists in many countries.

Increasing organ shortage has become a major policy issue within the last two decades and drastic measures had to be taken to stabilize the demand and/or to increase the pool of transplantable organs. On the demand side patients who were previously listed have been removed after transplant coordinators have strengthened the medical conditions necessary to remain on the waiting list. Patients suffering from renal failure have remained on dialysis unless they had no choice but transplant. While medical requirements for patients were getting strict, they were loosened for donors. Individuals who have not been considered as viable donors due to old age and poor quality of organs have been considered as donors, known as ECD. The age limit has been dropped and a more subjective case-by-case evaluation has been used to

1.3. The Emergence of Organ Shortage

locate potential donor organs. Although some surgeons have declined organs of poor quality for their relatively healthier patients, most of them have become willing to use organs that they previously would have rejected (Howard, 2002). As the medical technology advanced, non-heart beating donors (cardiac death) have been used in addition to heart-beating donors (brain death). A series of donor awareness programs and national initiatives for organ donation have been implemented to overcome misconceptions and subjective judgments of individuals. Donor awareness programs in many ways emphasized that organ donation is a “gift of life”. In countries particularly where religion was thought to be the major obstacle for donation, leaders of major denominations stated that donation is an act of supremacy encouraged by most religious doctrines.

Figure 1.1.: The number of transplants performed in the US and Europe 1995-2009



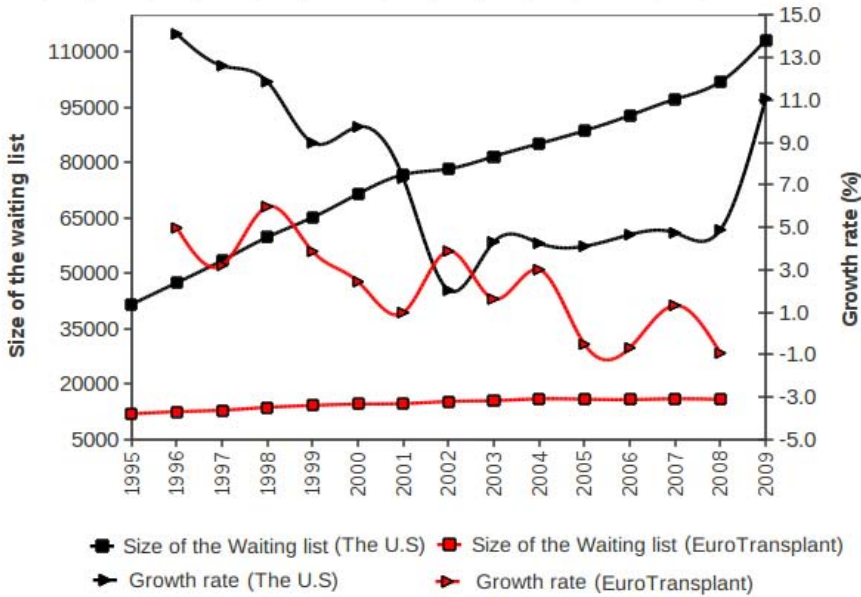
Despite these efforts to match the demand with the supply the number of patients on the waiting list has kept its steady rise and the supply of organs remained relatively flat causing an increasing gap. This led to an increase in the average waiting time for a transplantable organ. Consequently some patients died while waiting on the list and others experienced a significant loss or a permanent reduction in health. In the year 2003-2004, the median waiting

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time for a liver transplant in the US ranged from 6 to 642 days and the median time for a kidney transplant reached almost 2000 days.

Figure 1.1 shows the number and the growth rate of transplants performed in the US and the EuroTransplant area⁶. In both regions the number of transplants shows similar upward trends with a 15-year growth rate of 46 and 42 percent respectively in the US and the EuroTransplant area. However, the waiting list in the US grew tremendously by 172 percent from 1995 to 2009 while this figure was only 33 percent in the EuroTransplant area.

Figure 1.2.: The size of the waiting lists in the US and Europe, 1995-2009



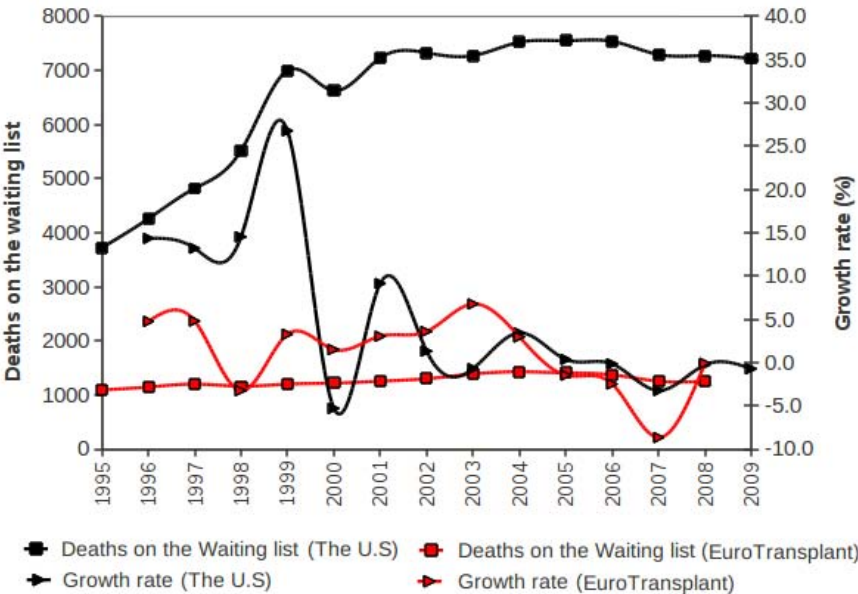
As of November 2010, there are over 117,000 patients in the US and over 40,000 patients in Europe waiting for a transplant. In the US, 32,000 patients have been added to the waiting list in the year 2009 and almost 7,000 patients have died due to organ failure while waiting on the list the same year. 94,000 patients died between 1995 and 2009 while waiting for a life-saving organ in the US only, representing a 94 percent increase in the waiting list deaths over the 15-year period⁷. In contrast deaths on the waiting list grew only 14 percent during

⁶The EuroTransplant area consists of Belgium, Croatia, Luxemburg, the Netherlands, Germany, Austria and Slovenia.

⁷This figure amounts to more than twice the number of terrorism fatalities in the entire world in the last

this period in the EuroTransplant area.

Figure 1.3.: The number of deaths on the backlog in the US and Europe, 1995-2009



1.4. Central Contribution

This research aims to propose policy prescriptions through supply-driven regulatory, legislative and institutional changes that would directly or indirectly help eliminate the organ shortage and the trafficking of human organs. Organ shortage not only concerns medical professionals but also economists, legal scholars, sociologists, bioethicists, philosophers, policy makers, bureaucrats, philanthropists and most importantly patients and their families. However the dimensions of the issue are countless, leaving some of the topics unaddressed. Although there are numerous factors leading to an ever-increasing gap between the supply of and the demand for human organs, this study almost exclusively focuses on governmental/policy problems related to the supply of human organs and does not investigate demand-related problems, demand-side remedies, managerial, organizational or consensual issues in the supply of organs. As far as the disciplinary dimensions of this research are concerned, this study strictly deals with

forty years which was only 35,000.

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the legal and the socio-economic issues in the supply of organs including but not limited to, the allocation of organs, monetary and non-monetary incentives, default rules, legislations and institutions. Under the aforementioned framework the central contribution of this monograph is to present an economic analysis of the legal and the policy-related aspects of organ procurement in order to alleviate the repercussions of persistent organ shortages that have been experienced throughout the world.

The research examines the legal and economic aspects of organ procurement in three complementary dimensions. The first two of these dimensions are concerned with deceased and living donor organ procurement systems that are either legislated and well-established or discussed at length without further action. The third dimension focuses on black markets and the trafficking in humans for the purposes of organ removal.

Chapter 2 reviews eleven deceased organ procurement policies that have been proposed in the literature. These are presumed and informed consent, mandated choice, conscription, reciprocal systems (opt-in, opt-out), free market, government monopsony, future delivery markets (opt-in, opt-out) and reimbursement schemes. Each policy is evaluated by invoking to an axiomatic approach which takes into account three important and detailed notions of policy evaluation: equity, efficiency and effectiveness. An axiomatic approach not only offers a systematic and complete treatment for policy evaluation but also allows exploring notions of fairness and justice which may be highly relevant in the assessment of social welfare. Furthermore by drawing upon a survey conducted in the city of Bursa, Turkey, chapter 2 attempts to broaden the literature by testing the crowding-out hypothesis in free markets and its impact on the market price and on the resulting number of transplants.

The chronic organ shortage has become a daunting health policy issue in Europe, the US and other western countries. In most of the European countries, deceased organ procurement is based on the principle of presumed consent on the anticipation that it could yield higher deceased donation rates. Following the success of the few, a great debate has emerged about whether the default rule itself could be responsible for higher deceased procurement rates. For this purpose Chapter 3 purports to advance the literature on the impact of presumed consent laws on deceased donation rates by examining the interactions between a presumed consent legal regime, role of the family and donor registry systems using an international dataset for 24 countries over a 14-year period. The chapter contributes to the existing empirical literature in two respects. First it is argued that the impact of presumed consent laws on deceased donations

depends on various institutional settings which have not been explicitly modeled previously. Second in a setting in which laws and institutions show no variance overtime, failure to control for the unobserved country heterogeneity will lead to misleading inference regarding the impact of presumed consent legislation. Thus instead of a FE model it is worthwhile to employ a three-stage error component estimator which controls for the unobserved country heterogeneity and still identifies the impact of presumed consent legislation on deceased donation rates.

Living donation differs significantly from deceased donation both in terms of the organs in question as well as in terms of the denouement of the donor. A decade ago market reforms or revising the allocation rather than the procurement was out of the scope of the debate because the former raised ethical issues and the latter raised equity concerns. As backlogs continued to grow faster than the number of transplantable organs, some scholars proposed minor compensation or a regulated market while others advocated that the current system of living donor organ procurement could be developed to its full potential by rectifying an efficient allocation of organs from living donors. These allocation mechanisms developed in an attempt to transplant formerly medically incompatible kidneys by exchanging donors. Chapter 4 reviews five living donor organ procurement policies in this respect, namely monopsony, reimbursement, PKE, NEAD chain and list donation, all of which have been implemented in several countries and proposes potentially effective solutions in order to increase the number of kidneys recovered from living donors.

It has been known that individuals willing to become living donors are exposed to serious financial and medical risks and that these risks may generate disincentives or barriers to donation. An increasing number of proposals emphasizes the need to introduce reimbursement for living donors for non-medical costs incurred throughout the process of donation. In the US, a number of states passed legislation that allows individuals to take paid leave of absence and/or to claim a \$10,000 tax deduction following organ or bone marrow donation. However, the impact of reimbursement legislation on living donation rates has not been studied extensively so far. By using a dataset from the US for 50 states and the District of Columbia over a 22-year period, chapter 5 aims to provide some preliminary empirical evidence on the extent to which reimbursement legislation is effective in increasing biological and unrelated living donation rates. Chapter 5 also aims to investigate the overall impact of an efficient organ allocation mechanism known as PKE on living donation rates and test the existence of two donor substitution effects.

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Chapter 6 is devoted to the legal and the economic aspects of organ trafficking. The first part examines the topology of illicit markets, the motivations behind the sale and the purchase of human organs. The second part discusses the legal instruments and the international standards set by the UN, the WHO and the COE. A comparative analysis of criminal provisions for thirty-eight countries suggests that despite organ trafficking being an international crime, legislations concerning such criminal activities are local with suboptimal sanctions and inadequate provisions of enforcement. This problem not only requires the identification of an optimal magnitude and mix of penalty that should be imposed on offenders but also necessitates the distinction between criminal agents and severe and otherwise punishable violations. The third part develops a simple model of law enforcement to address these issues.

The seventh and the final chapter summarizes the findings of the research, recommends supply-side policy prescriptions in order to help alleviate the persistent global organ shortage problem and discusses the future of organ procurement and the potential consequences of market reforms. Interested readers are advised to consult the appendices of this monograph for a detailed account of the laws governing deceased organ donation and procurement, the legislation related to reimbursement of living donors and the criminal provisions against the commercialization of human organs in selected countries.



A controversial organ donation ad by the French Association of Human Organ and Tissue Donation (ADOT)

2. Deceased Organ Procurement Policies

“Dead bodies do not speak. But the relatives can be quite expressive.” Michele Goodwin

2.1. An Axiomatic Approach

Various incentives have been proposed to increase the supply of transplantable human organs. These policy proposals diverge from one another primarily in terms of the source the organs are extracted from. The majority of patients waiting for a transplant in Europe as well as in the US needs kidneys which can be procured from brain-dead and living donors. However for other solid organs such as hearts, lungs, intestines and pancreas, a deceased donor is currently the only source.

This chapter develops a comprehensive and axiomatic approach to evaluate the existing and alternative deceased organ procurement policies in detail given widely debated concerns and constraints on procurement. An axiomatic approach for policy evaluation classifies and studies the properties of deceased organ procurement policies that capture a certain number of normative and positive notions of what policy evaluation entails. The approach sets out axioms or properties an organ procurement policy may or may not satisfy and determines the extent to which a policy is more preferable than others. Although an axiomatic approach may not be a welfarist policy assessment for it introduces non-individualistic elements of social welfare, it has few merits to mention in the case of organ procurement. First an axiomatic approach not only offers a systematic and complete treatment for policy evaluation but also allows exploring the notions of fairness and justice which may be highly relevant in the assessment of social welfare¹. In the delicate and controversial area of organ procurement, individuals, governments and policymakers may derive higher utility if a policy takes into account the notions of justice and fairness which may also constrain individuals who cannot be trusted to use their discretion to maximize social welfare (Kaplow and Shavell, 2001). Second in the face of widely-enforced prohibition for explicit payment, it becomes inestimable to evaluate monetary policies with supporting evidence from the pilot studies and experiments which are also prohibited by law. In the lack of substantive evidence either through experiments or through experience, it may be useful to invoke an axiomatic approach.

The following axioms are derived from the concepts conventionally used in health care and some of them are modified in order to capture the peculiarities of organ procurement.

¹Kaplow and Shavell (2001) shows that any non-welfarist approach to policy assessment may sometimes require the adoption of a policy that makes everyone worse-off therefore violates the Pareto principle.

Axiom 1: Equity

An OPP is *equitable* if the policy:

- (i) does not discriminate based on gender, ethnicity, race, religion, social class or other minorities (*non-discrimination*)²,
- (ii) does not force a party to behave involuntarily through action or inaction provided that a choice has been given (*non-coercion*),
- (iii) respects the will of the patient (*autonomy*),
- (iv) treats unequals (i.e. donors and non-donors) differently (*vertical equity*),
- (v) treats equals (i.e. donors or non-donors) similarly and gives equal transplant access for equal need (*horizontal equity*)³.

Definition: Pareto Superiority and Optimality

Suppose that there are two policies that result in states S_A and S_B . Let U_i denote the utility of agent i . A state S_A is called *Pareto superior* to S_B if $U_i(S_A) \geq U_i(S_B) \forall i$. This means that the state S_A increases at least one person's utility without adversely affecting the utility of others. If S_A is Pareto superior to S_B , then S_B is Pareto inferior to S_A . A state is called *Pareto optimal* if no further distributions are capable of enhancing everyone's welfare without making someone else worse off. Thus Pareto optimal outcomes has no outcomes Pareto superior to them (Coleman, 2002; Feldman and Serrano, 2006)⁴.

Axiom 2: Efficiency

An OPP is *efficient* if:

- (i) it is *Pareto optimal*⁵;

² A policy may discriminate based on medical criteria and may not adhere to an individual's notions of fairness. However medical discrimination is imperative in healthcare and therefore it is an irrelevant criterion.

³ See Mooney and McIntyre (2007).

⁴ According to Pareto (1906) "... the members of a collectivity enjoy maximum *ophelimity* (economic satisfaction) in a certain position when it is impossible to find a way of moving from that position ... in such a manner that the *ophelimity* enjoyed by each of the individuals ... increases or decreases. That is to say, any small displacement in departing from that position necessarily has the effect of increasing the *ophelimity* which certain individuals enjoy, and decreasing that which others enjoy, of being agreeable to some, and disagreeable to others." (Pareto, 1906, p.261). Allais (1943) states that an allocation is Pareto optimal if there is an absence of a set of mutually beneficial (non-harmful) exchanges between individuals which he calls "distributable surplus".

⁵ Conventionally in law and economics the Kaldor-Hick criterion is used to assess the efficiency of a policy or a legal rule. However, Kaldor-Hicks criterion is intransitive and lenient whereas Pareto criterion is transitive and strict (Coleman, 2003). Under Pareto criterion, if policy A is Pareto superior to policy B and policy B

2. Deceased Organ Procurement Policies

(ii) the allocation rule, by which organs are distributed, enables higher donor-recipient tissue compatibility or match relative to another allocation rule (distributionally efficient)⁶.

Axiom 3: Cost-Effectiveness

An OPP is cost-effective relative to another OPP if the organ procurement is achieved at a lower cost given the number of transplants is fixed; or if an OPP yields a higher number of transplants given the cost of transplant is fixed⁷.

The following sections of this chapter review five principal deceased OPPs that have been either implemented or proposed and attempt to evaluate them based on the aforementioned criteria. These policies can be broadly classified as OPPs based on *defaults*, *compulsion*, *reciprocity*, *contemporaneous market* and *future delivery market*.

2.2. Policies based on common pool allocation

Transplantable human cadaver organs are a typical example of privately owned common-pool resource characterized by rivalry and excludability. Due to their excludability, access to such privately owned common-pool resources can either be available to everybody through compulsion or default, or to a group of users based on their willingness to contribute to the common pool.

is Pareto superior to policy C, then policy A is also Pareto superior to policy C. As for the Kaldor-Hicks efficiency, both policy A and policy C can be Kaldor-Hicks efficient to one another (Scitovsky, 1941). The discussion of Pareto efficiency of OPPs is reserved for Section 2.4.

⁶An OPP is characterized by the following three mutually exclusive rules in organ allocation. Organs can be allocated according to medical criteria; organs can be allocated based on the ability to pay; or organs can be allocated on a priority basis defined by non-medical or non-financial criteria. Distributional efficiency is a relative notion; therefore policy A may be distributionally more efficient than policy B but distributionally less efficient than policy C. A change from one allocation rule to another does not have to actually yield higher compatibility; for our purposes it is sufficient that such possibility exists.

⁷Cost-effectiveness analysis compares the relative costs and outcomes of two policies. Let C_A and C_B denote the costs and Q_A and Q_B denote the outcomes of two policies, A and B. A switch from policy A to policy B is assessed by the cost-effectiveness ratio: $(C_B - C_A) / (Q_B - Q_A)$. In this chapter, we provide a descriptive and theoretical evaluation of cost-effectiveness rather than an empirical and technical one which requires measurement. Policy A may be more cost-effective than policy B but less cost-effective than policy C; for our purposes it is sufficient to show that policy A is more or less cost-effective than policy B without referring to the extent of this effectiveness.

2.2.1. Default Rules (Presumed vs. Informed Consent)

Default rules are constructed to affect the behavior and they can affect the choice in three ways. First, default rule implies a suggestion or a recommended action for the decision maker. In the context of organ procurement this recommended action might be based on the severity of organ shortage and what the majority of the society thinks of organ donation. Second, decision making is costly, disconcerting and stressful while remaining at the default is costless and easy. Acting in a way so as to not remain at the default usually implies the contemplation of one's own death and what would happen to their bodies after death, which may be unpleasant. Opting out of the default rule also implies that the individual bears some physical costs (i.e. time and effort) in a way similar to shoe-leather costs. Third, changes in the default rules involve a trade-off between a satisfaction and a loss. Becoming a donor yields a satisfaction and induces a contemplation that their organs might benefit those who need them. Becoming a donor also drives individuals to think that their body will no longer be intact for burial (Johnson and Goldstein, 2004).

In criminal law the *presumption of innocence* states that one is considered innocent unless proven guilty. By setting the default rule to “innocence”, the burden of proof is shifted onto prosecution which has to collect evidence to confute innocence. In the medical literature concerning emergency room procedures, doctors attempt to save the patient's life unless an advance directive of DNR by the (formerly competent) patient has been given. Thus it is assumed that people would want to be saved in case of medical emergency. By setting the default rule to “resuscitation”, the burden of proof is shifted onto those who do not want their lives to be saved. In the context of organ donation two types of default rules loom, known as presumed and informed consent and the way default rules are constructed changes the choice thus the number of individuals onto whom the burden of proof is shifted.

In presumed consent or opt-out regimes, a brain-dead individual whose organs are suitable for transplantation is considered to be a donor unless she premortem took an affirmative action to revoke it. Therefore it is presumed that the deceased donor does not have any objection to have her organs removed unless she stated a preference to not donate by registering as a non-donor, by holding a signed organ retainer card, by checking a box on driver's licence or by objecting orally in front of a civil servant (Jacob, 2006). Countries, in which the default rule is to donate, assign property rights of human organs to the public domain (Tietzel, 2001).

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Furthermore, an opt-out rule implicitly assumes that there is a social inclination towards organ donation but people cannot come forward with an explicit donation decision due to a number of psychological reasons and subjective judgments such as the fear to contemplate one's death, the lack of trust and wrongful determination of death. By presuming consent the burden of proof is shifted onto those who strictly dissent the idea of donation.

On the contrary, in informed consent or opt-in regime an individual is required to take an explicit affirmative action by registering herself to the national registry of donors or by holding a donor card. Therefore an individual who is not registered in the system is assumed to not donate her organs upon demise. Countries, in which the default rule is not donate, implicitly assume that there is a social reluctance towards organ donation.

Table 2.1.: Defaults and types of errors

Realization	Intention	
	Donor	Non-donor
Donor	Correct	mistaken removal, wrongful
Non-donor	mistaken non-removal, wasteful	Correct

Table 2.1 displays the types of errors that might be committed when the donor intention and the donor realization do not match. Irrespective of the default rule and all else equal an OPP will always respect patient autonomy whenever patient intention is honored. Accordingly, both the removal of a donor organ and the non-removal of a non-donor organ are correct practices respecting patient autonomy. Off these conditions two types of errors prevail. First, the organs of a patient who is a non-donor might be removed by mistake, called *mistaken removal* or *erroneous donation* (Gill, 2004; Orentlicher, 2008). In this case the procurement is said to be wrongful because the removal is against the patient's will and it invades one's body. The second type of error occurs when the hospital fails to remove the organs of a patient who is a donor, called *mistaken non-removal* or *erroneous non-donation* (Gill, 2004; Orentlicher, 2008). In this case the procurement is said to be wasteful because at least one transplant patient could have been saved if the donor organs had been removed. Mistaken non-removals are also socially more costly than mistaken removals because a wasteful procurement indicates that the patients whose lives could have been saved will continue to receive cost-ineffective treatment instead of receiving transplants.

Proponents of presumed consent regime contend that mistaken-removals and mistaken non-

removals are equally worse therefore one should base the default rule so as to produce the least number of errors (Gill, 2004); or equivalently so as to maximize the number of people whose wishes are respected (Orentlicher, 2008).

On the other hand, opponents of presumed consent argue that mistaken removals and mistaken non-removals are not equivalent in value and the default rule affects the probability of error. When the prosecution mistakenly convicts an innocent person or mistakenly acquits a guilty person, both legal mistakes are deemed to be wrongful however mistaken convictions are considered to be worse than mistaken acquittals. Similarly, mistaken removals are considered to be worse than mistaken non-removals because in the former the body of a deceased person is invaded but in the latter there is only a forgone transplant even though neither mistakes respect patient autonomy (Gill, 2004).

Under a presumed consent default rule there will be more mistaken removals than mistaken non-removals. Thus those who remain at the default are more likely to be subject to wrongful procurement. On the other hand under an informed consent rule there will be more mistaken non-removals than mistaken removals. Thus the organs of those who remain at the default are more likely to be wasted. If people tend to be loss averse, then the discomfort of the idea of having one's organs removed mistakenly may be greater than the discomfort of the idea of mistakenly not removing a donor's organs (Orentlicher, 2008). Therefore loss aversion makes mistaken removals more serious than mistaken non-removals.

The lack of decision-making capacity of brain-injured patients makes organ donation a special case that creates an ambiguity over the assignment of property rights of the body of the deceased. Even if the brain-injured patient declared an advance directive, the final decision is made by a surrogate. In legal contexts the decisive criteria of the surrogate when the patient is no longer competent is largely determined by the substituted judgment standard. This approach states that the duty of the surrogate, with or without the aid of an advance directive by the formerly competent patient, is to determine given the best available knowledge what the patient would have wanted if she had the decision-making capacity (Brostrom, 2007). Substituted judgment standard therefore implicitly indicates that the surrogate decision-maker should be the person who has the most accurate information about the wishes of the patient, which follows a chain of priority from spouse to parent to kin. Although an advance directive made by registering as a donor or by holding a donor card is almost never a sufficient reason for procurement, it signals the donor preferences to the next-of-kin.

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Both presumed and informed consent regimes are non-discriminatory against gender, ethnicity, race or social class if and only if the public is well informed about the law and potential organ retainers are informed on how to register an objection under the former legislative default. Jacob (2006) argues that in countries where opt-out must be indicated on a driver's licence or identity card, it is not possible for a homeless person to express an opposition against donation. When the opposition must be given in writing, less-educated, illiterate persons or people with vision or hearing impairment face similar obstacles (Verheijde et al., 2009). In countries where the default rule is to not donate, vulnerable populations also face similar barriers for donation. However, loss aversion renders not being able to oppose donation worse than not being able to consent to donation. Thus Jacob (2006) asserts that an informed consent policy better protects vulnerable populations and suggests that the default rule should be chosen based on the merits of contract law in such a way that it is against the wishes of the stronger party in donation decisions. She contends that the burden of proof should be placed upon physicians to obtain consent for organ donation.

Critics argue that presumed consent legislation is constitutionally questionable because it violates persons' wishes about what should happen to their bodies after demise thus it undermines patient autonomy (Veatch and Pitt, 1995). On the other hand, proponents argue that individuals are given the opportunity to opt-out so that patient autonomy is not violated (Jensen, 2000). It is acknowledged that the issue of patient autonomy is not so easily dismissible given the interference of the family in the decision-making. Neither presumed nor informed consent regimes may respect patient autonomy if families are allowed to veto donation because there is a probability that the wish of an individual to become a donor or non-donor might be overridden by the family⁸. The probability of family veto could be reduced, if not completely eliminated, by implementing other strategies that send prodonation signals to the next-of-kin. These signaling strategies consist of establishing a donor registry, signing a donor card or implementing donor awareness programs. The extent to which these legislative defaults diverge from one another with respect to patient autonomy is determined by the actual number of family veto cases.

Both informed and presumed consent regimes are non-coercive and horizontally equitable because no one is forced given they are informed about the policy. The reason is that the organs

⁸Fevrier and Gay (2005) contends that when the family has the same preferences as the donor, both regimes respect the will of the individual. However when the family has different preferences, neither informed nor presumed consent respects personal autonomy.

of those who objected to donation are generally not removed in the latter regime and the organs of those who consented to donation are generally removed in the former regime. Whether the default rule complies with the concept of horizontal equity is bound to disagreements for two reasons. First, the probability of committing a legal mistake under both regimes is non-zero. Second, the opinion of the family may change the outcome under both regimes. On the other hand, a presumed consent regime violates vertical equity by setting the default rule to opt-out so that those who did not object and those who did not object yet did not intend to be a donor are treated the same. In contrast, in an informed consent regime only those who take an action by registering are assumed to donate. Therefore an informed consent legislation is vertically equitable⁹. Under presumed and informed consent regimes the recovered organs are distributed based on medical compatibility and need.

A presumed consent regime may be productively more or less efficient than an informed consent regime depending on the relative costs of procurement. These costs largely depend on the societal tendency towards donation, the rate of family refusal and the registry maintenance costs. Intuitively, if the society favors donation in general and there is a single registry but also the family consent rate is high, one expects the presumed consent regime to be more productively efficient than an informed consent regime. The reason is that by presuming consent the costs of establishing and maintaining a donor registry are saved. A high family consent rate also implies relatively low costs of physician training for requesting consent. On the other hand if the society disfavors donation and there is a combined registry but also the family consent rate is low, then an informed consent may be productively more efficient than a presumed consent.

Recently, there is a growing empirical studies literature that focuses on the effectiveness of presumed and informed consent regimes on deceased donation rates (Johnson and Goldstein, 2004; Abadie and Gay, 2006; Neto et al., 2007). These studies show that presumed consent regime exhibits higher donation rates compared to informed consent regimes after controlling for a large set of potential factors that might affect donation rates, thus a presumed consent

⁹It could be argued that an informed consent regime may violate vertical equity for if someone is willing to donate but did not opt-in, he/she would be treated the same as a deliberate non-donor. However, it is the reasons to not opt-in that affect whether the legislative default is responsible for the inequity (if any) because it then determines what is the source of such inequitable outcome. As much as the burden of proof is on those who strictly dissent donation in a presumed consent regime and the default is “no action”, many individuals do not or cannot opt-out, not because they choose not to donate but because of reasons exacerbated or induced by presuming will to donate. On the contrary those reasons do not hold true for and are not induced by the informed consent regime per se.

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regime could be effective in eliminating shortages¹⁰.

2.2.2. Mandated Choice

Mandated choice requires every individual to state a preference by urging them to register as either donors or non-donors. According to the AMA (1994), the reluctance to contemplate one's own death could be overcome by requiring individuals to render a decision regarding post-mortem donation. Thus those who strongly feel the reluctance to confront their death will be urged to do so under a mandated choice policy.

Proponents of mandated choice claim that it is productively efficient due to low administrative costs of registering oneself. The registration process could be implemented by asking individuals to state a preference at the time of renewal of driving licence, population census or any other task mandated by the state in a cost and time-effective manner.

Currently most of the countries that enacted presumed or informed consent legislation seek the consent of the family when the decedent's own preferences are unknown. Physicians find it extremely difficult to seek next-of-kin permission and families who are in mourning over the death of their loved ones often find the timing of donation requests inappropriate. Accordingly attempts to obtain permission to recover the organs of the brain-dead patient fail. By requiring individuals to state preference, the pressure placed on families of dying patients and on physicians who are responsible of brain-injured patients could be relieved.

Once a choice has been made about donation, both the hospital and the family has to respect the wishes of the individual therefore patient autonomy is respected. In the absence of a default rule and family involvement, organs of those who oppose donation remain intact and organ of those of who wish to be donors are removed therefore mandated choice also satisfies horizontal and vertical equity. Although a mandated choice policy is the most constitutionally and morally acceptable system because it respects personal autonomy it exhibits two significant flaws.

First, a mandated choice policy may produce a lower number of donations than otherwise. If a substantial proportion of individuals choose not to donate, then the system has no option but to respect the stated preference of the individual upon death since families are not allowed to be persuaded or to express opinion (Hansmann, 1989). Mandated choice has not been implemented nationwide so far simply because there is a tremendous fear among policy makers

¹⁰See also Chapter 3.

that most of the individuals whose preferences were unknown might register as non-donors and the donation rates might dramatically fall. Preliminary findings in the states of Virginia and Texas showed that a mandated choice policy could result in a lower number of donations. In the state of Virginia, more than 24 percent of the residents refused to state a preference whereas in Texas 80 percent of the people registered as non-donors following the implementation of a mandated choice policy and the legislation was repealed afterwards (Siminoff and Mercer, 2001; Klassen and Klassen, 1996). The evidence shows that a mandated choice policy is unlikely to be effective.

Second, mandated choice is non-discriminatory because it requires every individual to make a choice irrespective of gender, ethnicity, race, religious beliefs or social class. However it forces individuals to make a choice. Opponents argue that people cannot be forced to make a choice. At the time of democratic elections voters are given the right to cast a blank or invalid vote (perhaps largely due to the secrecy of the ballot) even though an otherwise valid vote is preferable. On the other hand Chouhan and Draper (2003) justifies forcing individuals to make a choice (i.e. legal coercion) about organ donation because it is a matter of life and death that many lives depend upon in the same way forcing tax-payers to cast a valid vote because people should decide how they want to be governed in a democracy. It is argued that a mandated choice regime cannot be deemed coercive because individuals are given the choice to donate or to retain their organs after death.

As far as the cost-effectiveness is concerned, mandated choice and default rule regimes primarily differ in their registry costs. Most of the presumed consent regimes establish only non-donor registries to record those who object to organ removal, albeit opt-out regimes with combined registries do exist. Similarly, most of the informed consent regimes establish only donor registries to record those who would like to have their organs removed upon death, albeit opt-in regimes with combined registries do exist. However in a mandated choice regime, it is imperative to establish both registries in order to record both consent and objections. Therefore mandated choice is more likely to be equally cost-effective at best and less cost-effective than the default rules at worst. Under a mandated choice policy, the recovered organs will be distributed as it is today, based on medical compatibility and need.

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2.2.3. Required Recovery

In a required recovery or conscription regime, every individual with suitable organs for transplantation automatically becomes a donor upon demise and no one is allowed to object the removal of the deceased organs including the donor and her family. Thus, a required recovery transfers ownership and autonomy of one's own body from the individual to the state (Jensen, 2000). Required recovery has long been considered a radical paternalistic policy and no attention has been given to this proposal by policy makers whose reason, according to Spital (2003), is the priority given to personal autonomy of patients over the aim of maximizing the recovery of organs from brain-dead individuals. An examination of this policy in depth reveals that it has many advantages over the existing procurement policies.

The major advantage of a required recovery regime is the ability to increase the pool of organs substantially. Currently, about half of all the suitable organs for transplantation cannot be recovered because of family refusal or the explicit premortem objection of the deceased against donation. Under this regime, since neither consent of the families nor the premortem objections of deceased individuals are taken into account, the number of recovered organs are expected to increase. Spital and Erin (2002) and Spital (2003) argue that this system is the most efficient and effective among all alternatives. A second advantage is that it is simpler and less costly than other procurement policies because there is no need to set up registries whose establishment and maintenance cost millions of dollars at the outset, no need to train physicians in order to discuss donation with the next-of-kin, no need to spend millions of dollars for organ donation awareness programs and no need to develop regulatory measures to monitor market abuses under a system with monetary incentives (Spital and Erin, 2002). A third advantage is that it would eliminate the stress of the decision-making of the next-of-kin and the pressure exerted on physicians and staff members who approach the grieving families to obtain consent. This often results in delays in organ recovery that compromise the viability of the organs of the deceased. Some scholars also believe that it is an honest policy on the contrary to a presumed consent regime which, by making the default rule an "opt-out", conscripts in disguise (Veatch, 1991). A fourth advantage of a required recovery regime according to Spital and Erin (2002) and Spital and Taylor (2007) is that a conscription policy satisfies the principle of distributive justice by sharing the benefits and burdens.

A required recovery regime satisfies horizontal equity because it treats all proponents of do-

nation similarly by forcefully procuring their organs and all opponents similarly by procuring against their will. However it violates vertical equity due to the exact same reasons by procuring organs of all proponents and opponents. A conscription regime is also non-discriminatory because the organs of every medically suitable brain-dead individual are removed irrespective of gender, ethnicity, race, religion or social class.

The major objection to required recovery is that it fails to respect personal autonomy, one of the fundamental principles of bioethics. However proponents argue that it is not possible to talk about the personal autonomy of a dead person. If a dead person does not have an autonomy over his or her body then we should also abolish canons of inheritance altogether because the will that has been left while the testator was alive should not be honored after his death by the same reasoning. But we do not abolish these canons because we find outrageous to not honor a person's wish to bequeath. Once the individual expressly states that she does not want her organs to be recovered after her death such wish should be honored upon demise. The tension that arises in the discussion of a required recovery regime as in any other common pool allocation system is induced by the failure to identify the owner of the property rights of the organs and the autonomy of the individual.

Under a required recovery regime the recovered organs will be distributed as it is today, based on medical compatibility and need.

Glannon (2008) argues that in a regime in which consent either from the individual while alive or from the next-of-kin after demise is absent or ignored, physicians duty of care of brain-injured patients would be compromised and their life might be prematurely terminated at the interest of organ recipients waiting for life-saving transplants. On the contrary to those who advocate that delays in the recovery of organs would be eliminated by conscription, he argues that families under this policy knowing that they are not allowed to express opinion would be much more reluctant to remove life-support of brain-injured patients and delay this process thereby compromise the viability of the organs for transplant. Therefore the resistance of families against a conscription regime could result in a lower number of organs available for transplant than under regimes in which family consent is sought.

Perhaps the major impediment to the implementation of a required recovery policy is public outrage and political and legal opposition (Kaserman and Barnett, 2002). According to the results of a survey of 1,014 interviewed adults in the US by Spital (2005), 70 percent opposed conscription of deceased organs for transplantation. Despite its great public fiscal advantages

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and potential effectiveness, a required recovery regime violates patient autonomy by removing organs against individuals' unarticulated will, engender public resistance and violates constitutional rights. Therefore, this coercive nature violates equity albeit it could be an effective policy.

2.2.4. Reciprocal Systems

Reciprocal system proposals have emerged as a solution to the current procurement systems which facilitate free riding by decoupling the decisions to give and to take organs. These systems help to enforce a donor's wish against family veto and to cease seeking next-of-kin consent. The aim is to use an individual's intrinsic motivation to save his or her life in order to save the lives of others (Calandrillo, 2004). Briefly, an individual's action or inaction that allows the recovery of her organs upon death entitles the individual to a priority transplant if she ever needs it. By construction, a reciprocal system exploits the statistical difference between the lifetime probability of being suitable for organ donation and the lifetime probability of experiencing organ failure. By this token, the benefits of allowing post-mortem recovery of organs of an individual in exchange for a priority transplant exceeds the costs because the probability of being medically suitable for post-mortem organ donation is less than the probability of needing a transplant (Kolber, 2003).

This system, being one of the very few that deals with both the procurement and the allocation of deceased organs, was first proposed independently by Vining and Schwindt (1988) and Kleinman and Lowy (1989) and later discussed by Breyer and Kliemt (1995), Schwindt and Vining (1998), Tietzel (2001), Tabarrok (2002), Kolber (2003), Nadel and Nadel (2005), Bramstedt (2006) and recently Robertson (2007) and Breyer and Kliemt (2007).

2.2.4.1. Informed (opt-in) Reciprocity

The initial proposition of a mutual insurance pool by Vining and Schwindt (1988) was specifically designed for infants and children. Later Schwindt and Vining (1998) has expanded the idea to include adults. Accordingly an individual would receive priority future delivery of a transplant, should the individual need it, if and only if she agrees to have her organs available to other members of the insurance pool if she dies under circumstances that would render her organs available for transplant. Thus commitment to donate one's organs upon demise is the

insurance premium in this system.

A second version of the mutual insurance pool envisages that all available organs would be allocated to members of the pool on a priority basis by the government. Schwindt and Vining (1998) argues that a government-involved mutual insurance pool is preferable due to the fact that a high degree of trust is required for the system to function properly whose concession to private profit-making firms would aggravate the problems of opportunism. Alternatively one could think of multiple insurance pools separated by exclusive rights over geographical areas by which competition is hindered. However, the attainment of the minimum efficient scale remains to be solved. As noted by Schwindt and Vining (1998), Tietzel (2001) and Kolber (2003), it may take a long time until local or regional pools can attract enough members to implement a priority incentive. Thus a priority incentive scheme implemented at a national level by the government sponsorship is more likely to maintain the minimum efficient network scale in order to ensure an effective pool.

A variation of this non-market solution is proposed by Tabarrok (2002) in which the basic mechanism is a “no-give, no-take plan”. The incentive is a priority future delivery of a transplant, should the individual need it, if and only if she agrees to donate her organs. Thus the potential donor signs an organ donation card and registers herself to a common pool of donated organs. Those who agreed to donate their organs will have priority access to a transplant in the future over those who did not agree to donate. Proponents of this system argue that human organs should be allocated first to individuals who are willing to sacrifice to save others’ lives. Those who are willing to get a transplant but not willing to donate when asked, referred to as free riders, are punished by the system.

In order to establish a well-functioning priority incentive scheme, first a national registry should be maintained to record donors who wish to receive priority transplant if they need one day. A national registry also minimizes the adverse selection of donors. Absent of a registry, those who need a transplant and accordingly cannot donate any organ could declare willingness to donate in order to claim priority. Similarly, those who are more likely to experience organ failure will have a greater incentive to join the pool and low risk individuals will not insure. This adverse selection problem, as taken into consideration by Schwindt and Vining (1998), could be circumvented by requiring prospective members of the pool to submit their medical history so that their eligibility for a priority access could be assessed based on the entailed risks. However, a medical examination of prospective members will automatically exclude many

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individuals who were born with diseases that render them ineligible for donation and those who are already on the transplant waiting list unless they registered before their ineligibility was discovered. Instead, Kolber (2003) suggests that the intent to donate by registering could be limited to those who are over the age of eighteen, regardless of their health status or eligibility to donate. After the first registration, a waiting period of one or two years must be borne in order to gain priority access. A second indispensable aspect of an informed reciprocal system is to disallow family veto and to respect the premortem decision of the individual. If a registered donor is granted priority but never had to use this priority and died under circumstances that would render his or her organs available for transplant, allowing family veto would not only result in failure to recover the organs of the registrant but also impinge upon the will of the donor. Therefore, the next-of-kin should not be allowed to revert or rescind the registrant's donor status after death.

At one extreme, being a registered donor for priority could be the only tie-breaker between two equally eligible transplant patients (Kolber, 2003). At the other extreme, only those who identify themselves as potential donors could be eligible to receive a transplant (Jarvis, 1995). Accordingly those who refuse to donate will not receive a transplant until every registered donor in need for a transplant received one. Kolber (2003) suggests that the degree of priority given to registered donors should be chosen such that it yields a Pareto superior distribution that lowers the expected waiting time for an organ for everyone including those who are not registered.

Offering priority against the risks of becoming a recipient in the future appears to be discriminatory. However, Schwindt and Vining (1998) argue that non-members would also benefit from the pool's existence if the government mandates that organs of non-members are first offered to pool members. The authors further argue that this would create additional incentives for non-members to join the pool and raise the total number of organs available. Further, the incentive scheme offered by informed reciprocity discriminates against certain groups who cannot donate because of religious, cultural or medical reasons. Generally, the former group of individuals are also against transplantation on the same grounds therefore discrimination against these groups should not be a problem (Nadel and Nadel, 2005). According to Bramstedt (2006) those who cannot donate due to religious or cultural reasons should be regarded as having a "special value" and should not be subject to the rules of a reciprocal system. On the other hand the latter group of individuals whose medical condition, such as HIV or Hepatitis

C, denies them to enter into a reciprocal system could be allowed to receive a future priority transplant if they agree to commit to donate their body for medical research (Nadel and Nadel, 2005).

According to Byrne and Thompson (2001), proposals granting rewards (especially financial rewards) to registered donors are time inconsistent. If allowed, an individual may rescind her donor status after being registered as a donor and having undergone a priority transplant given that doing so raises her utility. If a pool member dies unexpectedly, then she does not have an opportunity to rescind her donor status. On the other hand if a pool member is terminally ill she may leave the insurance pool without cost.

A mutual insurance pool ignores the possibility of a better match between a member and a non-member by committing to donate the organs of a member of the pool first to another member. Due to this intra-pool priority informed reciprocity is distributionally less efficient than any other policy based on medical need or ability to pay because another distribution can be found such that a better tissue match could be achieved outside of the pool by searching non-pool members for medical compatibility.

Tietzel (2001) argues that dissipation of rent will not take place in a reciprocal system as opposed to other common pool allocation systems and the number of transplants will not be any lower than systems based on monetary incentives or market solutions. On the other hand Ravelingien and Krom (2005) argues that an increasing number of pool members decreases the marginal benefit of joining the pool, suggesting that a reciprocal system may not be effective¹¹.

Although reciprocal systems are non-coercive because every individual is given the choice to become a pool member, the autonomy will be assured only if the policy disallows family veto so that the wishes of the pool member are respected. If the family is allowed to veto the wishes of the pool member, particularly after having undergone a priority transplant, this situation will lead to problems of free riding and failure to recover the organs of pool members.

A reciprocal system *prima facie* violates horizontal equity by violating the principle of *equal access for equal need*. Patients already signed up on the waiting list for a transplant will no longer access one based on need because the pool members will override the existing organ allocation criteria. However, proponents argue that informed reciprocity satisfies vertical equity because those who commit to donate their organs upon death and those who do not cannot

¹¹ A laboratory experiment conducted by Kessler and Roth (2010) shows that an organ allocation policy giving priority for transplant has a significant positive impact on registration.

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be regarded as equals therefore should not be treated equally.

The mutual insurance pool has been implemented in 2002 by *LifeSharers*, a non-profit organization operating in the US¹². The membership is free and open to everyone regardless of race, color, religion, sex, age, health or economic status. The organs of *LifeSharers* members are offered first to other *LifeSharers* members before being offered to non-members. If a suitable match cannot be found among members, the organs are offered to non-members. *LifeSharers* argues that this priority is not absolute and that the organs could be allocated to non-members directly if a non-member is a better match for the organ and less sick than a *LifeSharers* member. *LifeSharers* members do not qualify for first access to organs from other *LifeSharers* members until they have been a member for 6 months. This waiting period encourages people to join while they are still healthy and discourages people from waiting to join only when they find out they need an organ. By November 30, 2005, there were about 3,500 members of which 22 were listed on the UNOS waiting list. As of October 31, 2010, *LifeSharers* has 14,246 members of which 102 are on the national waiting list. Of these, 89 have qualified for preferred access to the organs of other *LifeSharers* members and no member has died so far in circumstances that would have permitted recovery of organs. UNOS did not challenge the legality of *LifeSharers* but also declined to offer support. Therefore it remains unknown whether UNOS and its associated OPOs will cooperate if any *LifeSharers* member becomes an organ donor (Kolber, 2003). Nine years of experience with *LifeSharers* indicates that a reciprocal system is unlikely to be effective possibly due to the failure to establish the minimum efficient network scale.

A similar proposal is scheduled to come into effect in 2010 in Israel. This bill provides a priority in the allocation of organs for transplantation based on giving points to those who sign the organ donor card, including the transplant candidates whose first-degree relatives have signed their organ donor cards or were organ donors (Lavee et al., 2009).

According to Kolber (2003), reciprocal systems as opposed to monetary incentives which are strictly prohibited by law, do not require legislative action in order to be implemented. In most of the western countries with the exception of the US, Australia and Singapore, organ transplant acts prohibit the commercialization of human organs without explicitly referring to intrinsic motivations in the exchange of human organs. In the US where the NOTA does not only restrict the exchange of human organs to monetary transactions, it makes it illegal

¹² <http://www.lifesharers.org>

to “knowingly acquire, receive or otherwise transfer any human organ for *valuable consideration*”¹³. Kolber (2003) argues that registration for a priority transplant cannot be considered a valuable consideration in the NOTA context.

First, NOTA was passed in response to commercialization of human organs. Therefore NOTA does not prohibit all transfers of organs in exchange for consideration (Mahoney, 2009). Second, by registering, the individual agrees to donate his or her organs upon death for a possible priority transplant while alive. The right for a priority may or may not be used by the individual while alive because it depends on the probability of needing a transplant. Therefore, the individual only submits to a mere possibility for such a priority transplant and his or her organs are not exchanged or promised to be exchanged for something of value. Third, at the time of death, the organs of the deceased are transferred to a common pool to be transplanted to the most suitable patient and the individual whose organs are transferred cannot receive a consideration because he or she is dead and her organs do not value anything to her. Second, the registrant is allowed to change his or her mind at any time until death. Thus, it remains unclear whether the registrant has made any legally enforceable agreement to be deemed a valuable consideration. The legality of priority incentive schemes could be viewed similarly for Australia and Singapore where the law prohibits entering into a contract or agreement for valuable consideration.

2.2.4.2. Presumed (opt-out) Reciprocity

The idea of presumed reciprocity is proposed by Breyer and Kliemt (2007) and Robertson (2007). Under this rule the organ procurement is governed by the presumed consent rule (i.e. individuals are assumed to be willing to donate unless they express otherwise) but those who explicitly oppose donation by registering themselves as non-donors will not have a priority access for a transplant should they need in the future. By this token presumed reciprocity is easier to establish because those who remain silent regarding donation (i.e. those whose will to donate is presumed) will be given priority for a transplant.

A presumed consent rule coupled with a reciprocal system provides double disincentive for

¹³A consideration in the common law of contracts is the price one pays for another's promise which can take a number of forms: money, property, work, performance, other services, a promise, the doing of an act or abstaining from doing an act. A valuable consideration refers to a consideration, something of value, that is either a detriment incurred by the person making the promise or a benefit received by the other person, sufficient to sustain a legally enforceable agreement.

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those who wish to keep their organs. The first disincentive is that one has to bear the cost of registering oneself if one likes to retain her organs. These costs largely consist of psychological costs. The second disincentive is that once registered as a non-donor the individual is denied priority access for a transplant. Because of this double disincentive, an OPP based on presumed reciprocity is very likely to be self-destructive. If those who remain silent regarding donation are prioritized assuming there are contemplation costs for non-donors, then an overwhelming majority of the population will not bother to register but only those who strongly oppose the idea of donation possibly on religious or cultural grounds will register as non-donors. If an overwhelming majority remains silent under reciprocity because the rule is based on the presumed will of the donor then there is no point of giving priority. This problem suggests that there must be a maximum efficient network scale along a minimum one. The idea at the heart of these systems, regardless of which rule it is coupled with or the market structure is that a sufficient level of inequality must be present within the system, that is a relative balance between self-sacrificing individuals (pool members) and egotistical individuals (non-members) or an optimal size of membership so that the essence of priority does not erode. In other words, the common pool must be sufficiently large to be effective but no so large that the club is no longer a club. Under a presumed reciprocity regime the membership size is likely to be supoptimal.

Currently Singapore uses an allocation policy for deceased organs based on presumed reciprocity. In Singapore the procurement of deceased organs is based on the presumed consent rule (i.e. every individual is assumed to be a donor unless they opt-out) for all non-muslim citizens between the ages of 21 and 60 and on the informed consent rule for muslims. Muslims can opt-in to donate if they wish and non-muslims can opt-out if they wish. However, non-muslims who opt-out get lower priority for transplant if they ever need one. The combination of presumed consent rule and priority status appears to be somewhat more successful than before the enactment of the law and provided a steadier kidney supply although it did not entirely meet the need for transplants (Chandler, 2005).

2.3. Policies based on monetary incentives

Market solutions to the increasing shortage of transplantable human organs can be classified based on the type of organ, the pricing mechanisms, the level of centralization and competition

in the market, the timing of exchange and the assignment of property rights.

There exist two major distinctions between OPPs based on monetary incentives and OPPs based on non-monetary incentives. First, monetary incentive policies will always be non-coercive because the exchange is voluntary, that is individuals are given the right not to sell their organs. Thus offering or requesting payment cannot constitute a coercive action irrespective of the structure of the market or the type of organ. Second, policies based on monetary incentives may not respect patient autonomy because generally a surrogate has to decide on behalf of the deceased.

2.3.1. Contemporaneous Markets

The term “contemporaneous” refers that the exchange and the delivery in these markets are immediately effective. Some authors advocated a direct market for organs with varying prices according to the demand and supply (Barnett et al., 1992; Spurr, 1993; Barnett et al., 2001; Kaserman and Barnett, 2002; Clay and Block, 2002); others proposed centralized systems with a single price (Van Dijk and Hilhorst, 2007; Becker and Elias, 2007). While Barnett et al. (1992) argues that a market for organs with prices set by the forces of demand and supply has important advantages over the current altruistic system as well as over the compensation schemes, Spurr (1993) argues that the value of an organ is higher in contemporaneous markets than in markets based on future delivery of organs because it will be used immediately in the former model, ensuring efficiency and effectiveness.

One of the characteristics of contemporaneous markets with respect to principles of bioethics is that strictly speaking, donor autonomy does not exist in such markets. The reason is that in the absence of any signalling, the immediate exchange and delivery of organs of a deceased person implies that the individual cannot make an advance directive and that it requires the involvement of a surrogate in order to decide to sell the organs.

2.3.1.1. Free Market System

Becker (2003) states that in a well-working market the gap between the number of patients on the waiting list and the number of organ donors would be zero; in a fairly well-working market that gap would be constant. However, the gap between the number of patients on the waiting list and the number of organ donors has grown rapidly, causing an increasing shortage

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of transplantable organs under the current system. Most of the early proponents of the market system have used the tools of demand and supply to show that the current altruistic system is inferior to market system on social welfare grounds and it is believed that the market system will increase the number of organs (Adams et al., 1999; Barnett et al., 1992; Carlstrom and Rollow, 1997).

Barney and Reynolds (1989) claims that an OPP based on voluntary donation enables organ transplant centers and transplant surgeons to obtain economic rents. A zero-price policy restricts the number of organs available for transplants which in turn restricts the number of procedures. A smaller number of procedures increases the transplant fees. By this conclusion Barney and Reynolds (1989) and later Kaserman and Barnett (1991) argued that the system based on altruism enables transplant surgeons to operate as cartel and reap the benefits of organ shortages.

The monograph written by Kaserman and Barnett (2002) is a comprehensive synthesis of the works of Kaserman and Barnett (1991), Barnett et al. (1992, 1993), Barnett and Kaserman (1995) and Adams et al. (1999). Kaserman and Barnett (2002) heavily advocates the implementation of a market system in the US instead of relying on the current altruistic system where the former ensures equilibrium of the demand and supply that is left to free adjustment and market fluctuations. They argue that all forms of informed and presumed consent policies are socially inferior because they are based on a policy by which the price of organs is set to zero whereas compensation and market system allow the deceased donor's family to be rewarded in return for donation that results in improved collection rates. A market system is further superior relative to compensation because it enables the price of organ to fluctuate based on changes in the demand and supply of organs. Accordingly, the adoption of a market system is said to eliminate some of the organizational problems associated with organ collection. Kaserman and Barnett (2002) states that the reluctance to donate would be completely eliminated following a market system because under an altruistic system based on donation, the physician who approaches the grieving family to obtain consent to collect the decedent's organs may experience reluctance to do so or face inability to request consent, resulting in failure to broach the subject of donation. On the contrary they argue that a market system would not need to rely on consent because it is no longer a relevant issue for collecting organs. Second, the failure to identify potential donor candidates in a timely fashion will also be eliminated because the decedent's family is said to have an incentive to donate following the

introduction of a market system. Therefore a free market system does not only increase social welfare but also proves to be efficient. They further add that not only transplant surgeons and hospitals are unwilling to give up the altruistic system which enforces a cartel mechanism, but also the dialysis centers have a deep interest in keeping the *status quo*. The reason is that as the transplant fees increase due to a restricted number of organs and transplants implied by the altruistic system, dialysis centers obtain supra normal profits due to a higher demand for dialysis caused by the restricted supply of kidneys and transplants. Therefore, Kaserman and Barnett (2002) asserts that the majority of medical community strongly opposes the idea of a market system in the US.

The equilibrium characterization of Kaserman and Barnett (2002) consists of an inelastic demand and an elastic supply schedule. They argue that the demand for organs (kidney) is not likely to decrease substantially due to marginal increases in price and could be even unresponsive to price changes over some low to medium price interval. The first reason behind this characterization is that the dialysis, as the only alternative to kidney transplantation, is in fact a poor substitute. Second, kidney transplants in the US are covered by Medicare and 90 percent of liver and heart transplants are covered by Medicare, Medicaid and private insurance companies (Carlstrom and Rollow, 1997). Thus third party payment of transplants implies low price elasticities of demand. On the contrary to their demand characterization, the supply curve appears to be very elastic. The assumption of an elastic supply curve is founded on two considerations. First, they claim that the number of cadaveric organs for transplantation can be expanded without confronting the capacity constraint. Second, they believe that the opportunity cost of supplying the decedent's organs is low because uncollected organs will be buried without causing an actual burden for the donor's family under the current system. The supply will be relatively more responsive to changes in the price under the free market system compared to the altruistic system but the responsiveness appears to be more sensitive to the *price range* rather than the *price change*.

To test this prediction Kaserman and Barnett (2002) administered a survey at Auburn University to 391 students. The implied equilibrium price based on the survey results suggested that it was substantially less than \$1,000¹⁴. Wellington and Whitmire (2007) examined the viability of allowing a market for kidneys and estimated the market equilibrium price of cadaveric kidneys by replicating the survey of Kaserman and Barnett (2002) for a larger and

¹⁴See also Peters (1991) and Cohen (2003).

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more representative sample of the overall population. In contrast to the findings of Kaserman and Barnett, they found that the equilibrium price for deceased and living donor kidneys is prohibitively high, around \$144,000. The substantial discrepancy between the estimates of Kaserman and Barnett (2002) and Wellington and Whitmire (2007) is attributable to the wider range of prices and the more representative sample used by the latter study¹⁵.

Byrne and Thompson (2001) demonstrates that allowing financial incentives to sign a donor card or to become a donor may not increase the supply of organs and could even produce perverse supply responses. The idea is that donors have true and revealed preferences and when the donor's family makes a decision upon donation they try to estimate donor's true preferences. Upon offering financial incentives, families become sceptical of the decision of their next-of-kin on the grounds whether the donor's true and revealed preferences are coherent and may refuse donation if they realize that the revealed preference of the donor are induced by financial incentives. However, revealed donor preference is one of the best predictors of family choice (Tabarrok et al., 2004).

One of the major criticisms and causes of resistance against monetary incentives is that those who were otherwise willing to donate purely out of volunteerism will be offended upon the introduction of payment and will exit the market. The hypothesis is that extrinsic motivations can crowd-out intrinsic motivations, degrade the sense of virtue and weaken moral obligations upon the introduction of money (Frey, 1993; Rothman and Rothman, 2006). In his seminal book, *The Gift of Relationship* that changed the organization of blood supply in the US, Titmuss (1971) analyzed blood donations in the US and England in the late 1960s and early 1970s and argued that the organization of blood supply in the US, which was based on paid donors, was both quantitatively and qualitatively inferior compared to the organization of blood supply in England which was based on unpaid volunteer donors (Steiner, 2003). Titmuss, known for his dissent of market system, claimed that the introduction of monetary compensation for blood donors might reduce the total blood supply. At the writing of the book, Titmuss' claim was not empirically tested and has become the subject of criticism of Solow (1971) and Arrow (1972) on the grounds that it undermined the virtues of the market. Solow (1971) and Arrow (1972) argued that market system and altruism could coexist as the market increases the choices and does not restrict existing possibilities (Steiner, 2003). Epstein (2008) objected to the crowding-out hypothesis and claimed that an individual could

¹⁵ A lower range of prices used by Kaserman and Barnett (2002) biases the equilibrium price downward.

preserve his self-image of altruist by donating the payment to a charity instead of refusing to join and receiving the payment. He also contends that even if crowding-out exists, it would be at least as equally effective as the current system. Recently there has been a growing body of literature presenting empirical evidence on the potential adverse consequences of introducing monetary incentives¹⁶.

In this section, we attempt to broaden this literature by testing Titmuss' claim of crowding-out in the exchange of transplantable human organs. The empirical estimate of the supply curve for cadaveric transplants shows that a free market system, in which the price of organs is left to free adjustment by the forces of demand and supply, may exhibit a crowding-out effect and may be forced to set a higher-than-otherwise price in order to compensate for the loss of supply caused by the crowding-out of intrinsically motivated volunteers.

We administered a survey at a public university in the city of Bursa, Turkey to test the hypothesis of the existence of a crowding-out effect and its impact on the market price and on the resulting number of transplants. A contingent valuation method was used to measure the participants' willingness to accept remuneration for donating their relatives' organs upon death. Contingent valuation methods are typically used to determine one's willingness to accept and willingness to pay for non-market goods¹⁷.

645 students from a wide range of disciplines ranging from freshman to graduate researchers were randomly asked to state the smallest amount of remuneration they are willing to receive for donating their relatives' organs upon their death¹⁸. 99 of them (15.3 percent) stated that they are willing to receive remuneration, 330 (51.2 percent) stated that they would voluntarily

¹⁶See Frey and Oberholzer-Gee (1997), Gneezy and Rustichini (2000) and Mellstrom and Johannesson (2008).

¹⁷Contingent valuation methods suffer from three biases. First, *hypothetical bias* arises due to the inconsistency between the answer of the respondent to a hypothetical case and her reaction to a real case. Hypothetical bias can be eliminated if one conducts an experiment. Second, *the mental account bias* refers to the situation in which it is ambiguous whether the respondent's willingness to accept covers only a single organ, for instance kidney, or all of her transplantable organs. If the respondent is willing to receive remuneration, it is assumed that she is willing to donate at least the kidneys and the liver of their deceased next-of-kin. Finally *the anchoring bias* refers to the case in which the offered values affect the respondent's answer.

¹⁸After explaining the respondent that it is illegal to buy and sell human organs, they are requested to answer the following questions as if such cases were legal and that there were organizations to legally procure human organs:

1. If an organ procurement organization had a program to allow you to receive remuneration for donating relatives' organs upon their death, what is the smallest amount you would donate for (in Turkish Liras)? (a) 0 (b) 50 (c) 100 (d) 250 (e) 500 (f) 1000 (g) 5000 (h) more than 5000 (i) I would neither donate nor sell the organs of my relatives."

2. Would you be offended by a transaction involving the sale of cadaveric organs between individuals if that transaction saved someone's life? (a) Yes, I would be offended by such a transaction (b) No, I would not be offended by such a transaction."

2. Deceased Organ Procurement Policies

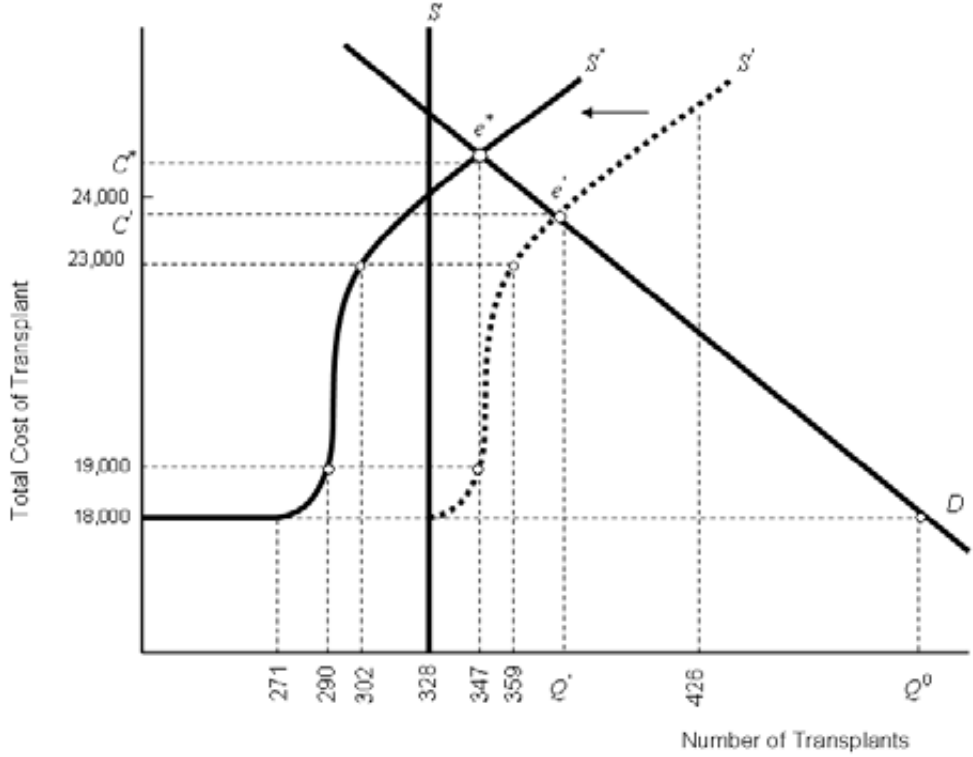
donate, 206 (31.9 percent) stated that they will neither donate nor sell their relative's organs and 10 (1.6 percent) respondents failed to answer the question. Of those 330 respondents who are willing to donate voluntarily, 57 (17.3 percent) stated that they are offended by the sale of deceased organs and 2 (0.6 percent) respondents failed to answer the question. Of those 57 respondents, more females than males were offended by the sale of deceased organs. Of those 99 respondents who are willing to receive remuneration, 9 (9.1 percent) stated that they are nevertheless offended by the sale of deceased organs and 1 (1 percent) respondent failed to answer the question. Based on 426 observations, an empirical cadaveric transplant supply curve has been depicted in figure 2.1 by calculating the cumulative sum of the number of respondents who are willing to receive remuneration.

The cost of kidney and liver transplants are currently around 18,000 and 48,000 Turkish Liras (TL) respectively at public transplant facilities in Turkey¹⁹. First consider the case where sale is prohibited and the organ under consideration is kidney for which the demand is relatively elastic because kidney transplantation has substitutes such as black market and dialysis²⁰. In this case there would be 328 organs available for transplantation coming from volunteers. This is shown by the perfectly inelastic supply curve S in figure 2.1. Since the prohibition does not permit a price above zero, the price determined by the intersection of the demand curve D and the supply curve S cannot be sustained. This creates a kidney shortage of size $(Q^0 - 328)$.

¹⁹These costs include lab tests, medical equipment, hospital stay and physician fee. These figures are fixed and subsidized by Turkish Social Security Institution. The Euro equivalency could be obtained roughly by dividing these figures by two.

²⁰The conclusion reached here would still remain valid if one were to assume a relatively inelastic demand because the substitutes are in fact poor and the cost of renal transplantation is covered by third parties.

Figure 2.1.: Market for kidney transplants with empirical cadaveric kidney transplant supply curve and the crowding-out of intrinsically motivated volunteers ($n = 426$)



If the prohibition on the sale of organs is removed and the price is left to free adjustment, it is argued that some of those who were previously willing to donate will be offended by the sale and drop out of market²¹. Based on the answers of the respondents, 57 of them will leave the market, leaving a total of 271 transplantable organs under a free market, as shown by the supply curve S'' . When the total cost of kidney transplant is 19,000 TL of which 1,000 TL is the organ price, there will be 19 additional organs available for transplantation coming

²¹The relevant survey question separates those who are willing to donate and those who will not participate in this market regardless of whether payment is introduced. Accordingly, those who stated that they would neither donate nor sell the organs of their relatives are left out of the analysis. However there is no way of knowing, based on the survey questions, whether a person who retains the organs of their relatives or a person who donates would refuse donating because money is offered. However being offended or feeling repugnance decreases market participation or constrains market transactions (Roth, 2007; Leider and Roth, 2010). Therefore, those who would be willing to donate at a zero price but are offended by the sale of cadaveric organs are assumed to drop out of the market upon the introduction of monetary incentives.

2. Deceased Organ Procurement Policies

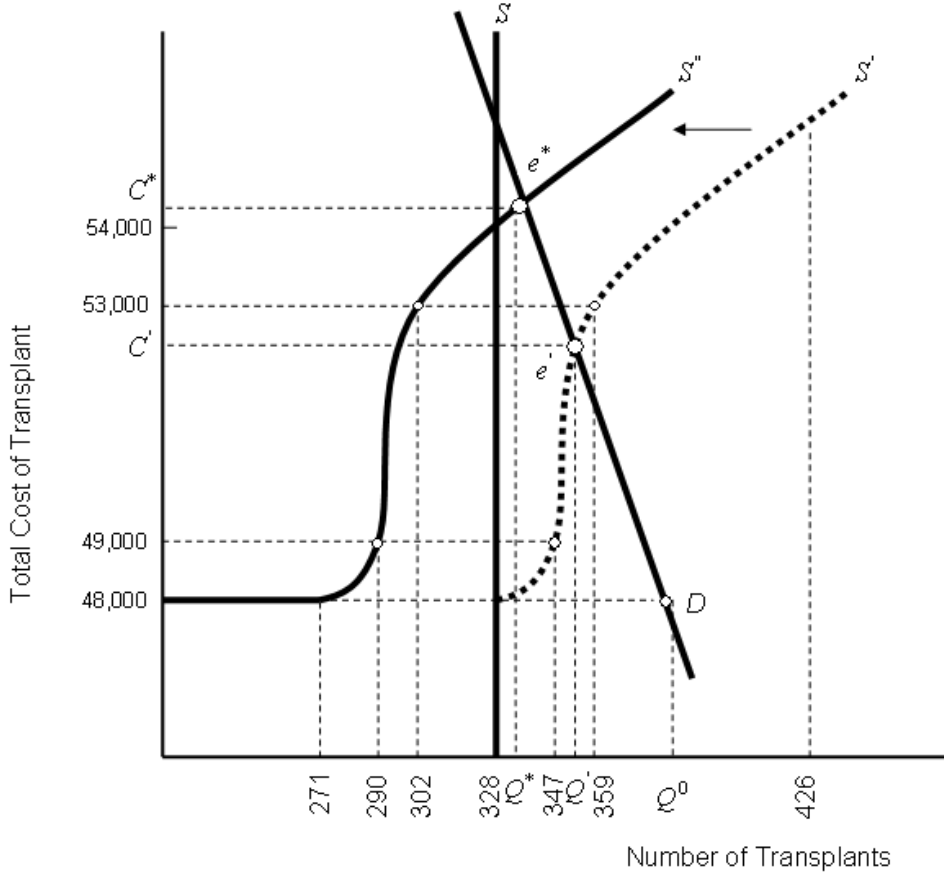
from extrinsically motivated volunteers, reaching 290 transplantable organs. At a price of 5,000 TL for an organ which brings the total cost of transplant to 23,000 TL, there will be 31 additional organs on top of 271 organs donated by volunteers, reaching a total of 302 organs for transplantation. Notice that if no intrinsically motivated volunteer was offended by the sale of deceased organs, which is shown by the supply curve S' , there would be 359 organs available for transplantation at a cost of 23,000 TL as opposed to 302 organs supplied under the crowding-out of intrinsically motivated volunteers, a reduction in the supply of about 16 percent. This crowding-out effect was found to be more prevalent among females (60 percent) than among males (40 percent)²².

For the aforementioned free market to perform effectively, given that some individuals will refuse to sell their organs because they are offended, a price must be set such that it yields more organs than under sale prohibition. Therefore the equilibrium number of kidney transplants under a free market must lie to the right of the supply curve S . This is shown by the equilibrium point, $e^*(C^*, 347)$ where the total cost of transplant is around 24,500 TL and the number of transplants is higher than under sale prohibition. Notice that if no volunteer was offended by the sale of cadaveric kidneys, the equilibrium would be attained at point $e' (C', Q')$ which yields a higher number of transplants than 359 and a slightly lower cost (price) than 24,000 TL.

The demand for livers is drawn relatively inelastic in figure 2.2, shown by the curve D , because liver transplantation has no substitutes and the operation costs are fully or almost fully covered by third parties. Since the liver waiting lists and yearly additions for liver transplant is substantially less than kidney waiting lists and additions, the demand for liver is much lower than the demand for kidneys. If payment is introduced the demand for liver is equal to the supply curve S'' at a point where, the equilibrium price is C^* and the equilibrium number of transplants is Q^* which is slightly higher than under the sale prohibition. If no volunteer was offended by the sale of cadaveric livers, the equilibrium would be attained at the point $e' (C', Q')$, the intersection of the supply curve S' and the demand curve D , which yields an equilibrium cost of transplant slightly lower than 53,000 TL and an equilibrium number of transplants between 347 and 359.

²²This result partly reflects the findings of Mellström and Johannesson (2008) in the market for blood that a crowding-out effect exist for women and not for men.

Figure 2.2.: Market for liver transplants with empirical cadaveric liver transplant supply curve and the crowding-out of intrinsically motivated volunteers ($n = 426$)



Given there is a crowding-out effect, the market equilibrium will result in a higher price and thus a higher cost of transplant than otherwise. Notice that at any fixed level of number of transplants, a market with crowding-out is less cost-effective compared to a market without crowding-out. However in our empirical case, the impact of crowding-out raises the total cost of kidney transplant by only around 3-4 percent and lowers the number of transplants by around 8 percent compared to an equilibrium in which crowding-out is absent. This indicates that although the relative size of those who are presumed to leave the market upon paid donation is sizeable, its adverse impact on the resulting equilibrium number of kidney or liver transplants

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is not. A possible explanation of this finding is that in the market for transplantable human organs the number of altruists exiting the market relative to the number of individuals induced by offering monetary incentives may not be as large as Titmuss (1971) claimed. This effect might have been caused by the possibility that contrary to the widely-held belief, repugnance for monetary incentives may not be so strong and/or that the prices may have to be driven high to offset the crowding-out.

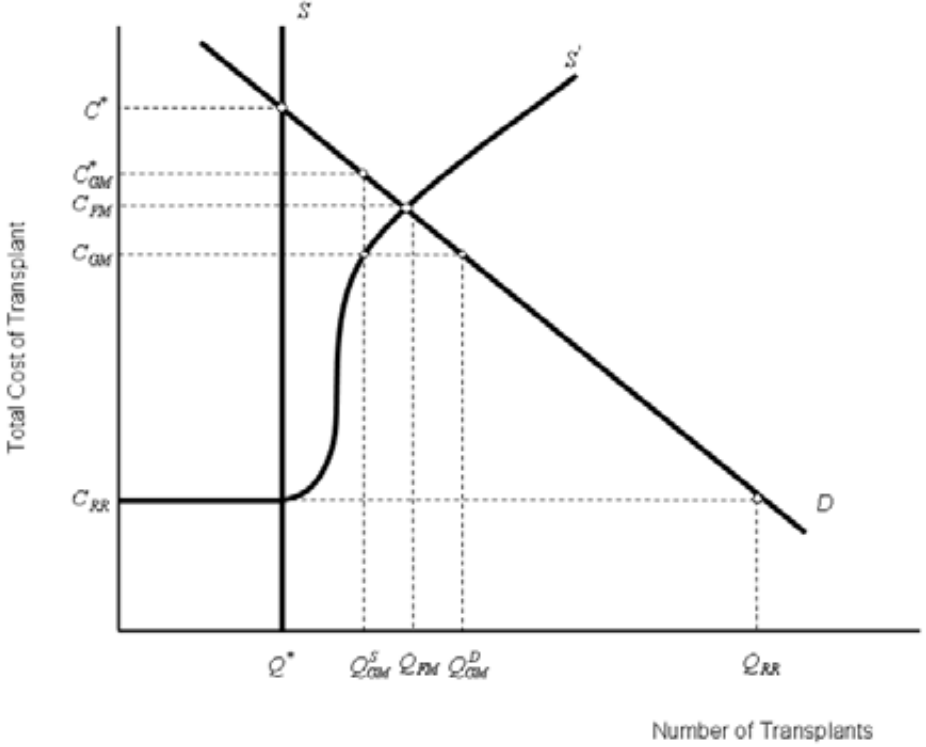
The analysis presented in this section imposes several limitations and caveats. First, the sample is randomly selected among a population group which exhibits certain common characteristics (e.g. age, education level). This common characteristic of the sample does not represent public attitudes because of the high overall education level of the respondents and is likely to produce biased results which can neither be generalized nor be used to estimate national figures. On the other hand, conducting a representative survey in order to infer the whole population is costly. Second, the low range of offered values to measure one's willingness to accept may bias the equilibrium price downward (Wellington and Whitmire, 2007). Thus the increase in the total cost of transplant may be larger than the analysis suggests. Other potential biases that may have been incorporated in the survey should also be highlighted. These biases are associated with respondents' knowledge about donation and organ procurement. An individual's knowledge about organ donation in general and organ procurement systems in particular may be negatively or positively associated with his or her willingness to accept remuneration after being exposed to all the relevant arguments both in favor of and against paid donation. Therefore a sample of informed respondents may have yielded different results.

Given the aforementioned caveats, the empirical evidence points that a free market with a sizeable crowding-out of intrinsically motivated volunteers might be less cost-effective vis-a-vis a free market with no crowding-out. The cost-effectiveness of free markets vis-a-vis other deceased OPPs can be demonstrated by using the supply schedule depicted in figure 2.1 and by further incorporating the supply characteristics of the other policies. A comparison of free markets, government monopsony, default rules and required recovery is given in figure 2.3.

In figure 2.3, S' is the supply curve for free market and D is the demand curve for transplantable organs. The y-axis shows the total cost of transplant (i.e. the cost of operation plus the organ price) where anything in excess of C_{RR} accounts for the price of organs. Q_{FM} and C_{FM} respectively represent the equilibrium number of transplants and the equilibrium cost of

organ under free market. In a required recovery regime, since the organs of every medically suitable brain-dead patient is removed at a zero price and no one is allowed to object the removal including the donor and her family, Q_{RR} number of organs will be recovered, which is the intersection of the lowest possible cost of transplant, that is C_{RR} , and the demand curve D ²³. Therefore under a required recovery regime $Q_{RR} - Q_{FM}$ additional number of transplants will be performed compared to a free market at a much lower cost than C_{FM} . At the lowest possible cost, C_{RR} , however, the free market can only provide Q^* number of transplants. Thus a required recovery regime is more cost-effective than a free market²⁴.

Figure 2.3.: Comparative cost-effectiveness of deceased OPPs



On the other hand, S represents the supply curve for default rules (presumed consent,

²³It is reasonable to assume that there is no capacity constraint (i.e. there is a sufficient number of brain-dead individuals from which to recover organs). Under capacity constraints, the number of transplants would be less than Q_{RR} in a required recovery regime.

²⁴It is assumed that organ recipients do not place a lower value on the transplanted organs than donors. Otherwise, there will be a social loss equal to $\int_{Q_{FM}}^{Q_{RR}} (S' - D) dQ$ (Kaserman and Barnett, 2002).

2. Deceased Organ Procurement Policies

informed consent) and mandated choice policies and is drawn perfectly inelastic because there is sale prohibition. Although it might seem that the cost of kidney following a sale prohibition is zero, there is an implicit value denoted as C^* by which rent-seeking activities are created. Under a default rule or a mandated choice policy, the actual price of kidney is $C^* - C_{RR}$ and the number of transplants is Q^* . Note that at Q^* the actual cost of transplantation under a free market is only C_{RR} or alternatively the price of organ is zero. Thus a default rule or a mandated choice policy is less cost-effective than a free market system.

Finally, it is assumed that the fixed price offered by a monopsonist is above zero but below the market clearing level. This will result in a number of transplants somewhere between Q^* and Q_{FM} at a cost somewhere between C_{FM} and C_{RR} . At this fixed cost level denoted as C_{GM} , the number of transplants is Q_{GM}^S and there is an organ shortage of amount $Q_{GM}^D - Q_{GM}^S$. However, a monopsony would still exert an implicit value denoted by C_{GM}^* by which rent-seeking persists. Therefore, although the cost of transplant under a monopsony seems to be C_{GM} , the actual cost is C_{GM}^* . Note that at the monopsonist output level, Q_{GM}^S , the actual cost of a transplant would be C_{GM} under a free market. Thus a monopsony is less cost-effective than a free market system but more cost-effective than a default rule or a mandated choice policy²⁵. For the reimbursement scheme, the same intuition follows; however since reimbursement is made to cover only the actual costs of donors (i.e. hospital or burial expenses) the offered price under a reimbursement scheme is likely to be very close to C_{RR} . Therefore it is more likely to be less cost-effective than a monopsony but more cost-effective than default rules or a mandated choice regime.

In free markets the medical criteria for the distribution of organs is replaced by the ability to pay. Free markets are distributionally more efficient than regimes whose allocation criterion is based on medical need because if the market is left to the adjustment of the demand for and the supply of organs, a buyer can obtain a healthier and better-matched organ, thus can increase her welfare by paying more even if the distribution of organs favors wealthy buyer and not medically the most in need who may not be wealthy. Given that those who would sell their organs will be the families of the poor and that the rich will not sell their organs unless the price is prohibitively high, a free market for cadaver organs is discriminatory. Respect for patient autonomy in free markets depends on the revealed preferences of the donor. It is not

²⁵ A government monopsony or a reimbursement scheme would achieve an equal cost-effectiveness of a free market if the fixed organ price offered is set to the market clearing price level. However, as Kaserman and Barnett (2002) points out, this is very unlikely.

possible to talk about patient autonomy unless the will of the deceased while alive has been communicated to the next-of-kin and the family does not act on the contrary of the wishes of the deceased.

From the buyer's perspective, transplants will be inaccessible for those who cannot afford to pay in free markets unless buyers are covered by health insurance. Therefore, horizontal equity may be difficult to establish in free markets. On the other hand, a free market system complies with vertical equity because the organs of a donor are removed in return for payment and the organs of those whose families refused payment remain intact.

2.3.1.2. Government Monopsony

The idea of government monopsony proposed by Becker (1997) is built upon the alienation of all buying and selling rights to a single entity, the government. Although Becker does not get into the details of this system, here we envisage a contemporaneous system in which the government offers a fixed price for organs of the deceased, akin to the proposal made by Steinbuch (2008) albeit his proposal excludes deceased donors. The system could be financed by proportional or even progressive taxation in the short-run and by the funds the procurement system would save from the diminished utilization of dialysis in the long-run. This financing scheme appears to be feasible since transplantation is a cost-effective procedure and dialysis is not²⁶.

The critics argue that competition in the procurement of organs is preferable over monopsony because it would determine the efficient contract, render a greater incentive and a higher quality of organs. There are many good reasons to employ a centralized system of organ procurement. Schwindt and Vining (1986) argues that a publicly owned monopsony has an economy-of-scope advantage over private monopsonies and competitive structures and the enforcement of the contract and the administrative procedures would be much simpler and easier with a government monopsony.

It is conceivable and perhaps morally less repugnant that the government will sell the procured organs neither through market mechanisms nor by other means but allocates them within the system as it is allocated today based on need and medical criteria without any

²⁶The average cost of a kidney transplant in the US is about \$90,000 and the post-operation cost of medication is around \$16,000 per year. The average cost of dialysis is about \$65,000 per year. After five years, the total cost of dialysis is \$325,000 whereas the total cost of kidney transplant is about \$270,000 which yields an average saving of \$11,000 per year.

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preference for the recipient's financial status or the level of insurance coverage. This way, any concern on the grounds that transplants will be inaccessible for those who cannot afford to pay, would be eliminated²⁷. The existence of the government as the intermediary not only ensures vertical equity but also non-discrimination and horizontal equity in the market. This would also partly mitigate the crowding-out effect.

Unless a view by the deceased while alive has been communicated to the family there is no way of knowing what the deceased's preferences were, assuming there is no donor registry in the monopsonistic market. Therefore, once the wishes of the deceased are known by the family and the family preferences match with those of the individual may the autonomy be respected. Otherwise, one cannot talk about autonomy in such markets.

Finally, monopsonistic markets are distributionally less efficient than free markets because the price of organ is not allowed to fluctuate based on the forces of the demand and supply which could have allowed potential buyers to search for healthier organs or more compatible tissues; however they are distributionally more efficient than reciprocal systems because no potential buyer or group of buyers has priority over the distribution of organs.

2.3.1.3. Reimbursement

Two types of reimbursement schemes have been proposed as rewards to the family of the deceased donor. These are tax deduction or tax credits and the reimbursement of hospital and funeral expenses. Offering tax credit to induce citizens to become organ donors has been discussed by Oswald (2001), Delmonico et al. (2002) and Calandrillo (2004). While Delmonico et al. (2002) opposed tax credits and refunds because they assign an arbitrary monetary value on an organ, others argued that tax breaks could spur donation. Calandrillo (2004) warned that tax deductions could create additional inequity because they are peculiarly regressive. Tax credits would eliminate this inequity irrespective of income. Recently, tax deduction schemes have been proposed in the US by the Help Organ Procurement Expand Act (2001) and Gift of Life Tax Credit Act (2001). These acts respectively proposed a \$10,000 tax credit for deceased donation and a \$2,500 tax refund for deceased or living donation.

Reimbursement of hospital and funeral expenses on the other hand has found supporters

²⁷ The problem related to the ability to pay is more pronounced in the US where most of the patients without private health insurance have difficulties affording post-operative treatment and the cost of medication. In countries with universal health coverage as in Europe and Canada, ability to pay is not much of a concern.

among those who strongly oppose monetary incentives as well as proponents of payment (Hansmann, 1989). This reimbursement scheme supported by Delmonico et al. (2002), Howard (2007) and Abouna (2008), proposes that institutions that deal with the procurement of organs could offer to pay funeral and hospital expenses incurred by families if they agree to donate the organs of their deceased relative.

Barnett et al. (1992) argues that a compensation scheme provides an additional incentive for donors to agree to supply their organs however it does not increase the incentive to seek out donations and thus is unlikely to entirely eliminate the shortage. This is not necessarily a problem and on the contrary could have few advantages. It is argued that such reimbursements should be made automatically and not conditional upon the agreement to donate as the essence of reimbursement is not to seek out donation. According to Delmonico et al. (2002) an intentionally small reimbursement of funeral expenses of \$300 should not be seen as a monetary incentive but rather an expression of appreciation for donation. Howard (2007) also supports the use of such in-kind payments instead of cash payments as a solution to partially mitigate the crowding-out of intrinsically motivated volunteers, if not fully. He argues that rewards that appreciate and acknowledge the value of donors' contribution complement and reinforce motivation.

The period leading to the declaration of brain-death is excruciating both for the donor who is still alive during diagnostic tests and for the donor's family. One of the fears upon the introduction of monetary incentives is that the care of donor will be prematurely terminated. This medical concern is not exclusive to monetary incentives. Anecdotal evidence shows that even without monetary incentives, aggressive transplant teams and organ recovery coordinators, driven by pride and ambition, force doctors to declare brain-death earlier than before because waiting list grows and supply stagnates (Barber, 2007). On moral grounds, the hospitals should compensate the potential donor's family for the physical and psychic costs even if the process does not result in donation.

To identify the public attitude on the monetary incentives based on the survey conducted at a public university in the city of Bursa, Turkey, we asked the respondents to list, in preference order, five alternative monetary incentive schemes that were proposed in the literature, given in table 2.2²⁸.

²⁸The relevant question was: "List the following alternative incentive schemes by preference order if you were to receive some form of remuneration for donating organs upon death. (fill in the blanks from 1 to 5, 1 being the most preferred and 5 being the least preferred) (a) Spot Market: Right upon death, organ procurement

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Table 2.2.: Preference ordering of alternative monetary incentive schemes (n=645)

	Choice					No Answer	Total
	1.	2.	3.	4.	5.		
Contemporaneous Market	55 (8.52)	106 (16.34)	84 (13.02)	203 (31.47)	89 (13.80)		645 (100.00)
Futures Contract	54 (8.37)	79 (12.25)	94 (14.57)	155 (24.03)	155 (24.03)		645 (100.00)
Reimbursement of Expenses	46 (7.13)	83 (12.87)	178 (27.60)	93 (14.42)	137 (21.24)	108 (16.75)	645 (100.00)
Reduced Insurance Premium	119 (18.45)	169 (26.20)	117 (18.14)	54 (8.37)	78 (12.09)		645 (100.00)
Tax Deduction	263 (40.78)	100 (15.50)	64 (9.93)	32 (4.96)	78 (12.09)		645 (100.00)
No Answer			108 (16.75)				
Total	645 (100.00)	645 (100.00)	645 (100.00)	645 (100.00)	645 (100.00)		

The numbers together with percentages in parenthesis shown in bold represent the majority of the respondents whose preference ordering is aggregately consistent. Accordingly, of those 645 respondents a majority of 263 (40.78 percent) preferred tax deduction scheme as their first choice over the remaining alternatives, a majority of 169 (26.20 percent) preferred reduced insurance premium as their second choice, a majority of 178 (27.60 percent) preferred reimbursement of hospital or burial expenses as their third choice, a majority of 203 (31.47 percent) preferred contemporaneous market as their fourth choice, a majority of 155 (24.03 percent) preferred futures contract as their fifth choice and 108 respondents (16.75 percent) did not list any ordering. Notice that this vertical preference ordering is consistent with horizontal preference ordering; among all five choices contemporaneous market is the fourth choice, futures contract is the fifth choice, reimbursement of expenses is the third choice, reduced insurance premium is the second choice and tax deduction is the first choice by the majority of respondents. At the overall, the results indicate that a compensation scheme in the form of

agency offers you payment to have your consent to procure your relative's organs (b) Futures Market: You sell the property rights of your organs to an organ procurement agency for money now, to procure the usable organs upon death in the future (c) Compensation: Upon organ donation, organ procurement agency compensates you in the form of reimbursement of funeral or hospital expenses (d) Reduced Health or Life Insurance Premium: You receive a reduction in health or life insurance premiums in exchange for the promise to allow your organs to be harvested at death (e) Tax deduction: The government allows tax deduction upon the promise to allow your organs to be harvested at death."

tax deduction is the aggregate top choice among respondents, followed by a one-time insurance premium reduction and reimbursement of hospital and burial expenses as the aggregate second and third choices respectively. Contemporaneous and futures markets were listed as the least preferable systems respectively.

Reimbursement systems that appreciate donation efforts are horizontally and vertically equitable and non-discriminatory, however they may not respect patient autonomy for several reasons. First, unless a view by the deceased while alive has been communicated to the family, there is no way of knowing what the deceased's preferences were. Second, even if the deceased's preference were known, the family preferences should be the same as those of the individual in order to respect patient autonomy.

Under a reimbursement scheme the organs of a brain-dead individual are allocated as it is today, based on medical criteria. Therefore, it is distributionally more efficient than a policy based on priority but less efficient than a free market under which a distribution based on ability to pay may yield higher patient utility.

2.3.2. Future Delivery Markets

A futures contract can be defined as a legally binding contract based on the acquisition of the right today while the individual is alive and well, to procure her organs upon death. Futures contracts depend on the structure of the market (perfect, imperfect, monopsonist), designation of the beneficiary (donor, family) and the default rule (opt-in, opt-out).

2.3.2.1. Opt-in futures contract

In opt-in futures contract, an individual sells the property rights of his designated organs to a delegated institution(s) today if he or she dies in the future under circumstances that would render her organs suitable for transplantation. If the individual agrees to enter into a futures contract, the purchaser of the rights over the individual's organs typically would make yearly payments to him or a lump-sum payment to his family after his death. On the other hand, those who do not enter into a futures contract would presumably be deemed to wish not to donate. Further, the agreement does not allow family members to veto the contract or deny donation even if the beneficiary is the family²⁹.

²⁹It has been emphasized by the AMA (1995) that the decision to accept the financial incentive cannot be made by the family or the designated beneficiary. This practice is analogous to post-mortem life insurance

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An influential article on the proposal of a future delivery market of human organs is due to Schwindt and Vining (1986). They envisaged an opt-in futures market in which an individual engages into a lifetime and inalienable contract that would result in receiving a single cash payment from the government as the single buyer (monopsonist) in exchange for the right to procure his organs upon demise. Under the Schwindt and Vining's proposal, the government asks the recipient (or his insurance company) a price for the organ such that it covers the administrative costs of the government per donor plus the amount of payment to the donor.

Cohen (1989) and Hansmann (1989) propose an (im)perfectly competitive futures market in which health insurance companies would be the purchasers of the future rights to organs. By checking a box in the yearly insurance premium statement, an individual gives the insurance company the right to procure his designated organs for transplantation upon his demise. Unlike the proposal by Schwindt and Vining (1986), individuals could change their mind at any time and they would be assumed to wish an automatic renewal of the contract every year unless they act otherwise. Upon the initiation of the contract, the insurance companies submit to a central national registry the identification of its insureds and hospitals are then required to check the national registry upon death of the insured and locate the donors. According to Hansmann (1989) the recipient of the deceased's organs or the recipient's insurance company would be then required to pay the stated price. This stated price could be determined by the forces of demand and supply or set by the government which in turn determines the insurance premium reduction offered by the insurance company. Hansmann (1989) argues that establishing a futures market with multiple insurance companies has many administrative advantages over the futures market with government monopsony proposed by Schwindt and Vining (1986) and Cohen (1989). All the proposals for a future delivery market specifically emphasize that financial incentives should not play a role in the equitable distribution of organs.

One of the issues of an opt-in futures contract under (im)perfectly competitive markets is the price determination. Let q be the probability of having brain-death at any year t , h be the health stock and T be the life expectancy at the time of entering into a futures contract. The probability of dying under circumstances that would render her organs suitable for transplantation during t years is $1 - (1 - q)^t$. For simplicity, suppose that health stock evolves according to $h(t) = \mathcal{H} \exp(-\delta t)$ with $h(0) = \mathcal{H}$ where δ is the time-invariant depreciation rate of health stock and \mathcal{H} is the initial health stock at time $t = 0$. The value of organs depreciates with

redeem to the family of the deceased.

time which might also depend on the lifestyle (i.e. whether the person is a smoker or a heavy drinker) that might compromise the suitability of the organs for transplantation.

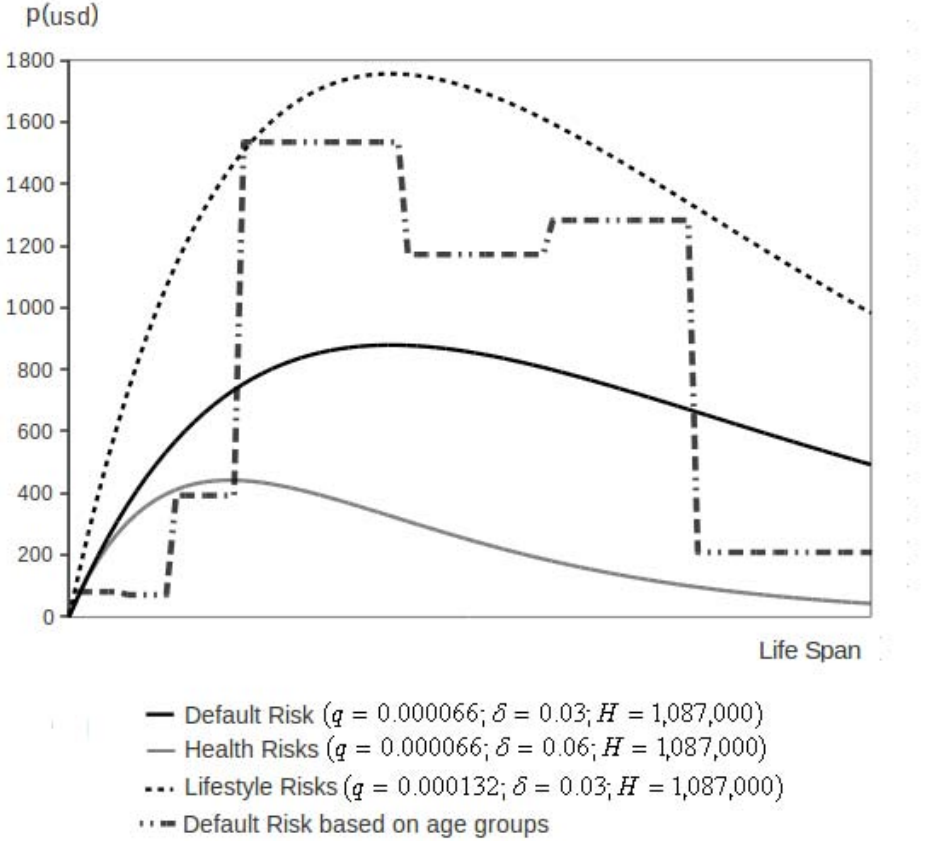
The health level at the end of T years is, $h(T) = \Phi$ which is a constant such that $\Phi \approx 0$ and $\mathcal{H} > \Phi$. At the end of her life span the organs will not be suitable for organ transplantation unless she becomes brain-dead. Let $p(t)$ be the insurance premium reduction offered to the individual at any year at the exchange of procuring her organs for transplantation in case she becomes brain-dead in the future. Then, the insurance premium reduction offered by the insurer at any year t is, $p(t) = [1 - (1 - q)^t] h(t) = [1 - (1 - q)^t] \mathcal{H} \exp(-\delta t)$ with $\lim_{t \rightarrow \infty} p(t) \rightarrow 0$. The amount of insurance premium reduction offered to the individual is strictly concave with respect to time with a negative second order derivative, indicating that the amount of reduction first increases and then decays towards zero. The total price paid by the insurer, denoted by Π , equals the total insurance premium reduction the individual obtains over the life span of the futures contract, $\Pi = \int_0^T p(t) dt$. For a numerical example based on the estimated donor probability by Howard and Byrne (2007), let the probability of dying during a given year under circumstances that would render her organs suitable for transplantation be $q = 0.000066$. Based on the central estimated value of a donor by Mendeloff et al. (2004), the value of organs is assumed to be \$1,087,000 at the time of entering into a futures contract and that the organs deteriorate at a rate of 3 percent ($\delta = 0.03$). The time path of the insurance premium reduction is given in figure 2.4 with varying degrees of q and δ . Under the default risk, shown by the solid black line, the offered insurance premium reduction reaches up to almost \$900 and then gradually declines toward zero. Under the default risks, the total insurance premium reduction over the lifetime of a donor is approximately $\Pi = \$56,810$ with a yearly average premium reduction, $\bar{p} = \$684$.

Under significant health risks (i.e. drug abuse, heavy drinking or smoking), shown by the light grey line in which the depreciation rate of health is doubled, both the total and the yearly average amount of insurance premium reduction is lower ($\Pi = \$19,105$; $\bar{p} = \$230$) because these health risks imply a reduced level of health (cirrhosis, renal failure, cancer) and thus a lower probability of suitability for transplantation had the insured an accident leading to brain-death. Therefore this group of individuals will not be solicited for futures contract. Other individuals who have been classified as living risky lives such as motor bikers tend to exhibit a higher likelihood of being in circumstances that results in brain injury, which is shown by the dotted curve in which the probability of dying under circumstances resulting in brain-

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death is doubled. These risks substantially increase the total and the yearly average amount of the insurance premium reduction ($\Pi = \$113,463; \bar{p} = 1,367$). The insurance company has a vested interest in aggressively soliciting organ futures from high risk individuals, such as motor bikers and gang members who are more likely to become brain-dead.

Figure 2.4.: Insurance premium reduction in opt-in futures markets



For a comparison, the insurance premium reduction based on the donor probabilities and estimates of the value of a donor by age cohort given by Howard and Byrne (2007) is further calculated as shown by the kinked grey line in figure 2.4 in which the probability of dying under circumstances leading to brain-death and the value of the donor vary over age groups. The total and the yearly average insurance premium reduction based on age groups shows a similar

picture and is slightly higher than our calculations of the premium reduction under default risks ($\Pi = \$70,526$; $\bar{p} = 850$). Although future delivery markets positively discriminate against individuals carrying significant life-style risks in order to secure procurement upon demise, this does not constitute a discriminatory policy with respect to Axiom 1.i in the same way that higher health insurance premiums are not discriminatory because the insured lives a risky life.

In opt-in future delivery markets, the contract that has been signed by the individual towards the recovery of organs upon death signals donor preferences to the next-of-kin. A bilaterally binding contract between the individual and the institution(s) delegated to execute such contracts indicates that the autonomy of the contractor is respected if and only if the families are removed from the decision-making process.

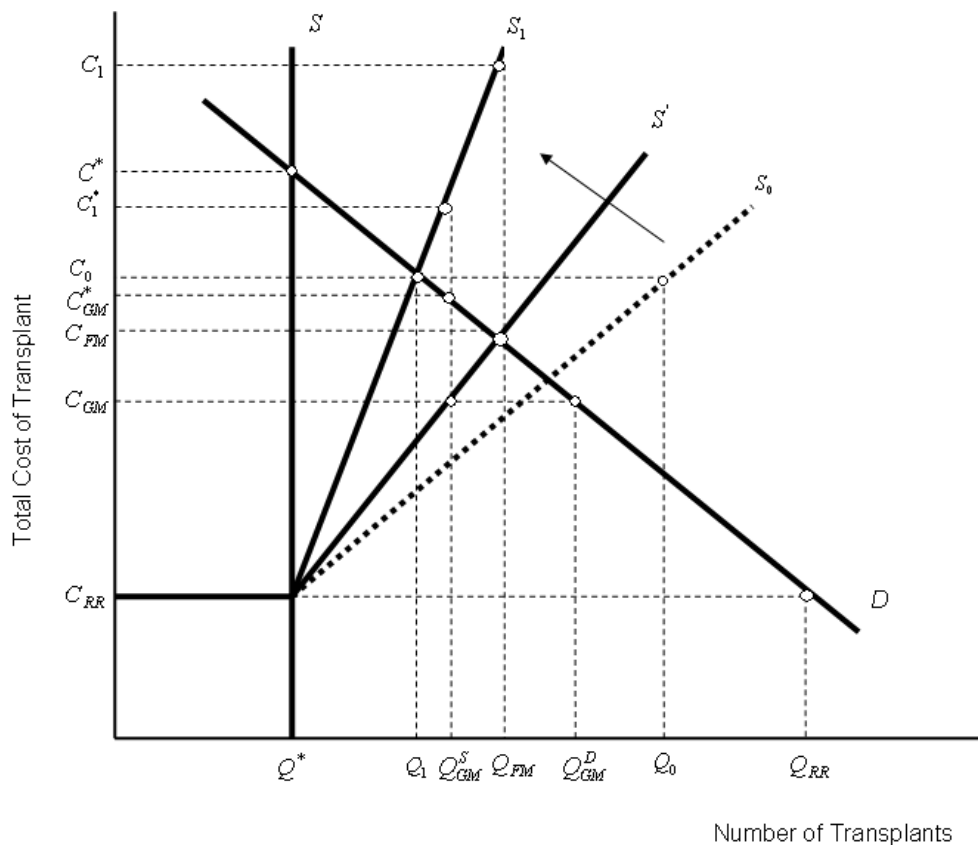
Opt-in futures contracts are both horizontally and vertically equitable. The reason for the former is that the organs of all contractors will be removed by the binding force of the contract from which families are excluded. The reason for the latter is that the probability of mistakenly removing the organs when the patient intention is not to be a donor is almost zero because the non-donor does not have a contract documenting otherwise. The probability of mistakenly not removing the organs when the patient intention is to be a donor is almost zero because the deceased holds a bilaterally binding contract whose violation is against the interests of the insurance company.

The assumption that the introduction of monetary incentives will drive out intrinsically motivated volunteers from the market still stands under futures contract. Individuals who would be willing to donate under an altruistic system might be offended by the introduction of payment and might refuse to participate in a futures contract. Among others, the effectiveness of an opt-in futures contract scheme thus depends on the number of altruists exiting the market relative to the supply induced by offering such monetary incentives and on the structure of the market.

Cash payments offered upon futures contracts aggravate the time inconsistency problem relative to priority rewards under reciprocal systems because the benefits of entering into a futures contract are not conditional upon rescinding (Byrne and Thompson, 2001). When an individual enters into a futures contract she receives a lump-sum or yearly payment. But after receiving the reward she chooses to rescind her donor status. At the overall everyone chooses to enter into a futures contract and receives the payment but the actual procurement rates remain unchanged. Therefore proposals like that of Hansmann (1989) are susceptible

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Figure 2.5.: Futures market vs. free market



to produce perverse supply responses because individuals are allowed to rescind. According to Byrne and Thompson (2001), perverse supply responses could be resolved by excluding the next-of-kin from the decision-making process and by rendering the initial decision of the individual irreversible or by making post-donation payments to the next-of-kin.

Figure 2.5 depicts the comparison of futures market relative to a contemporaneous free market system in which the line S represents the usual perfectly inelastic supply when there is sale prohibition, S' represents the free market supply and D represents the demand for transplantable kidneys. For simplicity, it is assumed that there is no crowding-out in the market and the supply is linear. Since a futures market implies two supply schedules (one of proposed

and one of delivered), the curve S_0 represents the supply curve for the promised kidneys. Due to a low probability of brain-death, the organs of a significant fraction of contractors will not be suitable for transplantation. Further, the time inconsistency implies that some of the contractors will rescind their donor status after receiving the reward. Upon delivery time the supply will be lower than at the time of contracting and will pivot to the left of the free market curve because of this time inconsistency and the low probability of brain-death³⁰. If the futures market is established as a monopsony, then the monopsonist will set a cost C_0 which will yield Q_0 number of promised organs and Q_1 number of organs available upon death (Schwindt and Vining, 1986). Note that if futures market had not induced time inconsistent behavior, the free market supply and the futures market delivery curve would be the same. However at Q_{FM} , the price of futures is $C_1 - C_{RR}$ as opposed to the free market price which is $C_{FM} - C_{RR}$.

If the fixed price offered by a monopsonist in a contemporaneous market is above zero but below the market clearing level as in figure 2.3, this will result in Q_{GM}^S number of transplants at a cost of C_{GM} under a contemporaneous government monopsony. Note that at this output level the actual cost of a transplant would be higher by $C_1^* - C_{GM}^*$ under a futures market despite an ongoing rent-seeking under a contemporaneous monopsony. Thus, a futures market is less cost-effective than a free market and government monopsony because the former induces time inconsistency that results in a lower-than-otherwise number of actual donors upon death whereas the latter two policies are based on immediate exchange of organs.

The rent-seeking implied by the implicit cost C^* under default rules results in Q^* number of transplants. Note that at this level of output the cost of transplantation under a futures market is only C_{RR} . Therefore a futures market is more cost-effective than defaults. The loss of effectiveness in futures markets may be higher or lower than what is implied by figure 2.5, depending on how serious the time inconsistency problem is. On the other hand, if the contract is binding and irreversible thus rescinding the donor status is not possible, then the futures market would be equally cost-effective as the free market based on the above analysis.

An opt-in futures contract might also lead to a problem akin to free riding, caused by informational asymmetries. Those who are medically ineligible for donation may opt-in for such a contract if they are not medically screened regularly when they are alive whose examination

³⁰ The supply curve S_0 pivots to S_1 because if it had shifted parallelly to the left instead, then at Q^* , a futures market would be more costly than under any non-market solution (i.e. the cost of transplant would be above C_{RR} at Q^* under a futures market).

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imposes substantial costs on the insurer. This could be rectified if the insurance coverage is sufficiently widespread in the country. However the cost of identifying the medical history of each insured poses financing problems.

The existing proposals for a future delivery market are not independent of the extent of health care coverage and health care politics in a country. For instance, in a private health care system as in the US to which these proposals are essentially targeted, 17 percent of the population lives without a health insurance. Thus an organ procurement system with many profit seeking insurance companies and without a universal health care coverage is unlikely to succeed in executing these contracts, if not for other reasons.

2.3.2.2. Opt-out futures contract

Contrary to the opt-in, an opt-out futures contract requires an individual to pay the insurance company if she strictly opposes to have her organs removed in case of brain-death. By default those who do not engage in a futures contract are assumed to have no opposition to have their organs removed after death. Similar to a presumed consent regime, it is envisaged that those who do not want their organs removed upon death register themselves on a national non-donor registry and pay a yearly fixed amount in order to remain on the registry.

The primary feature of opt-out futures contracts is that by requiring individuals to pay, they render the choice of opting out even more difficult. The amount to be paid is also used as a policy instrument to determine the level of this difficulty. Assuming that the degree of dissent of individuals for organ donation is a set of infinite values, the amount paid by those who would like to retain their organs upon death should be as large as possible in order to retain a large pool of organs to procure. Those who do not have a strong dissent will be discouraged by the high premium and only the group of individuals who are strongly repulsed by the idea of donation, possibly due to religious or cultural grounds, will choose to opt-out. But a high premium will also provide an incentive for medically eligible persons to lie about their health in order to avoid payment and medically ineligible persons to remain silent. However it is technically implausible to medically screen those who stay at the default in order to circumvent this adverse selection problem because they are presumably a large population. At the overall every medically ineligible person will choose “no action” strategy and enter the pool of available organs with no actual use for transplantation.

Requiring those who choose to object donation to pay is discriminatory because the choice

to not contract is determined by the ability to pay.

In contrast to an opt-in futures market, the family cannot be removed from the decision-making process simply because the system presumes that non-contractors are willing to donate their organs upon demise. The reason is that either the non-contractor actually wanted to contract in but he or she could not because of the inability to pay, or the non-contractor simply did not bother to opt-out but actually wanted to not donate. In both cases, the family should be considered as the third party besides the non-contractor and the institution³¹. For contractors who paid a redeem and refused to donate, the family cannot be persuaded to decide otherwise because the contract is bilateral and legally binding. Given the presumed will of the non-contractor to donate and the decisive role of the surrogate, an opt-out futures market will respect autonomy if the family has the same preferences as the non-contractor.

Opt-out futures contracts are horizontally equitable because the organs of all contractors will remain intact by the binding force of the contract and the families cannot be persuaded to donate. In contrast, they are vertically inequitable because the organs of those who did not object and those who did not object yet did not intend to be a donor are removed upon demise. Furthermore, there will be medically ineligible thus posthumously useless bodies of those who did not object to be a donor because objection requires the contractor to redeem.

Both opt-in and opt-out futures markets do not deal with the allocation of organs because the organs under a futures contract would be allocated as it is today, based on medical criteria. Therefore they are distributionally less efficient than free markets but more efficient than reciprocal systems.

2.4. Pareto Optimality

So far, we did not address Axiom 2.i in evaluating the deceased OPPs. If policy or allocation A is Pareto superior to a set of policies or allocations (let's say, B, C and D), it is sufficient to say that B, C and D cannot be Pareto optimal because A is already Pareto superior to them.

First we need to identify the relevant parties that are going to be affected by the changes

³¹ If an individual did not opt-out for whatever reason and if the organ removal is not enforceable without the consent of the family this will induce an ex-ante strategic behavior to avoid both the organ removal and the payment. Absent enforcement measures, this strategic behavior is not desirable for the government. Therefore if the futures market is regulated by additional enforcement measures such that it requires the family to pay the redeem if they object to removal of organs of the decedent who did not opt-out, then there is no way of avoiding both donation and payment; either the organs will be removed or the family will pay the redeem.

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in the policy rule. These are the potential recipients or patients, the next-of-kin of brain-dead individuals and the health professionals. Second, we need to provide, at least theoretically, the cost-effectiveness ordering of the policies under consideration because Pareto superiority depends on the relative number of individuals whose utilities are affected. Based on figure 2.5, a required recovery is the most cost-effective policy which increases the utility of Q_{RR} patients, followed by a free market which increases the utility of Q_{FM} patients, a government monopsony which increases the utility of Q_{GM} patients, a futures contract which increases the utility of Q_1 patients and finally a mandated choice and default rules (presumed and informed consent) which increase the utility of Q^* patients. From the existing empirical studies, we know that a presumed consent yields more donations than an informed consent which in turn is expected to yield more donations than a mandated choice.

It is obvious that any departure from a required recovery regime will yield a minimum $Q_{RR} - Q_{FM}$ number of patients and a maximum of $Q_{RR} - Q^*$ number of patients who will be worse off by not getting a transplant. Thus there is no policy that is Pareto superior to a required recovery regime. Now, suppose that there are Q_{RR}/k deceased donors (thus Q_{RR}/k next-of-kin) under required recovery and Q_{FM}/k deceased donors (thus Q_{FM}/k next-of-kin) under a free market where k is the fixed number of transplantable organs harvested from one deceased donor. Suppose further that a fraction, β , of all the deceased donors did not want to donate ($0 < \beta < 1$). Thus the number of opposing next-of-kin to required recovery is $\beta Q_{RR}/k$. Any departure from a free market regime to a required recovery regime will result in $Q_{RR} - Q_{FM}$ patients whose utility will increase by getting a transplant since a required recovery regime forcefully procures the organs of all suitable brain-dead individuals. But there will be $\beta Q_{RR}/k$ number of next-of-kin who will be worse off because their decedent opposed procurement yet her organs are procured. This indicates that neither a required recovery nor a free market is Pareto superior to one another. Further, it is obvious that any departure from a free market to any regime other than required recovery will also yield a minimum $Q_{FM} - Q_{GM}$ number of patients and a maximum of $Q_{FM} - Q^*$ number of patients who will be worse off by not getting a transplant.

It may seem that any departure from a non-monetary policy to a monetary policy will enhance the welfare of recipients and the welfare of the next-of-kin of the deceased without producing losers. However, the introduction of money will increase the number of organs available for transplants which in turn increase the number of procedures. A larger number

of procedures will decrease the transplant fees. This will also reduce the profits of dialysis centers due to a lower demand for dialysis by unleashing the supply of kidneys and transplants. Therefore any departure to any monetary policy will produce losers. The empirical evidence confirms that any movement from a presumed consent to an informed consent or mandated choice will reduce the number of transplants. Thus any departure will reduce the utility of some patients waiting for a transplant. Further, any departure from a presumed or an informed consent to a required recovery regime will increase the utility of $Q_{RR} - Q^*$ patients but will also reduce the utility of $\beta Q^*/k$ next-of-kin whose decedent did not want to become a donor. Any movement to a policy based on priority will reduce the utility of at least one recipient who is a non-member of the pool even if such departure increases the utility of some pool member patients waiting for a transplant.

Thus within non-monetary policies, any departure from one to another will either result in lower number of transplants and therefore reduce the utility of some patients or reduce the utility of the next-of-kin or reduce the utility of the unprioritized. Within monetary policies, any departure from one to another will either result in lower number of transplants and therefore reduce the utility of some patients or reduce the utility of surgeons, hospitals and dialysis centers by driving profits down. This establishes that none of the policies is Pareto superior to another; thus all policies are Pareto optimal and therefore Pareto incomparable to one another.

2.5. Policy Evaluation

This chapter presented an exhaustive review of the deceased OPPs by laying out an axiomatic approach for policy evaluation. This axiomatic approach highlights three crucial notions in evaluating any policy: fairness, efficiency and effectiveness. Five absolute notions of equity have been considered in order to evaluate the fairness of a policy. These are non-discrimination, non-coercion, autonomy, horizontal equity and vertical equity. On the other hand, the efficiency has been evaluated in terms of Pareto and in terms of distributional efficiency. The summary of the evaluation of deceased OPPs is displayed in table 2.3.

A policy evaluator is said to be *inequity averse* if he/she is intolerant to inequitable outcomes and is willing to give up any desirable attribute (i.e. efficiency or effectiveness) of a policy in order to achieve more equitable outcomes (Fehr and Schmidt, 1999). Similarly, a policy

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evaluator is said to be *inefficiency averse* if he/she is intolerant to inefficient outcomes and is willing to give up any desirable attribute (i.e. equity or effectiveness) of a policy in order to achieve more efficient outcomes. Finally, a policy evaluator is said to be *ineffectiveness averse* if he/she is intolerant to ineffective outcomes and is willing to give up any desirable attribute (i.e. equity or efficiency) of a policy in order to achieve more effective outcomes³².

Based on table 2.3, an inequity averse policy evaluator would prefer informed consent, mandated choice, government monopsony, opt-in futures and reimbursement policy provided that family veto is disallowed or the family has the same preferences as the individual. The first of these policies is equivalent to what is known as a *first person informed consent*, which has gained considerable attention in the US. According to this policy, organ procurement is solely based on the documented intent of the donor and the organs of a registered deceased donor are removed even if the family objects. Disallowing family veto is therefore a legal instrument and the law plays a crucial role in shaping the permissibility by removing families from the decision-making process. In contrast, disallowing family veto cannot be used as a legal instrument under a monopsonistic market because the exchange is voluntary and the relevant party is no longer the individual but his family. Therefore the only legal instrument the policy maker could use in order to respect autonomy is to ensure that the family has the same preferences as the individual and the only way to ensure overlapping preferences is through signalling them by registries or donor cards. Therefore a precondition to an equitable monopsonistic market, among others, is to manage a donor registry. This applies to reimbursement and opt-in futures markets as well unless the contract is binding and enforceable in the latter.

It is shown that all policies attain Pareto optimality, either because any departure from that policy puts one of the primary parties involved in the exchange (i.e. recipients, health professionals) in a strictly less preferable situation, or necessitates the involvement of a secondary party (ie. the next-of-kin) in the exchange, whose interference may be undesirable from an economic point of view. This indicates that a change in the allocation of organs from one party (the brain-dead individual or the next-of-kin) to another (the patient) may not be Pareto superior. In cases of conflicting interests one is highly likely to encounter in organ

³² These types of aversion will always result in corner solutions (i.e either completely equitable satisfying Axiom 1.i-v, or completely efficient satisfying Axiom 2.i-ii). A policy evaluator might also be willing to give up some fairness and efficiency in order to choose a policy which is an interior solution (i.e equitable and efficient, but only partially). The superiority of an interior solution compared to a corner solution depends on the relative weights the policy evaluator subjectively assigns to each sub-axioms.

Table 2.3.: Comparison of deceased OPPs

	Equitable					Efficient		Cost-effective
	Non-discrimination	Non-coercion	Autonomy	Horizontal	Vertical	Pareto	Distributional ^a	
I. Presumed Consent	Yes	Yes	Yes ^{b,c}	Yes	No	Yes	-	I \leq II ^d
II. Informed Consent	Yes	Yes	Yes ^{b,c}	Yes	Yes	Yes	-	II > III ^e
III. Mandated Choice	Yes	Yes	Yes	Yes	Yes	Yes	-	III \leq I,II
IV. Required Recovery	Yes	No	No	Yes	No	Yes	-	IV > VI
V. Reciprocity	No	Yes	Yes	No	Yes	Yes	PR < MN	-
VI. Free Market	No	Yes	Yes ^b	No	Yes	Yes	ATP > MN	VI ^f > VII
VII. Govt. Monopsony	Yes	Yes	Yes ^b	Yes	Yes	Yes	-	VII > III
VIII. Opt-in Futures	Yes	Yes	Yes ^c	Yes	Yes	Yes	-	X < VIII ^g < VII
IX. Opt-out Futures	No	Yes	Yes ^b	Yes	No	Yes	-	-
X. Reimbursement	Yes	Yes	Yes ^b	Yes	Yes	Yes	-	I,II < X \leq VII

^aMN: Medical need; PR: Priority; ATP: Ability to pay.^bIf the family has the same preferences as the individual.^cIf family veto is disallowed.^dSee Chapter 3, Johnson and Goldstein (2003), Abadie and Gay (2006), Neto et al. (2007).^eSee Siminoff and Mercer (2001), Klassen and Klassen (1996).^fThe larger the crowding-out, the less cost-effective the policy.^gIf the donor status is rescindable.

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procurement, the characteristics of the optimal outcome and the costs of its attainment are altered by law through placing the burden of reaching optimal arrangements on the donor and his family rather than on the recipient. Therefore, the optimality of allocations may be difficult to apprehend without taking into account the impact of existing laws and the involvement of the government (Mishan, 1967; Goodwin, 2006).

The Pareto criterion does not provide any discriminating indication since all policies lie on the Pareto border. Therefore an inefficiency averse policy evaluator would list policies in a preference ordering according to their distributional efficiency. Let \succ , \sim , and \succeq respectively denote strictly preferable, equally preferable and equally or more preferable. Then based on table 2.3 the preference ordering of an inefficiency averse policy evaluator is:

free market \succ *presumed consent* \sim *informed consent* \sim *mandated choice* \sim *required recovery*
 \sim *monopsony* \sim *reimbursement* \sim *futures market* \succ *reciprocity*

Finally an ineffectiveness averse policy evaluator would list the policies in preference order according to their cost-effectiveness. Based on table 2.3, the preference ordering of an ineffectiveness averse policy evaluator is:

required recovery \succ *free market* \succ *monopsony* \succ *opt-in futures market* \succ *reimbursement* \succ
presumed consent \succ *informed consent* \succ *mandated choice*

The types of aversion and the corresponding policy choices are given in table 2.4. A policy evaluator who has no concern for inequitable outcomes would prefer two distinctly opposite policies: required recovery regime or a free market system. This choice depends on the extent to which one perceives oneself on the scale of liberalization. In a society of communitarian-based law, one could argue that requiring everyone to donate their organs would be constitutional if people were sufficiently concerned about life and the burden was shared by all. On the other hand, in a relatively individualistic society attributes that we possess and appreciate can become tragic liabilities if those natural assets are owned by someone else (Calabresi, 1991). In a libertarian society in which free enterprise and virtues of markets are highly appreciated, requiring everyone to donate their organs would be unconstitutional and may never find grounds for legislation.

Table 2.4.: Aversion and policy choice

	Types of aversion			
	Inequity (not ordered)	Inefficiency (ordered)		Ineffectiveness (ordered)
Policy Choice	First-person Informed consent	Ability to pay	Free market	Required recovery Free market
	Mandated choice	Medical Criteria	Govt. monopsony	Govt. monopsony
	Govt. monopsony		Opt-in futures market	Opt-in futures market
	Opt-in futures market		Reimbursement	Reimbursement
	Reimbursement		Presumed consent	Presumed consent
			Informed consent	Informed consent
			Mandated choice	Mandated choice
			Required recovery	
		Priority	Reciprocity	

The preference-ordered policy choices that would satisfy the triplet goals of equity, efficiency and effectiveness are the government monopsony, opt-in futures market and the first-person informed consent policy if and only if one is willing to give up some efficiency and effectiveness. Otherwise, one cannot find a policy that adheres to all three notions of aversion.

The analysis suggests that even though a monopsony may be inferior relative to a free market system with respect to efficiency, a paid, government-funded and regulated monopsonistic market with highly set safeguards to ensure an equitable distribution of deceased human organs is the most preferable policy that conforms to the notions of fairness, efficiency and effectiveness described in this chapter. In the order of preference a government monopsony is followed by an opt-in futures market and first-person informed consent policy.

As opposed to a free market, a government monopsony avoids risks of discrimination and violation of equal access for equal need by alienating all buying rights to a single non-profit organization and by ensuring an organ allocation based on medical criteria without any preference for the recipient's financial status or insurance coverage³³. By successfully managing a donor registry, a contemporaneous monopsonistic market will maximize the probability that the preferences of the family overlap with that of the deceased and will ensure patient autonomy. It is assumed that the fixed price offered by the monopsonist is likely to be below the market clearing level but its efficiency and effectiveness can be increased by setting the price

³³ A study by Leider and Roth (2010) shows that the majority of respondents supports the legality of markets with institutional intermediaries such as the government or the insurance companies and find them morally acceptable compared to markets in which individuals pay for organs.

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as close as possible to the market clearing price. This may require robust and extensive research on estimating the market price under given cultural, psychological and socio-economic dynamics.

One might be concerned about the extent to which the chosen policy is internalized by the society. The implementation of a monopsonistic market along the aforementioned lines is relatively easy in western countries where institutions delegated to ensure an equitable distribution of human organs are well-established. By enacting a legislation that legalizes monopsony these institutions will be additionally responsible for an equitable and efficient procurement of deceased donors. However, the internalization of this process for those who are subject to the rules of a monopsony may be difficult and costly due to moral conflicts and potential repugnance. Therefore, it might be reasonable to adopt a policy that is less cost-effective but one that heavily draws from an existing market that was once thought to be morally outrageous: Insurance markets. Insurance programs resemble market-based reform proposals today because both place value on the dead (Goodwin, 2006). A typical example is viatical or life settlements³⁴. The idea of the sale of a life insurance policy was repugnant in the 19th century not only because it was a bet on someone's death but also it was a life insurance policy held by entities that profit from deaths (Roth, 2007). Proponents of life insurance were compared to criminals because they were allegedly promoting a practice that would result in murders (Goodwin, 2006). Despite these ethical reservations, viatical and life settlements remain useful for the financial management of elderly or terminally ill people. Although repugnance may have endured, people internalized the idea of life insurance contracts and what policy owners do with them. Therefore extending the scope of life or health insurance policies by including an additional clause on future delivery of organs upon demise might be more feasible and less repugnant than initiating unaccustomed procurement systems.

³⁴Viatical settlement is the sale of a life insurance policy before it matures in order to pay extremely high health insurance premiums. These settlements involve insured individuals with much shorter life expectancy (generally two years or less) due to terminal illness. Life settlements are similar except that the life expectancy of the policy owner is more than two years.



A billboard in San Francisco, June 2006. Photo by Mark Coggins

3. The Impact of Presumed Consent Laws and Institutions on Deceased Organ Donation

“Those who seek to help others are twice disadvantaged in a manner that can easily be avoided by simply doing no more than everyone else.” Tom Koch

3.1. Introduction

Over the last decades, the gap between the number of patients on the waiting list and the number of organ donors has grown rapidly, causing an increasing shortage of transplantable organs. The chronic organ shortage in developed countries has become a major policy issue and recent proposals have focused on the effectiveness of presumed consent laws in increasing deceased donations. Particularly in the US where the gap between those who need an organ transplant and the number of transplantable organs is growing faster than ever, propositions to enact a presumed consent regime have been discussed at some length. Recently the British Parliament discussed the proposition of a system of presumed consent which has received support from the medical community.

Deceased organ procurement systems revolve around the defaults of presumed and informed consent legislations. A growing debate has emerged on the pros and cons of both systems among medical professionals, bioethicists, legal practitioners and philosophers. In presumed consent or opt-out regimes, a brain-dead individual whose organs are suitable for transplantation is considered to be a donor unless she premortem took an affirmative action to revoke it. Therefore, it is presumed that the deceased donor does not have any objection to have her organs removed unless he or she has stated a preference to not donate.

In contrast under informed consent or opt-in system, individuals are required to take an explicit affirmative action to become donors. Countries in which the default rule is not to donate implicitly assume that there is a social reluctance towards organ donation. Therefore, individuals who are not registered in the system are assumed to not donate their organs upon demise. However, the family of the deceased is allowed to express an opinion, generally respected by the hospital even though there are otherwise clear indications on the part of the donor. This practice is considered to place additional burden and stress of decision-making on families. In fact, informing families about the wishes of the deceased rather than asking to give consent has proved the families to rarely oppose donation (May et al., 2000). However the practice is changing. Recently in the US a first-person informed consent system has been implemented by which organ procurement is solely based on the documented intent of the donor and the organs of a registered deceased donor are removed even if the family objects¹.

Most of the European countries have adopted presumed consent legislation and it is sug-

¹ As of April 2010, the first-person consent system has been ratified in all states in the US except Kansas and Wisconsin.

gested that presumed consent can play an important role in increasing donation rates (Johnson and Goldstein, 2003; Gimbel et al., 2003; Abadie and Gay, 2006; Neto et al., 2007). However, disunity continues within the medical community and experts have expressed their skepticism whether any change in legislation per se could increase donations (Matesanz, 1998; Grigoras et al., 2010). Healy (2005) asserts that countries that enacted presumed consent regime also implemented a number of other practices to increase deceased donation rates. Thus presumed consent is an indicator of a country's commitment to donation rather than a direct cause of high donation rates². Under presumed consent, the wishes of the decedent's family are not taken into account and the next-of-kin is not allowed to override the donor's wish to donate. However in practice countries adopted presumed consent consider families' wishes and the next-of-kin is allowed to veto donation even if the decedent has previously revealed her preference to donate organs³. The reason for considering families' decision in the process has been to avoid public backlash, liability suits and to show respect for the grieving family (Healy, 2005; May et al., 2000). Thus presumed consent is not fully enforced and families are still allowed to make the final decision regarding organ donation. From this perspective, it is not clear whether enforcing presumed consent legislation has a positive effect on organ donation rates.

On the other hand presumed consent laws express a social norm about the default course of action. On the contrary of informed consent where donation is a special option (opt-in), it is assumed to be the default option (opt-out) under presumed consent (Healy, 2005). A higher number of deceased organs is expected to be procured because individuals who do not legally express their wishes to not donate are considered as having no opposition to have their organs removed. Based on this view enforcing presumed consent may have a positive effect on donation rates but it may not be of great magnitude because in practice families can override the wish of the deceased individual to donate.

This chapter purports to advance the literature on the impact of presumed consent laws

² This strategy, known as *the Spanish model of organ procurement*, has been introduced in 1989 by the efforts of Dr. Rafael Matesanz and has been successfully implemented in Spain, followed by Italy and later by South Australia. The Spanish model adopts the principle of decentralization of the donor coordination through regional coordination and aims to cope with the obstacles faced by physicians and staff (Chang et al., 2003). These include under-trained doctors, unidentified donors and the reluctance and incompetence to approach families to request donation. Therefore, Spanish model endorses continuous education and training of transplant coordinators to improve management and communication skills.

³ A remarkable exception to this case is Austria and recently Czech Republic where presumed consent legislation is strictly enforced, that is families are ruled out of the decision-making process. Therefore the organs of the donor can be procured unless the donor opposed the removal of her organs.

3. *The Impact of Presumed Consent Laws and Institutions on Deceased Organ Donation*

on deceased donation rates by examining the interactions between a presumed consent legal regime and other customs and institutions. The chapter contributes to the existing empirical literature in two respects. First, it is argued that the impact of presumed consent laws on deceased donations depends on various institutional settings which have not been explicitly modeled previously. Second, failure to control for the unobserved country heterogeneity will lead to misleading inference regarding the impact of presumed consent legislation. This unobserved country heterogeneity cannot be estimated by a FE model because laws and institutions show very little or no variance overtime or by a random effects model in the presence of correlated country effects. In this study we use an alternative three-stage error component estimator which controls for the unobserved country heterogeneity and still identify the impact of presumed consent laws on deceased donation rates.

To address these issues, data on the total number of deceased donations, total per capita health expenditure, the number of registered deaths caused by cerebro vascular diseases, motor vehicle accidents and committed intentional homicides, civil rights and liberties and binary information on consent legislation, legal systems, family consent, and donor registry systems have been collected for 28 countries over the period 1993-2006.

3.2. Data Source and Descriptive Statistics

The data cover Australia, Austria, Belgium, Canada, Croatia, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Ireland, Israel, Italy, Luxembourg, Netherlands, Norway, New Zealand, Poland, Portugal, Slovak Republic, Slovenia, Spain, Switzerland, Sweden, the UK and the US. Data on total population is obtained from World Bank, Health, Nutrition and Population statistics database⁴. Data on the number of total deceased donations are compiled from the TPM, International Registry of Donation and Transplantation⁵. Registered number of deaths caused by cerebro vascular diseases, motor vehicle accidents and homicides are compiled from the WHO Mortality database⁶. The number of deceased donations and the registered deaths are divided by the population and multiplied by million to obtain the total deceased donation rates and the registered death rates pmp. Data on the purchasing power parity adjusted per capita total health expenditure is obtained from the

⁴<http://devdata.worldbank.org/hnpstats/>

⁵TPM, International registry of donation and transplantation, <http://www.tpm.org/>

⁶<http://www.who.int/healthinfo/morttables/en/index.html>

WHOSIS database⁷. Information on consent legislation is compiled from Abadie and Gay (2006) and Healy (2005). Consent legislation variable takes the value of 1 for countries which enacted presumed consent and 0 for countries which enacted informed consent legislation. The data on civil rights and liberties is compiled from the Freedom House⁸. Data on legal systems have been collected from the CIA, World Factbook⁹. The legal system variable takes the value of 1 for common law countries and 0 for civil law countries. Information on donor registry and family consent is obtained from the Global Observatory on Donation and Transplantation, Abadie and Gay (2006) and via personal communication with the national transplant authorities¹⁰. The family consent variable takes the value of 1 if the next-of-kin consent is always sought in deceased donations and 0 otherwise¹¹. The combined registry variable takes the value of 1 if the country maintains a combined registry in any year and 0 if the country maintains at most a single registry in any year¹².

Table 3.1 displays country-by-country deceased donation rates, legislative defaults and consensual practices in the year 2006. With the exception of Greece, Portugal and Slovak Republic (Sweden and Poland), all presumed consent countries in the sample which (do not) routinely seek family consent also (do not) allow family to veto their next-of-kin's wishes. On the other hand, all informed consent countries with the exception of Canada allow family veto irrespective of whether family consent is routinely sought. Only about 29 percent of the sample countries managed a combined registry system in 2006.

The descriptive statistics are given in table 3.2. Column (1) shows means and standard deviations for the entire sample. Columns (2) and (3) show means and standard deviations for 18 presumed consent and 10 informed consent countries respectively. Column (4) shows

⁷<http://www.who.int/whosis/en/index.html>

⁸The civil liberties index comprises of freedom of expression and belief, associational and organizational rights, rule of law, personal autonomy and individual rights. In the sample, the total number of points awarded to civil rights and liberties corresponds to a point between 4 and 1, 1 being the highest and 4 being the lowest level of freedom. See <http://www.freedomhouse.org/uploads/FIWAIScores.xls>

⁹<http://www.cia.gov/cia/publications/factbook>

¹⁰Global Observatory on Donation and Transplantation, <http://data.transplant-observatory.org/paginas/informes/DatosUsuario.aspx>

¹¹If a country always seeks family consent, this means that the consent of the family is asked every time irrespective of the preferences of the donor (i.e. a deceased could have premortem allowed the removal of her organs but the hospital still asks the family or a deceased could have premortem opposed the removal of her organs but the hospital still asks the family).

¹²A combined registry indicates that the country allows both organ donors and organ retainers the right to express their wishes regarding organ donation by registering. On the other hand, a single registry indicates that the country allows either organ donors or organ retainers to express their wishes by registering, depending on the default rule (i.e. presumed or informed consent).

3. The Impact of Presumed Consent Laws and Institutions on Deceased Organ Donation

Table 3.1.: Donation rates, consent regimes and practices, 2006

	Deceased Donation pmp	Consent Legislation	Routine Family Consent	Family Vero	National Registry	Source
Australia	9.75	Informed	Yes	Allowed	Combined	Healy (2005), Abadie and Gay (2006)
Austria	24.26	Presumed	No	Not allowed	Non-donor	Healy (2005), Gevers et al. (2004)
Belgium	25.88	Presumed	Yes	Allowed	Combined	Gevers et al. (2004)
Canada	14.33	Informed	No	Not allowed	None	Frank Ivis* (CIH), Abadie and Gay (2006)
Croatia	13.51	Presumed	Yes	Allowed	None	Abadie and Gay (2006)
Czech Rep.	18.79	Presumed	No	Not allowed	Combined	Pavel Brezovsky* (KST), Abadie and Gay (2006)
Denmark	11.40	Informed	No	Allowed	Combined	Bjørn Ursin Knudsen* (SST), Fleischhauer et al. (2000)
Finland	20.69	Presumed	Yes	Allowed	None	Lauri Kyllönen* (HUCH)
France	23.50	Presumed	Yes	Allowed	Non-donor	Abadie and Gay (2006)
Germany	15.28	Informed	No	Allowed	None	Susanne Venhaus* (DSO), Fleischhauer et al. (2000)
Greece	7.08	Presumed	Yes	Not allowed	Donor	Canellopoulou-Bortis (2000), Abadie and Gay (2006)
Hungary	17.57	Presumed	Yes	Allowed	Non-donor	Abadie and Gay (2006)
Ireland	19.94	Informed	Yes	Allowed	None	Colin White* (IKA), Gevers et al. (2004), Healy (2005), Abadie & Gay (2006)
Israel	9.64	Presumed	Yes	Allowed	Non-donor	Tamar Ashkenazi* (Israel MoH), Grunfeld (1996)
Italy	21.02	Presumed	Yes	Allowed	Combined	Claudia Ferraro* (CNT), Gevers et al. (2004)
Luxembourg	12.69	Presumed	No	Not allowed	None	Abadie and Gay (2006)
Netherlands	12.23	Informed	Yes	Allowed	Combined	Hendrik van Leiden* (NTS), Gevers et al. (2004)
Norway	16.30	Presumed	Yes	Allowed	None	Niels Grunnet* (Scandia transplant), Gevers et al. (2004)
New Zealand	5.97	Informed	Yes	Allowed	None	Ngahooro and Gillett (2004)
Poland	13.00	Presumed	No	Allowed	Non-donor	Anna Pszeny* (Poltransplant)
Portugal	18.99	Presumed	Yes	Not allowed	Non-donor	Fleischhauer et al. (2000)
Slovak Rep.	11.87	Presumed	Yes	Not allowed	Combined	NCOT
Slovenia	14.94	Presumed	Yes	Allowed	Donor	Danica Ansec Letonja* (Slovenija Transplant)
Spain	34.20	Presumed	Yes	Allowed	None	Gregorio G. Cantarero* (ONT), Abadie and Gay (2006)
Switzerland	10.68	Informed	Yes	Allowed	None	Dagmar Vermet* (Swiss transplant), Gevers et al. (2004)
Sweden	15.08	Presumed	No	Allowed	Combined	Daniel Holm*, Charlotte Möller* (SCOTD), Gevers et al. (2004)
UK	12.85	Informed	Yes	Allowed	Donor	Phil Pocock* (UK Transplant)
US	26.84	Informed	No	Allowed	None	Beverly Trinkle* (UNOS), Healy (2005), Abadie and Gay (2006)

* denotes personal communication.

the differences between columns (2) and (3) along with the standard errors of the t-statistic for the null hypothesis of equal means for presumed and informed countries. In the sample, the mean deceased donation rate is slightly higher in presumed consent countries with a 14-year average of 15.25 compared to an average of 14.15 deceased donation rate for informed consent countries. This difference is significant at conventional test levels, shown in column (4). Presumed consent countries have statistically significantly lower health spending, higher cerebro-vascular diseases and motor vehicle death rates and a lower civil liberties compared to informed consent countries.

3.3. Regression Analysis

Four of the 28 countries were discarded from the regression analysis. Switzerland is discarded because the consent legislation varies by canton although it is an informed consent country by federal law. Israel is discarded in order to reduce heterogeneity in social norms¹³. Greece is discarded on the grounds that the cause of low transplant rates is a low number of medical staff and intensive care units and not a low deceased donation rate (Karatzas et al., 2007). Luxembourg is discarded due to data inconsistencies on deceased donation rates. After removing Switzerland, Israel, Greece and Luxembourg, the regressions were performed for the remaining 24 countries over the period of 1993-2006.

In empirical studies most often the interest is on the impact of time-invariant or almost time-invariant variables on the dependent variable. The researcher may want to estimate the impact of institutions or laws which do not change in the short-run. In such cases, a FE error component model does not allow the estimation of the parameters of these time-invariant variables. In the case of slowly changing variables with little within variance a FE model further results in inefficiency that lead to highly unreliable point estimates and misleading inference. Under these circumstances the solution to estimating the impact of time-invariant or almost time-invariant explanatory variables is to employ a pooled OLS or a RE estimation. However, both RE model and pooled OLS will be biased if the unobserved effects are correlated with the regressors and the latter estimation will be less efficient than a RE estimation even if the unobserved country effects are uncorrelated with the explanatory variables. In this

¹³The cause of extremely low deceased donations in Israel is the reservation on the definition of death and the belief that the Jewish Law forbidding desecration of the human body outlaws donation (Steinbuch, 2008).

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Table 3.2.: Descriptive statistics, means and standard deviations

Variable	Overall	Presumed country	Informed country	Difference (2)-(3)	Number of observations
	(1) mean (s.d)	(2) mean (s.d)	(3) mean (s.d)	(4) difference [s.e]	
Deceased donation, pmp	14.85 (6.23)	15.25 (7.17)	14.15 (4.00)	1.1* [0.42]	385
Health expenditure, per capita \$	2154 (1099)	1898 (1024)	2597 (1086)	-699* [76.37]	382
Cerebro vascular diseases (CVD), pmp	1050 (437)	1205 (451)	766 (214)	439* [26.76]	348
Motor vehicle accidents (MVA), pmp	110 (45.57)	119 (49.06)	94.07 (32.47)	24.93* [3.15]	348
Homicide, pmp	16.92 (13.79)	16.49 (9.46)	17.70 (19.38)	-1.21 [1.16]	348
Civil liberties	1.48 (0.75)	1.68 (0.80)	1.14 (0.35)	0.54* [0.04]	392
Presumed consent	0.63 (0.48)	0.98 (0.12)	-	-	392
Common Law	0.25 (0.43)	0.05 (0.22)	0.60 (0.49)	-0.55* [0.03]	392
Family consent	0.67 (0.46)	0.72 (0.44)	0.60 (0.49)	0.12* [0.03]	392
Combined registry	0.17 (0.38)	0.15 (0.36)	0.20 (0.40)	-0.05 [0.04]	378
Number of countries	28	18	10		

Notes: Standard deviations in parentheses. Standard errors in brackets. * denotes statistical significance at the 5% level. The mean of consent legislation variable for presumed country sample is not equal to 1 because Sweden switched from informed to presumed consent legislation in 1996.

chapter, the impact of presumed consent laws on deceased donations is estimated via the FEVD proposed by Plumper and Troeger (2007)¹⁴. The estimation results are reported in table 3.3.

Column (1) displays the entire sample estimation results with only the consent legislation variable as the explanatory factor. Without taking into account of the potential remaining factors, presumed consent countries exhibit 3.5 percent higher deceased donation rates on average, compared to informed consent countries. In the absence of country specific effects and other explanatory factors, Abadie and Gay (2006) found that the impact of presumed consent on deceased donation rates is much higher, around 15 percent on average once the year fixed effects have been accounted for. The reason is that without country specific effects the consent legislation variable soaks up most of the explanatory power of the unobserved heterogeneity and shows a higher-than-otherwise impact of presumed consent laws.

The likelihood of medically becoming a donor is greater for individuals who have been exposed to situations in which irreversible brain injury resulting in brain death is more likely. Given medical compatibility, victims of motor vehicle accidents, assault and cerebro vascular diseases are suitable candidates for transplantation. In column (2) we incorporated the potential donor pool as a factor that might affect deceased donation rates. The estimation results detect a sizeable but lower impact of potential donor pool on deceased donation rates than previously predicted¹⁵.

Column (3) shows that presumed consent countries exhibit 5.3 percent higher deceased donation rates on average compared to informed consent countries after accounting for total per capita health expenditure, death rates caused by cerebro vascular diseases, motor vehicle accidents and homicides, civil rights and liberties and legal systems, whose coefficients are

¹⁴ It is a three stage estimator that allows estimating the impact of time-invariant variables and that is more efficient than the FE model in estimating parameters of almost time-invariant variables. In the first stage the country specific effects are estimated via FE excluding time-invariant and almost time-invariant variables. In the second stage the country specific effects are decomposed into an unexplained and an explained part by the regression on the time-invariant or almost time-invariant variables. In the third stage a (standard error corrected) pooled OLS is performed by including all the time-variant and invariant variables in the model and the unexplained part (residuals) from the second stage. The third stage allows for computing the correct standard errors of the parameters of (almost) time-invariant variables.

¹⁵ The control of supply measures for donation policy purposes creates a paradox in organ collection because the promotion of deceased donation through continuous education and awareness programs contradicts policies that aim to reduce the prevalence of motor vehicle accidents and hand-gun crimes by raising awareness (Annas, 1988). Recently, Dickert-Conlin et al. (2009) found that organ donations due to motor vehicle accidents increase by 10 percent following helmet law repeals and that a nationwide elimination of helmet laws in the US would increase the annual supply of organ donors by less than 1 percent.

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statistically significantly different from zero at conventional levels¹⁶.

The impact of presumed consent laws on deceased donation can be challenged by the fact that significant variations in deceased donation rates are accounted by the way consent laws are practiced and not only by the legal framework. It is argued that the practice of presumed consent regime depends on family referral and donor administration through registries. First, with notable exceptions most of the countries have either a national registry of volunteers or refusals. In presumed consent countries where the default rule is to donate, a registry of refusal (non-donor) allows individuals to explicitly oppose donation. In contrast, in informed consent countries where the default rule is not donate, a registry of volunteers (donor) allows individuals to explicitly consent to donation. It might be argued that if family consent is sought, donor administration should have no impact on deceased donation. However, donor registry can serve as a signaling device both to the next-of-kin and the hospital (Byrne and Thompson, 2001). It is known that the preference of the potential donor is the major predictor of family preference (Tabarrok et al., 2004). This signaling however depends on the legislative default. Under presumed consent, a combined registry allows some individuals to be registered as donors besides those who explicitly object donation. In turn the family who previously would have likely denied consent because of the unknown preferences of the potential donor under a single registry will consent to donation knowing their deceased next-of kin is a registered donor. However the consent rates for those who are not registered will decline because if the individual did not go through the trouble of registering, family may infer that the person was against donation.

On the other hand, under informed consent, a combined registry allows some individuals whose preferences towards donation were previously unknown to be registered as non-donors in addition to those who explicitly consent to donate. In turn, the family will deny consent knowing their deceased next-of-kin is a registered non-donor. However, the consent rates for those who are not registered may rise because if the individual did not register as non-donor, the next-of-kin may infer that the patient would have wanted to donate. Therefore it remains ambiguous whether establishing a combined registry will increase deceased donation rates.

¹⁶In the preliminary analysis, a binary variable representing religious belief that takes the value of 1 for countries in which the majority of the population is catholic and 0 otherwise has been considered as a potential factor that might affect deceased donation rates. However, such a measurement will not represent the effect of religious beliefs on deceased donation because it does not take into account the practice of religion but merely represents a group of the population who consider themselves as Catholics.

Table 3.3.: The impact of presumed consent legislation on deceased organ donation, 1993-2006

dependent variable: natural logarithm of deceased donation rate, pmp							
Fixed Effects Vector Decomposition (FEVD)							
	(1)	(2)	(3)	(4)	(5)	(6)	
Constant	2.646** (0.014)	-1.129** (0.203)	-0.789** (0.214)	-0.753** (0.257)	-0.589** (0.291)	-0.607* (0.314)	
Legislation							
presumed consent							
Health Spending	0.035* (0.019)	0.060** (0.015)	0.053** (0.016)	0.135** (0.015)	0.134** (0.017)	0.180** (0.026)	
log of per capita health expenditure							
Potential donors							
log of CVD+MVA+Homicide pmp		0.330** (0.015)	0.260** (0.016)	0.258** (0.019)	0.249** (0.020)	0.253** (0.022)	
Freedom							
civil liberties		0.190** (0.021)	0.241** (0.019)	0.238** (0.021)	0.231** (0.023)	0.230** (0.025)	
Legal System							
common law			-0.122* (0.016)	-0.122** (0.016)	-0.137** (0.018)	-0.137** (0.019)	
Role of the family							
family consent			-0.029** (0.014)	0.029** (0.014)	-0.001 (0.018)	-0.026 (0.019)	
Donor administration							
combined registry				-0.100** (0.009)	-0.095** (0.010)	-0.071** (0.017)	
Interaction terms							
presumed consent×registry					-0.156** (0.025)	-0.308** (0.036)	
presumed consent×family consent						-0.051 (0.056)	
presumed consent×family consent×registry						-0.101** (0.024)	
R-squared	0.7804	0.8972	0.8919	0.8927	0.8933	0.8928	
Sample size	359	290	290	290	290	290	
Normality test (p-value)	0.0000	0.3245	0.3528	0.3918	0.4798	0.5579	
Specification test (p-value)	0.0000	0.6348	0.7390	0.7303	0.7561	0.7416	
Include country fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	
Include year fixed effects	Yes	No	No	No	No	No	

Notes: Standard errors in parentheses are robust to arbitrary serial correlation and heteroscedasticity between countries. The second-stage residuals are not shown. The normality test reports p-values for the null hypothesis of normally distributed residuals. The specification test reports p-values for the null hypothesis of redundant year fixed effects. * and ** denote statistical significance at 10% and 5% respectively.

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In order to correctly identify the impact of presumed consent on deceased donations, we included family consent and donor registry variables in columns (4) and (5) as well as all the relevant interactions of presumed consent, family consent and donor registry variables in column (6)¹⁷. Based on the estimation results displayed in the last column of table 3.3, the impact of presumed consent law and other procurement attributes on deceased donation rates are reported in table 3.4 in which the sample countries are divided into eight groups based on the information on consent legislation, family consent and national registry. Each cell gives the impact of the row group on the corresponding column group. The particular interest is the impact of presumed consent legislation on deceased donation rates given its interaction with the family consent and the national registry variables.

Countries in which presumed consent is enacted exhibit 19 percent higher deceased donation rates on average compared to informed consent countries given both types of countries do not routinely seek family consent, irrespective of the donor administration system (cells corresponding to third row seventh column and fourth row eighth column). On the other hand if family consent is routinely sought but at most a single registry is maintained, presumed consent countries exhibit only 8 percent higher deceased donation rates on average (cell corresponding to first row fifth column). In contrast, if both types of countries maintain combined registries and always seek family consent, the impact of presumed consent on deceased donation rates is substantially higher around 75 percent on average (cell corresponding to second row sixth column).

Within presumed consent countries, routinely seeking family consent exhibit 15 percent lower donations on average under a single registry system (cell corresponding to first row third column) but 36 percent higher donation rates on average if a combined registry is maintained (cell corresponding to second row fourth column). On the other hand, routinely seeking family consent has a negative impact on deceased donation rates, around 7 percent, within informed consent countries irrespective of the type of donor registry (cells corresponding to fifth row seventh column and sixth row eighth column).

¹⁷In the specification analysis, a family veto dummy variable compiled from various sources has been considered as a potential explanatory factor. However, it has not been considered in the regressions for two reasons. First, the family veto variable is highly correlated with consent legislation and registry variables whose inclusion in the regressions rendered significant estimates but a lower than otherwise R-squared, confirming collinearity. Second, even if countries allow the right to veto donor's wishes families do not use this right either because they do not want to oppose their loved one's wishes or do not actually aware whether such a right has been granted.

Maintaining a combined registry exhibit a negative impact on deceased donation rates, around 26 percent, within informed consent countries (cells corresponding to eighth row seventh column and sixth row fifth column) whereas maintaining a combined registry exhibit 19 percent higher deceased donation rates on average within presumed consent countries which routinely seek family consent (cell corresponding to second row first column). However, maintaining a combined registry exhibits a negative impact on deceased donation rates, around 26 percent on average within presumed consent countries which do not routinely seek family consent (cell corresponding to fourth row third column). This result might indicate that maintaining a combined registry in presumed consent countries functions as a positive signaling device when families are always asked for consent. A possible explanation is that in an opt-out system in which only those who explicitly oppose donation can register, most of the individuals who do not oppose donation cannot signal or express their preferences to their families especially if discussing issues of donating one's organs upon his or her death is a difficult task and considered a taboo. Upon the introduction of a donor registry in such opt-out systems, by registering as "donor" some individuals will no longer have unknown preferences. This will induce families to allow donation of the organs of their deceased next-of-kin. On the other hand if families are not asked for consent they will be offended by being excluded from the procurement process and oppose donation even if the decedent was a registered donor, on the grounds that they assert a right on the body of their next-of-kin however such a right is not allowed to be exercised. However exceptions do exist. In Austria and Czech republic where the former country long considered the body of the deceased a property of the state, the deceased donation rates are substantially higher not only because the procurement process is well organized and efficient but also the public tends to reconcile with the strict enforcement of presumed consent legislation, internalizes the practice of exclusion of the family from the decision-making process and accepts organ donation as an ideology that is perceived as an implicit communal contract (Mossialos et al., 2008).

3.4. Policy Implications

This chapter presented empirical evidence on the impact of presumed consent laws on deceased donation rates by examining the interactions between a presumed consent legal regime and other customs and institutions. Given the small sample size, the absence of sufficient variation

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Table 3.4.: The impact of legislative attributes on deceased donation rates

Group	PC/FC/SR	PC/FC/CR	PC/NFC/SR	PC/NFC/CR	IC/FC/SR	IC/FC/CR	IC/NFC/SR	IC/NFC/CR
PC/FC/SR	-	-0.1613** (0.0709)	-0.1585** (0.0155)	0.1460** (0.0475)	0.0823** (0.0228)	0.4741** (0.0392)	0.0075 (0.0217)	0.3723** (0.0421)
PC/FC/CR	0.1923* (0.1008)	-	0.0032 (0.0808)	0.3664** (0.0996)	0.2904** (0.1192)	0.7576** (0.1387)	0.2013* (0.1075)	0.6363** (0.1260)
PC/NFC/SR	0.1884** (0.0219)	-0.0032 (0.0803)	-	0.3620** (0.0492)	0.2863** (0.0351)	0.7519** (0.0534)	0.1974** (0.0321)	0.6310** (0.0547)
PC/NFC/CR	-0.1274** (0.0362)	-0.2681** (0.0533)	-0.2657** (0.0265)	-	-0.0555 (0.0532)	0.2863** (0.0351)	-0.1207** (0.0476)	0.1974** (0.0321)
IC/FC/SR	-0.0760** (0.0195)	-0.2251** (0.0715)	-0.2225 (0.0212)	0.0588 (0.0596)	-	0.3620** (0.0492)	-0.0690** (0.0163)	0.2679** (0.0542)
IC/FC/CR	-0.3216** (0.0180)	-0.4310** (0.0449)	-0.4292** (0.0174)	-0.2225** (0.0212)	-0.2657** (0.0265)	-	-0.3164** (0.0255)	-0.0690** (0.0163)
IC/NFC/SR	-0.0075 (0.0214)	-0.1676** (0.0745)	-0.1649** (0.0224)	0.1373** (0.0615)	0.0741** (0.0188)	0.4630** (0.0546)	-	0.3620** (0.0492)
IC/NFC/CR	-0.2713** (0.0223)	-0.3888** (0.0470)	-0.3868** (0.0205)	-0.1649** (0.0224)	-0.2113** (0.0337)	0.0741** (0.0188)	-0.2657** (0.0265)	-

Notes: Health spending, potential donors and civil liberties are evaluated at means. Column indicates the reference group. Multiplication of the coefficient by hundred gives the percentage impact. Standard errors in parentheses are computed using the delta method. PC and IC denote “presumed consent” and “informed consent” respectively. FC and NFC denote “family consent is always sought” and “family consent is not always sought” respectively. SR and CR denote “at most single registry” and “combined registry” respectively. * and ** denote statistical significance at 10% and 5% respectively. For example, the cell corresponding to first row and second column reads as “a presumed consent country with at most a single registry in which family consent is always sought produces 16.13 percent lower deceased donation rates than a presumed consent country with a combined registry in which family consent is always sought”.

in consent legislation variable within countries over time and the points Healy (2005) raises about presumed consent being a signal of a country's commitment to donation rather than a direct cause of higher donation rates, the results presented should be treated with extreme caution.

In order to identify both the differential country endowments of deceased donation rates and the impact of consent legislation and other time-invariant legislative attributes on deceased donation rates, a FEVD model that decomposes country fixed effects into an unexplained part and a part that is explained by our time-invariant or almost time-invariant explanatory variables is estimated. The evidence confirms that countries in which presumed consent is enacted produce substantially higher deceased donation rates. However, the magnitude of this impact depends on the involvement of the family and the establishment of donor administration systems that have not been addressed previously. Presumed consent laws may greatly increase deceased donations if hospitals cease to seek family consent and maintain at most a non-donor registry or always seek family consent irrespective of the documented preferences of the deceased but also give both organ retainers and donors the right to state preference through registration (i.e. combined registry). The evidence indicates that otherwise presumed consent legislation does not have a sizeable impact on deceased donation rates.

These results may have serious implications in the course of switching from an informed to a presumed consent legislation. As the Brazilian experience with the presumed consent regime showed, potentially perverse effects that might arise due to failure to build social support and to establish better and timely organization of the procurement processes should not be ruled out. Brazil switched to presumed consent regime in 1998 that allowed organ removal from the deceased without seeking family consent and later attempted to reinforce the system by the threat of prosecuting doctors who refused to extract the organs of the deceased. Not only the presumed consent legislation has received a public backlash causing many to register as non-donors but also suffered from severe lack of medical infrastructure, timely organization of the procurement process and efficient allocation of organs (Csillag, 1998; Jensen, 2000). The legislation is inevitably abolished few years later. Similar concerns have been raised in Romania which recently switched from an informed to a presumed consent legislation (Grigoras et al., 2010). Therefore a presumed consent regime is not sustainable without a solid infrastructure and social support and is unlikely to be effective (Verheijde et al., 2009). It seems early to conclude for advocates, for example in the UK that switching to presumed consent laws by

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observing the successes of Spain on one side and Austria on the other side would increase deceased donations even though both countries enacted presumed consent law yet practices seem to differ to a large extent.

In a recent report the BMA expressed their support for a “soft” presumed consent system with safeguards in the UK which continues to involve the family (English, 2007). The empirical evidence presented concurs with the BMA’s view of a system of “soft” presumed consent and it might be effective in controlling organ shortages provided that families are not ruled out of the decision-making process in the transition period and a combined registry is established in order to respect both opponents’ and advocates’ views towards donation. Concerning strictly presumed consent countries where families are excluded from the procurement process, further empirical evidence may be needed to examine their success in raising donations.



As part of a NEAD chain, Dr. Stuart Geffner transplants a living donor kidney at Beth Israel Hospital in Newark in March 2009. Photo by Matt Rainey (The Star-Ledger)

4. Living Organ Procurement Policies

“Shall organs go to the sickest, or to the ones with most promise of recovery; on a first come, first serve basis; to the most valuable patient; to the one with the most dependents; to women and children first; to those who can pay; to whom?” Joseph Fletcher

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Living donor OPPs differ significantly from the deceased OPPs both in terms of the organs in question as well as in terms of the denouement of the donor. Transplantation of living donor organs are restricted to a single kidney, partial lung and partial liver transplants of which the latter two are complicated procedures and expose donors to significant health risks.

There are quite few advantages of using living donor organs for transplantation. First, the survival rates for living donor organ recipients are markedly higher than deceased donor organ recipients. Currently in the US for which data is readily available from the OPTN, 5-year survival rates of a kidney, partial liver and partial lung recipients from a living donor is 90.1, 77.8 and 35.8 percent compared to 81.9, 72.0 and 47.3 percent from deceased donors respectively. At a rough computation, a living donor organ recipient in the US is 16.4 percent more likely to live 5 years than a deceased donor organ recipient.

Despite the advances in immunosuppressive therapy, most of the living donors are altruistic and biologically related family members whose organs are less likely to be rejected by the recipient¹. In fact about 80 percent of living donors and recipients in the US are biologically or emotionally related (Becker and Elias, 2007). Biologically related living organ donation is one of the driving forces that leads to higher survival rates than under deceased donation.

A third advantage is that living donation allows for sufficient time to prepare the kidney recipient and the donor for transplantation which reduces the likelihood of complications during surgery (Steinbuch, 2008). During a living organ transplantation, the removed kidney can be transplanted right away without any concern for cold ischemia time that would typically occur in cadaveric transplantation². This advantage of living donor organs greatly increases the medical effectiveness of transplantation. Living donation also allows for the possibility of preemptive transplantation which is confirmed to have some survival advantages (Kasiske et al., 2002; Mange and Weir, 2003; Gill et al., 2004)³.

When a living donor donates one of his kidneys, failure of the remaining kidney would require a transplant albeit there exists a prolific body of clinical evidence documenting that living kidney donors have an equal post-operative quality of life to those with both kidneys

¹Deceased donors cannot be altruists but rather volunteers because altruism is defined as the act of knowingly harming him/herself for the benefit of others. By this definition only living donors are true altruists. However, in common parlance altruism refers to the act of furthering the welfare of others which is different than the former.

²Cold ischemia time is the period that begins when an organ is cooled after the removal and ends when it is implanted into the recipient.

³A kidney transplant is called preemptive if the patient did not go through pre-transplant dialysis which is associated with increasing risks of mortality and allograft failure.

intact (Ku and Kim, 2010). Living donation still carries significant health risks for the donor which is not a problem under deceased organ procurement.

The major distinction between living OPPs and deceased OPPs is that the former set of policies will always respect patient autonomy because the individual in question states her preference or will and act accordingly while alive whereas policies involving the procurement of the organs of the deceased may impinge upon the wishes of the formerly competent patient because a surrogate has to decide on his/her behalf.

4.1. Policies based on monetary incentives

A decade ago, market incentives to living donors in return for supplying a non-vital organ (kidney) or revising the allocation rather than procurement were out of the scope of the debate because most economists thought of the former raising ethical issues and the latter raising equity concerns. Under monetary incentives for living donors most of the scholars proposed monopsonistic systems or compensation of non-medical risks for living donors although there are exceptions⁴.

4.1.1. Government Monopsony

In a monopsony, all buying and selling rights are alienated to the government which offers a fixed price for organs of living unrelated donors. The government then delegates this duty to a non-profit organization who is responsible for the equitable distribution of organs as well as the matching of potential donors and recipients.

The commercialization of human organs is prohibited in all countries but one. A regulated market in living donor kidneys has been established in Iran, known as the *Iranian Model*. In 1988, Iran adopted a paid, government-funded, regulated living unrelated kidney transplant program. If an ESRD patient does not have a willing, living related donor and if a deceased donor cannot be found within six months, then the patient is referred to DATPA which is the only organization delegated to find suitable living unrelated donors (Ghods and Savaj, 2006). Neither the transplant centers nor the transplant physicians play a role in finding and matching donors (Hippen, 2008). Those who would like to sell their kidneys are also

⁴Bartz (2003) proposed that prisoners shall be given a reduced sentence which, according to his proposal, ranges between 60 days to 8 years depending on the portion of the body donated, premortem or posthumously.

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referred to DATPA and no financial incentive is offered to find an immunologically compatible donor. After the transplantation the government pays for all the expenses of the operation and the donor receives approximately \$1,200 and a health insurance from the government. The donor also receives a separate payment of \$2,300 – \$4,500 either from the recipient or from a charitable organization (Hippen, 2008). With the Iranian model the kidney waiting list has been completely eliminated by 1999. The Iranian model also has few safeguards in order to protect donors. The system does not allow any broker or third party to involve into the exchange. In order to prevent organ trafficking foreigners are not allowed to receive kidneys from Iranian living unrelated donors or to donate kidneys to Iranian patients.

In western countries, proposals for a government monopsony in living donors has been discussed by Rapoport et al. (2002), Harris and Erin (2002), Friedlaender (2003), Hippen (2005), Becker and Elias (2007) and recently by Steinbuch (2008). Becker and Elias (2007) provides a single market price estimate of what it would cost to use monetary incentives to induce sufficient supply of living and deceased kidney donors to reduce the organ shortage. They argue that monetary incentives could increase the supply of organs sufficiently enough by increasing the total cost of transplant by no more than 12 percent. They assume that the reservation price of an organ consists of three additive components: monetary compensation for the risk of death, time lost during recovery and risk of reduced quality of life. The estimated single price for kidneys, living or cadaveric, ranges from \$7,689 to \$27,677 and ranges from \$18,705 to \$69,291 for livers depending on the value of statistical life, risk of death, quality of life and foregone earnings.

Harris and Erin (2002) argues that the NHS in the UK shall act as a monopsonist that purchases human organs and tissues from living donors and distributes them on the basis of urgency or some fair principle at no cost to the recipient. They also suggest that donors who contribute to the scheme shall be given the right to priority access of a transplant if they need it in the future⁵. A similar proposal has been made by Rapoport et al. (2002) and Friedlaender (2003) in Israel. Both studies propose a tax-exempt fixed payment to living kidney donors with long-term follow up by the Israel Transplant who acts as a monopsonist. The US counterpart of this scheme is proposed by Steinbuch (2008). He proposed that the inalienable buying rights could be given to UNOS only, at a market price above a statutorily set minimum, which Steinbuch envisages to be at least \$20,000 for kidney and that UNOS will

⁵Currently, UNOS gives living donors priority access for a transplant.

allocate them according to need, as it is allocated today. This way the risks of exploitation of the poor and issues related to the ability to pay of the rich are eliminated. Steinbuch (2008) suggests that the payment shall spread over several years and donors shall be given lifetime government-funded supplemental health insurance. To circumvent market abuses, he suggests that a minimum waiting period and age requirement shall be imposed prior to kidney sale.

Monetary alternatives are perceived beyond the moral values and notions a society could seize, although there are many reasons for the dismissal of these alternatives. The major objection to a market for living donors is that allowing payment will compromise human dignity and that commodification of body parts is morally unacceptable and repugnant. Proponents of the idea of dignity of the individuals and respect in persons believe that body is part of the basic human dignity. According to de Castro (2003), selling an integral body part constitutes commodification because the value of organ and the human being to which it is integral becomes calculable once a price is set for selling them. Therefore, the organ is no longer a priceless body part⁶. From a normative sense it is argued that a policy is not necessarily immoral just so it offers monetary incentives for donation per se. An OPP could be based on an altruistic motivation yet be morally repugnant or based on monetary incentives yet be morally acceptable. The immorality of selling organs rests on the second formulation of Kant's categorical imperative: "*act in such a way that you treat humanity, whether in your own person or in the person of any other, never merely as a means to an end, but always at the same time as an end*" (Kant, 1785). Proponents of a market system argue that we commodify our bodies by selling blood, tissues, sperm, plasma, donor eggs for pregnancy or military career and these acts are not prohibited (Gill and Sade, 2002; Becker and Elias, 2007; Steinbuch, 2008). They further argue that abortion, physician-assisted suicide, prostitution, contraception, pornography, embryo experimentation, homosexuality and many other acts or preferences that people may find repugnant or consider them as acts or preferences demeaning human dignity are permitted by the society. Cherry (2005) argues that rhetorical moral terms such as sanctity, sacredness, dignity or even repugnance should therefore not bear any moral

⁶Calabresi and Bobbitt (1978) distinguishes between two kinds of determinations concerning a scarce good. The first order determination as they call, deals with how many transplantations shall be performed or alternatively how many organs shall be recovered either from a living or a deceased person. The second order determination deals with who receives that organ. Accordingly, all first order determinations contradict the pricelessness of a particular good unless imposed by absolute natural scarcity. Given the fact that human organs represent a quasi-natural rather than absolute scarcity, human organ cannot be priceless according to this notion.

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weight for the prohibition of organ sale. Gill and Sade (2002) argues that if selling kidneys violates Kantian duty to oneself, then all the above-mentioned acts shall be prohibited as well because they all treat humanity as means. From an ethical viewpoint repugnance is not a decisive factor and being repugned by the commodification cannot be an ostensible reason for banning organ sale.

Van Dijk and Hilhorst (2007) states that ethicists and medical doctors have difficulty with living donation because of the physical harm inflicted on living donors which violates one of the fundamental principles in medical ethics: *primum non nocere* (first, do no harm). Although this may be a legitimate argument to ban living donation completely regardless of the structure of the policy, it is generally not a convincing argument because the benefit to a recipient more than compensates the harm inflicted on the donor. Besides, medical professionals always harm their patients through euthanasia, especially passive euthanasia of brain-injured individuals, cancer treatment, or transplantation in order to help them⁷. The existing contradictory practice shifts the principle from *primum non nocere* to *primum succerrere* (first, hasten to help)⁸. Therefore oppositions based on “first, do no harm” can only be convincing if the whole practice of living donation is banned, not just organ sale.

A second objection to market-based reforms is that they may result in harvesting of low quality organs for two reasons⁹. First, it is argued that the health of the poor who is coerced to sell their kidneys will be lower compared to a wealthy individual who cannot be exhorted to sell his kidney by offering monetary incentives. Second, in a market by which profit is generated, institutions that are delegated to procure human organs will engage in aggressive solicitation from financially desperate individuals. This will loosen donor eligibility requirements in order

⁷Cancer patients undergo chemotherapy which destroys both cancerous and healthy cells. Similarly pre-transplant treatment of the recipient involves the injection of immunosuppressive drugs so that the transplanted organ is not rejected. These drugs render the immune system vulnerable to trivial but potentially deadly diseases.

⁸The principle of *primum succerrere* implies that an unexperienced medical condition could be exchanged with another in order to eradicate the existing medical condition. In the context of transplant medicine this could hardly be considered a cure.

⁹The connection between the form of exchange and the quality of the commodity being exchanged has been discussed at length in the market for blood. Titmuss (1971) claimed that a commercial, market-driven system in blood donation is inferior to a voluntary system. The reason is that if blood becomes a commodity which is exchanged in return for payment, those who wish to sell their blood will have an incentive to lie about their health and will be more likely to transmit a disease. By contrast he argued that there is no reason to lie about one's health if the system is based on unpaid volunteers. Therefore, Titmuss argued that a voluntary system will supply high quality of blood. Titmuss however, failed to take into account the contingent nature of the relation between the form of exchange and the quality of blood supply with depends on the distribution of disease in the population (Healy, 2006).

to harvest more organs to make more profit. The extended criteria for donation may result in lower quality organs and the existence of profit-driven institutions may further threaten donor allocation protocols but the market reform itself is not the source of low quality of organs (Hylton, 1990); it is the market structure and other subject-irrelevant problems such as the distribution of disease in the population. In a competitive market offering payment to living donors therefore may increase the proportion of diseased organs. However, if the market is monopsonistic there is no reason to believe that the procured organs will be of lower quality compared to those procured in an altruistic system.

A third concern postulated by the opponents of organ sale is that the free will of the donor will be compromised by offering financial incentives and most of those who would sell their organs to the rich would be the poor. This argument rests on the evidence from black markets and would be partly convincing if organs were sold in an unregulated market just as it currently is in underdeveloped countries. The allocation of organs solely by medical criteria would prevent individuals to seek organs by themselves. Thus under a regulated market it is not possible to buy an organ outside the system. Healy (2006) argues that a commodified exchange is not a direct cause of donor exploitation but it is rather the social context that puts them in a situation that leads to exploitation.

All market proponents so far have emphasized that their proposal is strictly confined to the procurement and not allocation. Whenever organs are acquired through changing motivation by offering money, there is no reason to believe why they should not be distributed according to the ability to pay. Furthermore, for the fact that if sellers have the right to demand whatever amount they deem appropriate for their kidneys, they also have the right to give it to whomever they deem appropriate. Even in the current allocation system for organs in the US which strictly prohibits explicit payment, living donors are allowed to direct their donation to a specific but unknown individual through bypassing organ allocation protocols, known as *unrelated directed donation*. Given that it is very difficult to determine the underlying motivation of the living donor to donate to a complete stranger, may it be altruistic, a hidden monetary exchange, photogenicity or social worth of the recipient all of which are irrelevant criteria to allocate an organ under UNOS policies, a directed living organ donation from a complete stranger undermines the efforts of UNOS to provide an efficient and equitable organ distribution and broaches a set of justice and fairness issues.

A commercial non-profit website called *MatchingDonors* operates to match recipients and

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unrelated donors who would like to voluntarily donate. The caveat with *MatchingDonors* is that they require recipients to pay for the opportunity to gain access to the site where such donors browse to choose their recipients¹⁰. The UNOS board has opposed this concept on the grounds that it exploits vulnerable populations and undermines public trust in the equitable allocation of human organs for transplantation¹¹. It is expected that directed donation from complete strangers such as those advertised in *MatchingDonors* will find further legitimate grounds following the introduction of payment in living donors. Thus it is very likely that recipients and donors will find additional incentives to override organ allocation protocols, albeit the distribution of organs under a monopsony proposal is still based on medical criteria. Therefore, a monopsonistic market in living organ donors is susceptible to distributional inefficiency.

If a free market is considered to be excessive and it is thus appropriate to offer a single price and to delegate a single buyer, then one must set a price at a level that would persuade a sufficient number of individuals to sell their kidneys. But what if this price is prohibitively high thus financially infeasible because no one is willing to supply a kidney for a small payment or prohibitively low such that it is unfair to sellers? Even if precautionary measures would prevent rich to access these organs, the burden will fall disproportionately on the poor. Accordingly, those who would sell their kidneys will be so desperate that their decision will no longer be considered a free choice (Gill and Sade, 2002). Poverty highlighted by organ sale, will force poor to sell their kidneys which will in turn aggravate inequality. It may be considered as morally unacceptable to implement a policy that aggravates inequality for the sake of efficiency. Such undesirable outcomes cannot be rectified by implementing half-way measures unless a redistribution of wealth and change in the means of production is targeted (Gill and Sade, 2002).

Perhaps the most striking yet succinct argument against the permissibility of human organ market is that it would erode social values. Inducing people to sell their kidney might erode the sense of care, generosity, altruism and might lead to social alienation (Rothman and Rothman, 2006).

¹⁰The fee to post a patient's profile in the database of MatchingDonors (organ registry fee) ranges from \$49 (7-day trial) to \$595 (lifetime membership). As of October 2010, there are 8642 registered potential donors and 527 patients awaiting for a transplant. About 100 transplants have been performed through MatchingDonors since its inception in 2004. <http://www.matchingdonors.com>

¹¹Interim Report of the OPTN/UNOS Ethics Committee, December 7, 2009. http://optn.transplant.hrsa.gov/CommitteeReports/interim_main_EthicsCommittee_1_5_2010_9_18.pdf

4.1.2. Reimbursement of Living Donors

The key concern that distinguishes living donors from deceased is that they are exposed to financial risks and that these risks may generate disincentives or barriers to donation. Therefore it has been increasingly stressed that living donors should be compensated for a number of non-medical costs incurred throughout this process. According to the Gallup (2005) survey, 52 percent of the Americans strongly agrees that living donors should be compensated for the costs of travel, child care and forgone earnings and 73 percent stresses that living donors should not be denied health or life insurance after donation. A number of compensation schemes that have been proposed include compensation for the costs of travel, lodging, forgone earnings, social security in the form of life insurance or long-term health insurance, even college tuition.

Gaston et al. (2006) proposes an inalienable package benefits for living donors to compensate them for the risk of mortality and medical complications that might arise following the surgery. The package includes a 1-year life insurance policy of \$1,000,000, a health insurance policy for long-term care and a reimbursement of travel expenses and forgone earnings. Further the authors propose that living donors could also be compensated by a tax deduction of \$10,000 or a tax-exempt lump sum payment of \$5,000 to offset the inconvenience, pain and anxiety of the individual. The cost of their proposal is in the range of \$23,525 to \$32,800 with a median saving of at least \$66,000 per living donor.

A number of countries have introduced or enacted legislation concerning the reimbursement of living organ donors including Australia, Belgium, Canada, Finland, France, Germany, Hong Kong, Japan, Luxembourg, Morocco, the Netherlands, Poland, Singapore, Spain, the UK and the US¹².

Little is known regarding the effectiveness of living donor reimbursement policies on donation rates. Recently, the impact of state legislation and federal policies on living kidney donation rates in the US is investigated by Boulware et al. (2008) and Wellington and Sayre (2010). The findings of the former study show that state and federal policies were positively associated with living unrelated kidney donations but not associated with living related donations. On the other hand, the latter study did not find any evidence to support that these laws affect

¹²See Boulware et al. (2008) for a detailed description of state legislation and federal initiatives for the reimbursement of living organ donors in the US. For a detailed description of international legislation on reimbursement of living donors consult Pattinson (2003) and Klarenbach et al. (2006a).

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organ donations. Further empirical research is needed to examine the relationship between legislation and living donation rates extensively¹³.

4.2. Non-monetary organ allocation

Non-monetary organ allocation mechanisms have been proposed in an attempt to not provide a general solution to the shortage of transplantable organs but rather to optimize the living donor organ allocation and to help people who already have a willing live donor (Roth, 2007). By this nature non-monetary organ allocation policies are free from coercion and only discriminate according to medical attributes which are not relevant criteria for policy evaluation. Due to lack of allocation protocols in living donation (perhaps perforce), non-monetary policies will not respect the medical need criteria.

4.2.1. Pairwise Kidney Exchange

In the face of widely acknowledged repugnance for explicit monetary incentives for donation, it is argued that living altruistic donation should be reinforced by efficient allocation of donors. This allocation mechanism is developed by Roth et al. (2005b). The idea is that the kidney of an altruistic individual who consents to donate to his/her loved one cannot be transplanted if the organ is incompatible with the biological recipient. Consider the example in figure 4.1. A kidney transplantation within pairs $\{1, 2, 3\}$ is not possible because they are immunologically or bloodwise incompatible¹⁴. However, the individual R_1 is found to be compatible with D_3 , D_1 is found to be compatible with R_2 and R_3 is found to be compatible with D_2 . Donors and recipients make a complete circle. This incompatibility resolving exchange mechanism has been implemented by the New England PKE program based on Roth et al. (2004, 2005a,b, 2007). Currently, kidneys can be exchanged between up to thirteen incompatible patient-donor pairs¹⁵. A variant of PKE is AUPKE in which one donor-recipient pair is incompatible

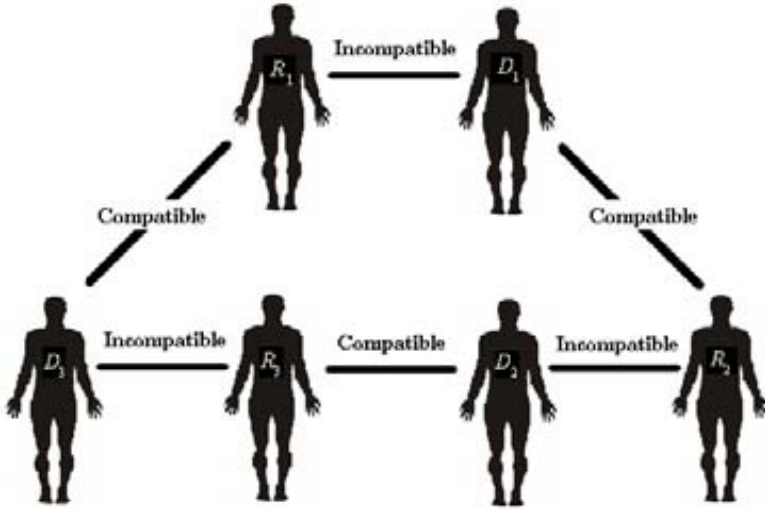
¹³See Chapter 5 for empirical evidence from the US on the impact of legislation related to reimbursement of living donors on living donation.

¹⁴An individual of blood type O can only donate to a recipient with blood types O , A , B and AB and can only receive an organ from an individual of blood type O . An individual of blood type A can only donate to a recipient with blood types A and AB and can only receive from an individual of blood type A and O . An individual of blood type B can only donate to a recipient with blood types B and AB and can only receive from an individual of blood type B and O . Finally, an individual of blood type AB can only donate to a recipient with blood type AB and can receive from an individual of any blood type.

¹⁵A historic six-way paired donation has been performed for the first time at Johns Hopkins Medical Center on 14 January 2009. The transplantations are successfully performed on 12 patients simultaneously at 3

(e.g. B-donor > O-recipient) and the other donor-recipient pair is compatible but not identical (e.g. O-donor > B-recipient). Swapping the recipients results in two compatible and identical (B-donor > B-recipient and O-donor > O-recipient) living donor kidney transplants. Blood type O recipients are the most unfortunate ones among all patients because they can only receive from type O patients. Therefore, an altruistically unbalanced donation can help these type O patients to find compatible kidneys.

Figure 4.1.: Pairwise kidney exchange



PKE has its drawbacks. For instance, if D_1 decides not to donate after D_3 has donated, then R_2 will not get a transplant. Then D_2 will not donate and thus R_3 will not be able to get a transplant. Rees et al. (2009) therefore assert that transplants must be performed simultaneously to eliminate the possibility of donor renegeing as opposed to Becker and Elias (2007) who argued that the simultaneity of transplants is to avoid the risk of payment between the donor and the recipient. The simultaneity of transplants further poses coordination problems among the transplant teams. Becker and Elias (2007) claimed that the New England PKE program is unlikely to provide a substantial increase in the number of transplants. This foresight, as it might be correct, is not caused by the mechanism per se but rather by the low number

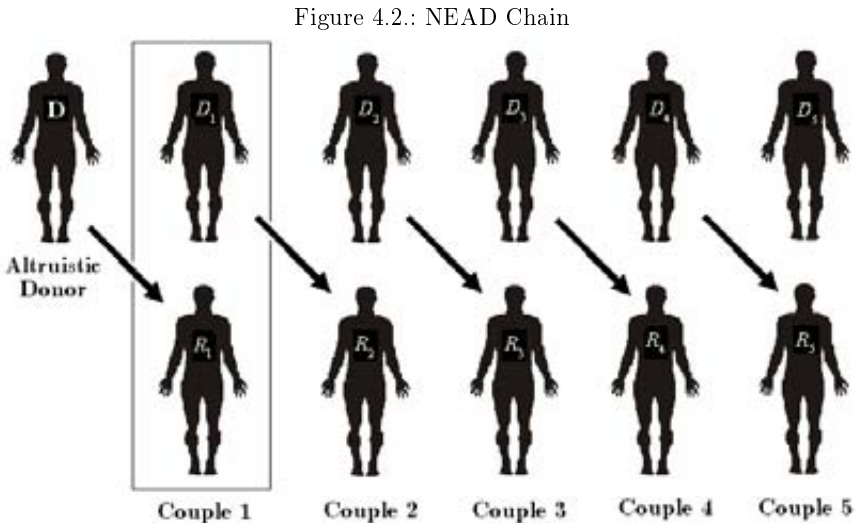
transplant centers in Baltimore, St. Louis and Oklahoma City. Over 100 medical personnel served the exchange. Between 2-11 December 2009, a thirteen-way paired donation has been performed jointly with Georgetown University Hospital and Washington Hospital Center. The transplantations are successfully performed on 26 patients.

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of living donations at the outset. According to USRDS 2009 annual report, a total of 280 kidney transplants have been performed in the US between 2003 and 2007 via pairwise kidney exchanges. Roth (2007) stresses that kidney exchange mechanisms, albeit restricted in their ability to solve the organ shortage problem, could increase the number of transplants by a thousand if organized at a national scale.

4.2.2. NEAD Chain

Other kidney exchange mechanisms have been developed by Abraham et al. (2007) and Rees et al. (2009). The mechanism described in the latter study is called the NEAD chain, displayed in figure 4.2. The principle of this mechanism is that recipient R_1 needs a kidney and donor D_1 is willing to donate but is found to be incompatible with R_1 . However, an altruistic donor is found to be compatible with R_1 . The system then finds a compatible match, R_2 for D_1 . Then a compatible match is found for D_2 who then pays it forward by donating to another recipient, R_3 etc... This way a never ending donation chain is established by only a single altruistic donor. The mechanism has been implemented by the initiatives of the Alliance for Paired Donation up to 10 patients in 2007-2008 (Rees et al., 2009).



The NEAD chain is based on altruism and trust. Since the transplants are not performed simultaneously for every chain, there is a risk of donor renegeing. For example, after the

altruistic donor donated to R_1 and if for some reason D_1 fails to donate to R_2 , couple 2 can still enter into another paired chain. Therefore, donor renegeing does not have serious consequences. Further, such possibility is remote because once the altruistic donor has donated, the remaining donors involved in this exchange carry emotionally or biologically induced incentives to donate in order to save the lives of their loved ones. The experience with the NEAD Chain further shows that no donor has reneged so far.

Section 301 of the NOTA states that “It shall be unlawful for any person to knowingly acquire, receive, or otherwise transfer any human organ for valuable consideration for use in human transplantation if the transfer affects interstate commerce.” Because the term “valuable consideration” could include more than cash payments, section 301 is amended by adding the following at the end of section 301 (a): “the preceding sentence does not apply with respect to human organ paired donation.” Thus the amendment excludes PKEs and NEAD chain from the scope of valuable consideration.

4.2.3. List Donation

List donation is very similar to PKE except that the kidney of a living donor who is incompatible with its biological recipient is transplanted to the first compatible recipient on the waiting list. In return the biologically incompatible recipient of the living donor is promised to receive the next available compatible kidney of a deceased donor or receives a higher place in the national waiting list. The distinguishing feature of list donation from other forms of non-monetary living donor allocations is that it combines living and deceased donor allocations and introduces the concept of priority in a way akin to reciprocal systems. List donation exchanges violate the principle of equal transplant access for equal need. Once the incompatible living donor donated a kidney to the first recipient on the waiting list, the next available deceased kidney goes to the biological recipient instead of the second recipient on the waiting list. This situation is problematic because allocation of the organs of the deceased is regulated by UNOS and other networks in Europe such that it favors the one in most medical need while living donor organ allocation is not regulated. By combining living and deceased allocations list donation violates UNOS allocation protocols. Similar objections arise when giving priority to the biologically incompatible recipient instead of allocating her the next available deceased organ. Crowe et al. (2007) argues that a list donation exchange discriminates against blood

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type O recipients. For instance, consider that a living donor with blood type B has a biological but incompatible recipient of blood type O. The living donor thus donates one of her kidneys to a recipient on the waiting list with blood type B in return for seeing her loved one receive a deceased kidney of blood type O. Since patients with blood type O are the ones who wait the longest, Crowe et al. (2007) suggest that blood type O recipients should not engage in list donations but perhaps engage in exchanges such as AUPKE.

4.3. **Concluding Remarks**

This chapter presented an exhaustive review of five living donor OPPs. These are monopsony, reimbursement, PKE, NEAD chain and list donation. These proposals and mechanisms are not evaluated based on the axioms set fourth in chapter 2 because various notions of efficiency of organ allocation mechanisms cannot be determined by neoclassical analysis and further research might be needed.

It is generally acknowledged that the effectiveness of PKE and NEAD chains are limited given their current size. However a nation-wide implementation of these mechanism is believed to greatly increase the number of transplants (Roth et al., 2007).

In contrast to deceased donor OPPs, monopsonistic markets or reimbursement for living donors do not preclude the implementation of organ allocation mechanisms or vice versa because market-based reforms aim to regulate the procurement and organ allocation mechanisms aim to manage an efficient distribution of living donor kidneys. In this light, any monetary incentive policy could be used to reinforce and ensure a higher participation rate in these exchange mechanisms. As mentioned in section 4.2.2 a prerequisite to initiate a NEAD chain is to find an altruistic donor which may not be found so easily. By giving extrinsic motivation a monopsony market or a small reimbursement could exhort more unrelated living donors to participate in NEAD chains. Regardless of whether nation-wide exchanges or market-based reforms are implemented, any modified strategy in living donation will result in higher number of living transplants, particularly preemptive renal transplants.

Reimbursement of non-medical costs must be routinely offered, not to seek out donations but to compensate living altruistic donors for the disutility of weeks of convalescence they experience during the donation process and foregone earnings. On the other hand, monopsonistic markets are not without cost. Potential problems include qualitatively and medically inferior

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outcomes, infringement of donor dignity, exploitation, impingement of free will and violation of donor allocation protocols in a way that results in unfair outcomes. These problems, some plausible some are not, highlight that it may be difficult to establish a morally permissible market for living donors, even when it is highly regulated.



Kidney vendors in Lahore, Pakistan in 2004 demanding financial help from the Pakistani government to pay off debts. Photo by K.M. Chaudary (Associated Press)

5. The Impact of Reimbursement Legislation on Living Donation: Evidence from the US

“The great danger [of economists] is that having seen a slice of human life, they imagine themselves to have seen the whole and they prescribe reforms with a passion that befits those who believe that an irrational world is ignoring their perfectly rational models.” Eric Cohen

5.1. Introduction

The rising prevalence of diabetes and hypertension together with the advances in the transplant technology led to an ever-growing demand for transplantable organs. As of November 2010, there were about 93,000 patients waiting for a kidney transplant in the US. However in 2009, about 15,400 kidney transplants were performed of which only 5,700 were from living donors. Despite the efforts, the yearly additional number of patients registered for a transplant far outstrips the yearly number of removals from the waiting list resulting in an increasing shortage of transplantable organs in the US.

It is known that individuals willing to become living donors are exposed to serious financial and medical risks and that these risks may generate disincentives or barriers to donation. In the face of insurmountable shortage and widely acknowledged repugnance for explicit monetary incentives for donation, an increasing number of proposals emphasizes the urgent need to introduce reimbursement for living donors for non-medical costs incurred throughout the process of donation (Delmonico et al., 2002; Gaston et al., 2006; Klarenbach et al., 2006b; Matas, 2007; Abouna, 2008). Reimbursement schemes of this kind include compensation for the costs of travel, lodging, forgone earnings, social security in the form of life insurance or long-term health insurance.

A second line of proposals discussed tax deduction schemes to exhort individuals to serve as an organ or bone marrow donor (Calandrillo, 2004; Milot, 2008). Tax deduction that may be claimed for organ donation is subtracted from gross income at the time of filing tax returns. As a result this lowers the overall taxable income and the amount of tax paid. Tax deductions are peculiarly regressive because they depend on the tax bracket (Calandrillo, 2004). A tax credit might correct this inequity problem because it is independent of the tax bracket and it reduces the tax owed rather than reducing taxable income. Milot (2008) stresses that tax deduction, albeit it *prima facie* appears to be a sound legislative approach, turns an otherwise non-tax event into a tax item that increases complexity of the tax system and provides differential tax returns to those who become living organ donors because it depends on the tax bracket. At a national level, a study by Boulware et al. (2006) reveals that of those 845 participants surveyed, 91 percent were in favor of reimbursement of medical costs, 84 percent were in favor of paid leave but only 35 percent were in favor of tax deduction/credit.

Most of the states that enacted legislation related to reimbursement of living donors only

allow reimbursement of public employees for becoming an organ donor. The share of public employees in the state population varies in the range of 1 to 4 percent, indicating that those who could potentially benefit from the legislation are a very small group (Boulware et al., 2008). Within the last two decades several states in the US enacted legislation that allows individuals to take paid leave of absence or tax deduction should they decide to become living donors. In 1998, Colorado became the first state that allowed paid leave of absence for prospective donors followed by Wisconsin and Maryland in 2000¹. A number of states further enacted legislation that allows a \$10,000 tax deduction or tax credit to serve as an organ or bone marrow donor which may be claimed for lost wages, travel, lodging and medical expenses. This legislation addresses only employed persons with sufficiently high levels of income to benefit from a \$10,000 tax deduction or credit (Boulware et al., 2008). The legislation that allows tax deduction was first introduced in the states of Wisconsin and Georgia in 2004.

Figure 5.1.: The evolution of state legislation related to reimbursement of living donors

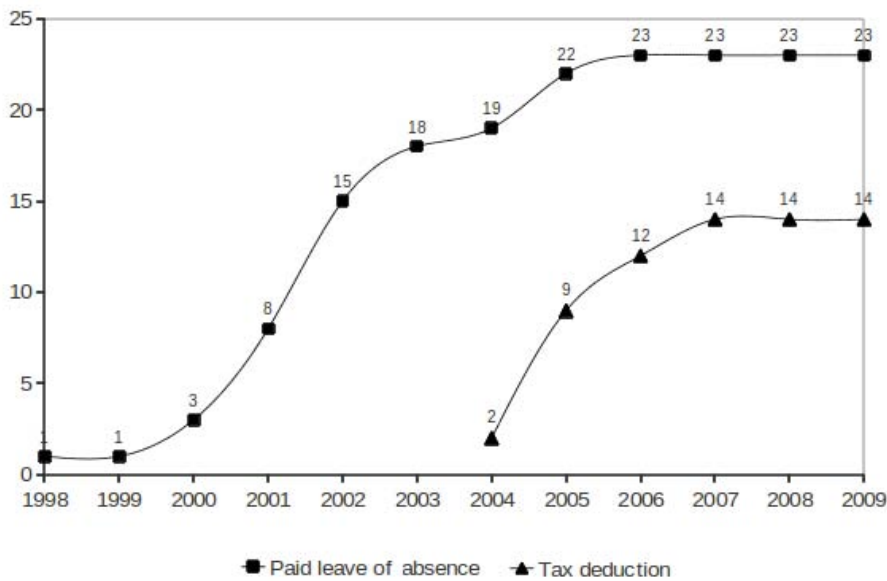


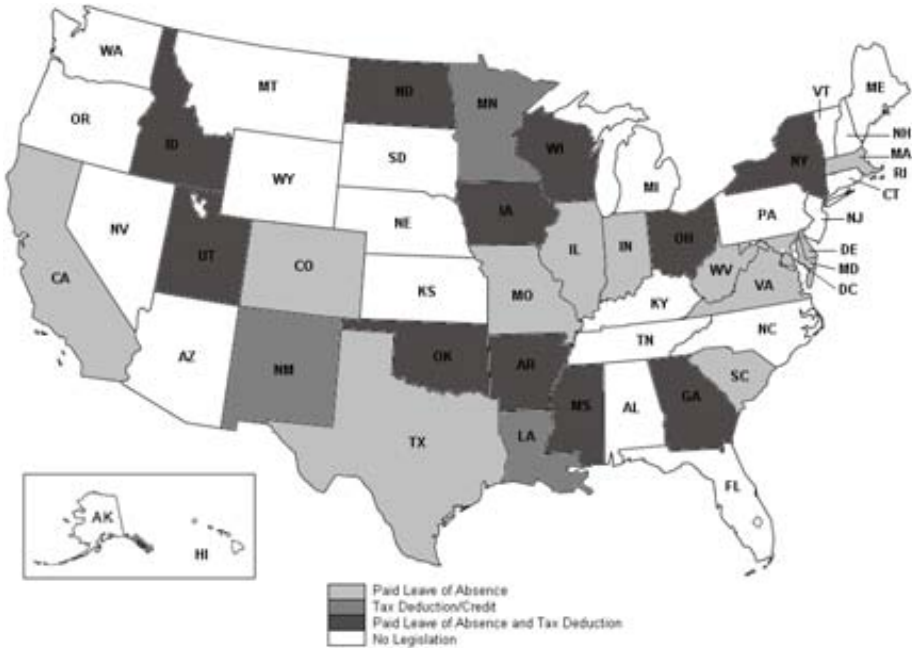
Figure 5.1 displays the number of states that enacted legislation related to reimbursement of living donors in the US since 1998. There has been a tremendous growth in the number of

¹A concise and updated version of the description of state legislation can be found in the appendix A.2.

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states that allowed paid leave of absence between 2000 and 2003 and tax deduction between 2004 and 2006. Currently, there are 26 states in the US that enacted legislation related to compensation of living donors of which 12 states allow paid leave of absence only, 1 state allows tax deduction only, 2 states allow tax credit only and 11 states allow both tax deduction and paid leave of absence for organ donors. Figure 5.2 displays the geographical distribution and the breakdown of state legislation in the year 2009.

Figure 5.2.: State legislation related to reimbursement of living donors



The first study that investigated the impact of state legislation and federal policies on living kidney donation rates in the US was carried out by Boulware et al. (2008). The findings of this study show that the state legislation and federal policies are not associated with sustained improvements in the larger number of living related donations and therefore overall living donation rates. On the other hand, state and federal policies are positively associated with living unrelated kidney donations. This indicates that legislation related to reimbursement of living donors may selectively decrease barriers to living kidney donation from unrelated persons and does not provide additional incentives for related donors. Wellington and Sayre (2010)

examined the association between financial incentives that either allow for tax deduction or 30 days of paid leave of absence and organ donations in the US. The results, in line with the findings of Boulware et al. (2008), show that state legislation is not associated with overall living donations.

Alongside the modest rewards that provide compensation for lost wages, lodging and travel expenses for organ donors in order to decrease barriers to living donation, it has been advocated that the current system of living donor organ procurement in the US could be developed to its full potential by rectifying an efficient allocation of organs from living donors. Currently in the US, most of the kidney transplants from living donors are associated with kidneys donated by relatives, spouses or partners, known as *living related donation*. However in some cases the tissue or the blood type of the related donor may be incompatible with its designated recipient resulting in failure to perform the transplant². PKE programs have been implemented in a number of transplant centers across the US over the last decade, starting with the Johns Hopkins program in Maryland in 2001 and have been developed in an attempt to not provide a general solution to the chronic shortage of transplantable organs but rather to optimize the living donor organ allocation and to help those who already have a willing living donor. In order to increase the number of living donor organ transplants, individuals are further allowed to direct their donation to a specific but unknown individual, known as *living unrelated donation*. This type of living donors are those who do not have any biological, romantic or legal ties with the organ recipient.

Simmons et al. (1987) shows that the likelihood of donating a kidney, knowing the presence of others who might donate, decreases almost linearly with the number of potential known donors. Thus when a donor believes that there are others who can donate the urge or the pressure to help the patient diminishes. This phenomenon is known as *the substitution or bystander effect*. We distinguish between two types of substitution effects. First, living donations differ significantly from deceased donations not only in terms of the medical effectiveness of the procedure and the denouement of the donor but also in terms of the organs in question. Currently in the US, the transplantation of living donor organs are restricted to single kidney, partial lung and partial liver transplants. This special case allows ESRD patients to receive kidneys either from deceased or living donors. Therefore all else equal a kidney obtained from

²The PKE mechanism, developed by Roth et al. (2005b) aims to resolve this incompatibility by swapping related but incompatible donors such that the resulting donor-recipient pairs are medically compatible.

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a brain-dead patient could be a substitute for a kidney obtained from a living donor. Since living donation is an act of genuine altruism, we investigate the extent to which living donors avoid donation on the anticipation that there will be higher deceased donations in the future. This phenomenon is called *the deceased donor substitution effect*. A second phenomenon equally important to the transplant community is the degree to which living related donations are substituted by living unrelated donations. This phenomenon is called *the living donor substitution effect*.

In the light of this information, the aim of this chapter is to provide a preliminary empirical evidence on the impact of legislation related to reimbursement of living donors as well as on the effectiveness of PKEs on living donation rates in the US. Specifically, the focus of interest is on the impact of enacting state legislation that allows individuals to take paid leave of absence, or to claim a tax deduction/credit of \$10,000 from income should they become living donors, on living related, unrelated and total living donation rates. A secondary goal is to provide empirical evidence on the extent to which states that initiated paired organ exchange programs are successful in increasing living donations and to test the existence of deceased and living donor substitution effects in the US. To address these questions, state data on the number of living related, unrelated and total living adult donation rates, combined deceased kidney and liver transplant rates, real per capita GDP, the number of transplant centers, the prevalence of ESRD and binary information on the legislation related to reimbursement of living donors and PKEs have been collected for 50 states and the District of Columbia over the period 1988-2009.

5.2. Empirical Analysis

To the best of our knowledge, empirical studies that aim to identify the factors that influence living organ donation rates in general are limited because the data required to conduct such analysis was not readily available. In particular, none to very little is known regarding the effectiveness of legislation and the impact of paired donation programs on living donation rates. The reason is that both the legislation related to reimbursement of living donors and the kidney exchange programs in the US have been introduced only recently.

5.2.1. Data Source and Descriptive Statistics

The data cover 50 states and the District of Columbia for the period of 1988-2009 with the exception of Alaska, Idaho, Montana and Wyoming which were discarded due to lack of data on the number of living organ donors. State data on the number of living related, unrelated and total living adult donors, the combined number of deceased kidney and liver transplants and the number of transplant centers are retrieved from the OPTN³. State population over the age of 18 is obtained from the US Census Bureau⁴. The number of living adult donors, the combined number of deceased kidney and liver transplants and the number of transplant centers are divided by the respective adult population and multiplied by million to obtain the pmap rates. The prevalence of ESRD pmp is retrieved from the USRDS 2009 Annual Report⁵. Real GDP per capita (in 2000 US dollars) is obtained from the US Department of Commerce, Bureau of Economic Analysis⁶. The state legislation related to reimbursement of living donors is collected from the National Kidney Foundation⁷, TransplantLiving⁸, National Conference of State Legislatures⁹ and Boulware et al. (2008). The tax deduction legislation variable takes the value of 1 if state i allows tax deduction or tax credit at any year t and 0 otherwise. The paid leave legislation variable takes the value of 1 if state i allows paid leave of absence at any year t and 0 otherwise. Finally, the binary variable on PKE which is collected from the OPTN, takes the value of 1 if a paired exchange program has been running in state i at any year t and 0 otherwise.

Table 5.1 shows the descriptive statistics for the 46 states and the District of Columbia. Column (1) shows means and standard deviations for the entire sample. Columns (2) and (3) show means and standard deviations for 13 states that enacted tax deduction laws and 34 states that did not enact tax deduction laws, respectively. Similarly, columns (4) and (5) show means and standard deviations for 22 states that allowed paid leave of absence and 25 states that did not allow paid leave of absence, respectively. Columns (6) and (7) show the differences between columns (2), (3) and columns (4), (5) along with the standard errors of the t-statistics for the null hypothesis of equal means for states that enacted either legislations

³ OPTN, <http://optn.transplant.hrsa.gov/latestData/step2.asp?>

⁴ US Census Bureau, <http://www.census.gov>

⁵ http://www.usrds.org/2009/ref/E_Ref_09.pdf

⁶ <http://www.bea.gov/regional/gsp/>

⁷ http://www.kidney.org/transplantation/LivingDonors/pdf/LDTaxDed_Leave.pdf

⁸ <http://www.transplantliving.org/livingdonation/nancialaspects/legislation.aspx>

⁹ <http://www.ncsl.org/default.aspx?tabid=13383>

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and states that did not enact any such legislation.

In the sample, states with tax deduction laws have higher average total and related living donors pmap per year than states without tax deduction laws but have lower average unrelated living donors. This difference, however, is not statistically significant at conventional test levels, shown in column (6). In addition, states that allow a tax deduction have statistically higher number of transplant centers, higher prevalence of ESRD but lower GDP per capita and lower combined deceased kidney and liver transplant rates. On the other hand, states with paid leave of absence law have systematically lower living donation rates, related or unrelated, than states without paid leave of absence legislation. These differences are statistically significantly different from zero in column (7). In addition, states in which paid leave legislation is enacted have statistically significantly lower GDP per capita, lower combined deceased kidney and liver transplant rates and lower number of transplant centers.

Figure 5.3.: Living adult donation rates in the US, 1988-2009

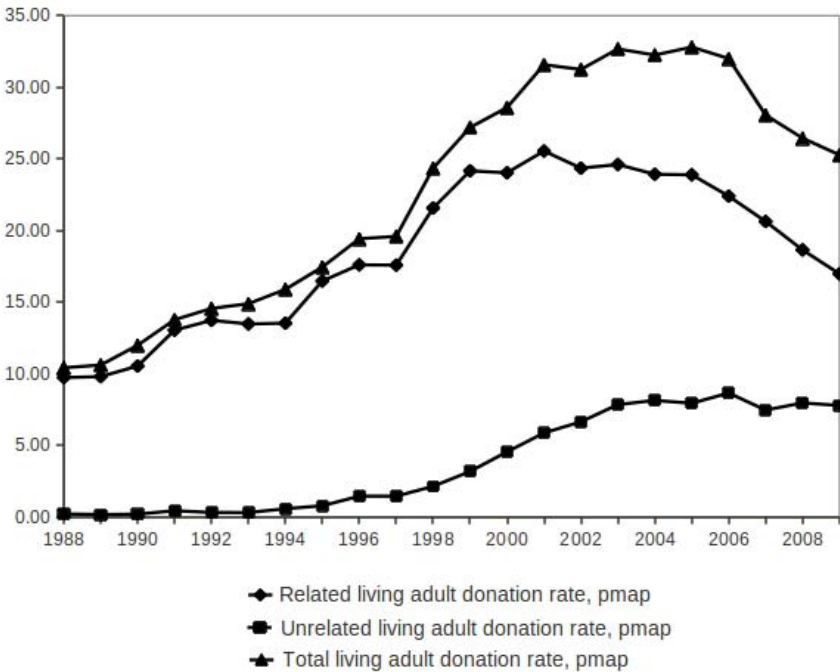


Figure 5.3 displays the evolution of living related, unrelated and total adult donation rates

Table 5.1.: Descriptive statistics, means and standard deviations

Variables	Entire Sample		Enacted tax deduction		Enacted paid leave		Difference		Number of observations
	mean (s.d)	mean (s.d)	Yes	No	Yes	No	(2)-(3)	(4)-(5)	
Total living donation rates, pmap	23.00 (26.99)	23.72 (19.45)	22.72 (29.44)	19.83 (13.64)	25.83 (34.62)	1.00 [1.12]	-6.00* [1.18]		998
Living unrelated donation rates, pmap	3.89 (6.34)	3.74 (5.57)	3.96 (6.62)	3.19 (4.05)	4.53 (7.79)	-0.22 [0.27]	-1.34* [0.28]		998
Living related donation rates, pmap	18.79 (21.51)	19.67 (14.92)	18.44 (23.59)	16.42 (10.63)	20.92 (27.70)	1.23 [0.88]	-4.50* [0.94]		998
Tax deduction	0.05 (0.23)	0.21 (0.41)	0.00 (0.00)	0.09 (0.29)	0.02 (0.16)	0.21* [0.01]	0.07* [0.01]		1034
Paid leave of absence	0.16 (0.37)	0.26 (0.44)	0.13 (0.33)	0.36 (0.48)	0.00 (0.00)	0.13* [0.02]	0.36* [0.01]		1034
Paired organ exchange	0.16 (0.37)	0.15 (0.36)	0.17 (0.37)	0.18 (0.38)	0.15 (0.36)	-0.02 [0.02]	0.02 [0.02]		1034
GDP per capita (constant 2000 USD)	32971 (12445)	29285 (5807)	34380 (13933)	31553 (7443)	34219 (15472)	-5095* [505]	-2666* [574]		893
Number of transplant centers, pmap	1.68 (1.72)	1.80 (1.16)	1.63 (1.90)	1.56 (1.01)	1.78 (2.17)	0.17* [0.07]	-0.22* [0.07]		1010
Deceased kidney+liver transplant rate, pmap	54.91 (42.02)	52.17 (22.00)	55.96 (47.47)	49.25 (21.02)	59.89 (53.67)	-3.79* [1.63]	-10.64* [1.79]		1034
Prevalence of ESRD, pmap	1231 (323.29)	1264 (334)	1218 (318.23)	1235 (328.88)	1227 (318.56)	46* [15.05]	8 [14.93]		940
Number of states	47	13	34	22	25				

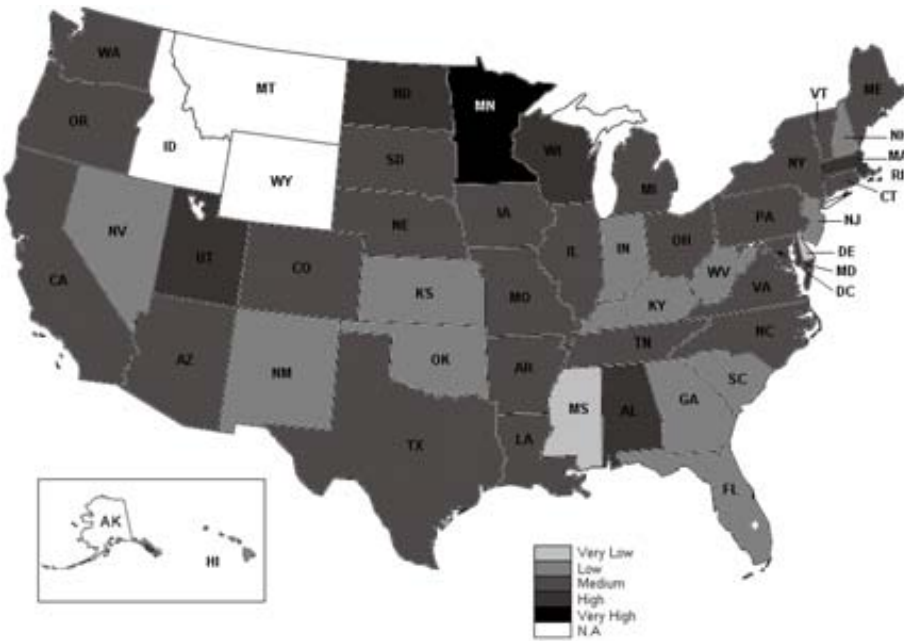
Notes: Standard deviations in parentheses. Standard errors in brackets. * denotes statistical significance at the 5% level.

5. The Impact of Reimbursement Legislation on Living Donation: Evidence from the US

pmap since 1988. There has been a constant fall in the average proportion of living related adult donors throughout the last two decades, from 94 percent in 1988 to 70 percent in 2009. This share also exhibits a similar variability across states. In the sample period, Vermont has the lowest average share of living related adult donors out of total living adult donors (71 percent) and Mississippi has the highest average share of related donors (94 percent). Donations from living related adults still constitute an overwhelming proportion of the overall number of living adult donors despite the recent marginal success in raising donations from unrelated persons.

Figure 5.4 displays the geographical distribution of total living adult donation rates pmap by state on a very low to very high scale. 2 states are classified as exhibiting very low (range: 1.41-2.05), 13 states are classified as low (range: 7.87-14.68), 23 states are classified as medium (range: 15.45-24.75), 7 states are classified as high (range: 30.29-40.08) and 2 states are classified as having very high (range: 66.14-163.16) levels of donations¹⁰.

Figure 5.4.: Total living adult donation rates by state, 1988-2009



¹⁰ A k-means clustering method is used to classify the level of donations.

5.2.2. Econometric Methodology

In order to test for *the living donor substitution effect* we postulate that there is a simultaneous relationship between living related and living unrelated donation rates and we treat them as endogenous variables. To see this, consider the following model:

$$y_{1it} = \mu_{1i} + \delta_{1t} + \alpha_{1i}w_{it} + Z'_{it}\gamma_1 + X'_{it}\beta_1 + \pi_1c_{i,t+1} + \rho_1y_{2it} + \varepsilon_{1it} \quad (5.1)$$

$$y_{2it} = \mu_{2i} + \delta_{2t} + \alpha_{2i}w_{it} + Z'_{it}\gamma_2 + X'_{it}\beta_2 + \pi_2c_{i,t+1} + \rho_2y_{1it} + \varepsilon_{2it} \quad (5.2)$$

$$y_{3it} = \mu_{3i} + \delta_{3t} + \alpha_{3i}w_{it} + Z'_{it}\gamma_3 + X'_{it}\beta_3 + \pi_3c_{i,t+1} + \varepsilon_{3it} \quad (5.3)$$

where y_{1it} , y_{2it} and y_{3it} respectively denote the living donation rates pmap for unrelated, related and total adult donors, i denotes the state $i = 1, \dots, N$, t denotes time $t = 1, \dots, T$, j denotes the equation $j = 1, 2, 3$; μ_{ji} , δ_{jt} and α_{ji} respectively are the state effects, the year effects and the linear state trend effects, γ_j 's are $L \times 1$ vectors where L is the number of exogenous almost time-invariant regressors, β_j 's are $K \times 1$ vectors where K is the number of exogenous time-variant regressors, the variable c is the combined deceased kidney and liver transplant rate and ε_{jit} is the stochastic disturbance term at j^{th} equation. Z_{it} consists of binary variables on tax deduction, paid leave of absence legislations and PKEs, X_{it} consists of real per capita GDP, the number of transplant centers pmap and the prevalence of ESRD pmp. We are primarily interested in the vectors γ and secondarily interested in the parameters π and ρ .

The endogeneity of living donation is accounted by specifying the model as a system of equations where contemporaneous values of living unrelated and living related adult donation rates are on the right-hand side of equations (5.2) and (5.1) respectively. This specification invalidates the consistency of OLS and requires the use of an IV estimation. A statistically significant negative estimate of ρ_j indicates that there exists a living donor substitution effect between unrelated and related donations.

Deceased donor substitution implies that a potential living donor today gives up donating on the anticipation that the number of deceased donations will increase in the future. This is accounted by the one-period lead value of the combined deceased kidney and liver transplant

5. The Impact of Reimbursement Legislation on Living Donation: Evidence from the US

rate¹¹. A statistically significant negative estimate of π_j provides evidence of deceased donor substitution effect in the US.

The unobserved state effects in the system above represent time-invariant or rigid factors that might affect living donations such as customs, beliefs, subjective judgments about transplantation and donation, the level of altruism, trust in medicine and doctors in general and trust in the US health care system in particular. In the panel data context, the state specific effects in equations (5.1), (5.2) and (5.3) can be estimated via FE and/or RE. Estimating a RE model requires that the state specific unobserved effects are uncorrelated with all the explanatory variables as well as with the error terms of the model.

First, it may be reasonable to assume that beliefs, subjective judgments, altruism and trust in the healthcare system may not only affect the level of donations from living donors but also donations from deceased individuals. Since the level donations from deceased donors has been accounted as an explanatory factor, this renders the unobserved state effects to be correlated with the error terms through the level of donations from deceased donors. Further, the unobserved effects are likely to be correlated with the endogenous variable which will be in turn correlated with the disturbances. This establishes the ground to perform a FE estimation.

Second, the visual inspection of the number of unrelated and related adult donors in the US states shows that there has been a slight increase in the number of living unrelated donors and a downward trend in the number of living related adult donors in most of the states, especially after 2002. Failure to control for these trends might confound the impact of legislation on living adult donors and tempt one to conclude that the legislation is positively associated with unrelated donation and negatively associated with related donation. To decouple legislation from these trends linear state trends have been incorporated in all three models.

Finally the exact time-variant factors that are thought to influence living unrelated donation

¹¹A natural question arises so as to whether living donations today might affect deceased donations at a later period, a phenomenon called *dirty altruism* coined by Rigmor Osterkamp. If exists, it might lead to an endogeneity problem. Although *dirty altruism* is plausible in principle, this substitution seems to be weak for several reasons. First, substitution requires a willing, living and medically compatible donor. Approximately 30 percent of all kidneys and livers in the US come from living donors and the remaining 70 percent are recovered from deceased donors. Substitution also depends on the medical urgency and the instantaneous probability of finding a deceased donor. Second, when a kidney or liver patient needs a transplant, she is asked to find a living donor first, not because people substitute per se but rather because the time when a deceased donor becomes available is unknown. Third, a living donor is most of the time subject to serious medical risks as opposed to deceased donors. It is acknowledged that dirty altruism might exist but this effect should be negligible. A recent study in the US by Beard et al. (2009) did not find convincing empirical support for the *dirty altruism* model.

rates but have not been explicitly accounted for in the model might also affect living related and thus total living donation rates. This will induce a contemporaneous correlation of error terms across all three equations which requires the use of a SUR framework.

5.2.3. Results

To reveal the impact of reimbursement legislation on living donation rates, equations (5.1), (5.2) and (5.3) are estimated as a system of equations via 3SLS with two-way FE error component model while allowing for state-specific linear trends. By employing a 3SLS Two-way FE, we accommodate for the unobserved state and year heterogeneity, endogeneity and cross-equation error correlation. The estimation results are reported in table 5.2.

Irrespective of the type donation, neither tax deduction nor paid leave of absence affect living donation rates once the state and the year fixed effects, linear state trends, organ allocation mechanism, wealth, medical capital, alternative source of organs and the demand for living donation have been controlled for. There may be many reasons for the failure of tax deduction legislation to induce related individuals to donate. First, as mentioned previously, the beneficiaries of the reimbursement legislation are limited to public employees and are a very small group, representing 1 to 4 percent of the total state population. Second, related donors may be irresponsive to tax deduction schemes simply because of the biological or emotional tie between the donor and the recipient. Third, as opposed to being rewarded by future benefits living donors might prefer being compensated today for their time and efforts for donation today. In this case tax deduction may become less appealing. On the other hand, the absence of a statistically significant and positive impact of paid leave of absence legislation is in line with the long held view that compensating donors for the lost wages during the recovery period following organ donation is not to seek out donations but to acknowledge the value of donor's contribution and to appreciate their efforts.

States that initiated paired exchange programs do not exhibit statistically significantly higher living unrelated, related or total adult donation rates once other potential determinants have been controlled for. This result is aligned with the view that PKE programs have been developed in an attempt to not provide a general solution to the chronic shortage of transplantable organs but rather to optimize the living donor organ allocation and to help those who already have a willing living donor (Roth, 2007). PKE is not an effective method

Table 5.2.: The impact of legislation on living adult donation in the US, 1988-2009

3SLS two-way FE			
	Unrelated donation	Related donation	Total donation
Legislation			
Tax deduction	2.241 (2.105)	-1.154 (2.059)	-0.762 (2.041)
Paid leave of absence	-0.860 (1.580)	0.788 (1.565)	0.685 (1.541)
Organ Allocation			
Paired exchange	0.096 (1.428)	0.373 (1.456)	0.233 (1.434)
Wealth and Capital			
GDP per capita	0.0007** (0.0002)	-0.0002 (0.0001)	-0.0003* (0.0001)
number of transplant centers, pmap	1.040 (1.713)	-3.787** (1.642)	-3.676** (1.490)
Alternative source of organs			
deceased kidney+liver transplants, pmap	0.082** (0.038)	-0.086** (0.026)	-0.087** (0.025)
Demand for living donation			
prevalence of ESRD, pmap	-0.027** (0.010)	0.014** (0.007)	0.015** (0.006)
Endogenous variable			
living related donation rate, pmap	1.362** (0.417)	-	-
living unrelated donation rate, pmap	-	-1.013** (0.398)	-
R-squared	-0.7863	0.8955	0.9307
Sample size	803	803	820
Instrument Relevance t-statistic (p-value)	8.6705 (0.0000)	-2.9738 (0.0030)	-

Notes: All specifications include state fixed effects, year fixed effects and linear state trends. All dependent variables are expressed pmap. The endogenous variables are instrumented by two-period lags. The instrument relevance statistic reports t and p values of the coefficient of the instrument resulting from the regression of the endogenous variables on exogenous variables. As a rule of thumb, in case of a single instrument at each equation, the t statistic for the instrument should be bigger than 3.2 (in absolute value) or the corresponding p -value should be lower than 0.0016 for a relevant instrument. Robust standard errors in parentheses. * and ** denote statistical significance at the 10% and 5% level respectively.

to reduce kidney shortages or to increase living donations but it is an efficient system that allocates formerly poor-matched or mismatched kidneys from related living donors.

Our results reveal the existence of a unilateral living donor substitution effect. As shown in column (2) donations from unrelated donors negatively affect the number of related donors. However as shown in column (1), the converse is not true. To test the potential existence of deceased donor substitution effect we incorporated one-period lead value of the combined deceased kidney and liver transplant rate as an explanatory factor that represents the alternative source of organs. The evidence points out to the existence of a deceased donor substitution effect in the US such that the larger number of living related donations today and thus total donations today decrease on the anticipation of future increases in the number of kidney and liver transplants.

5.3. Policy Implications

The empirical evidence presented herein points that the legislation that allows individuals to take paid leave of absence or to receive a tax deduction has no statistically significant effect on living adult donations, related or unrelated, even after controlling for other potential factors, linear state trends, endogeneity and cross-equation error correlation. This is not necessarily a compelling reason to abandon paid leave of absence legislation. The essence of allowing for paid leave for living organ donors is to compensate them for the recovery period and for the loss of income associated with the act of donation in order to help save a life.

Most of the states that enacted legislation related to reimbursement of living donors only allow reimbursement of public employees for becoming an organ donor. Failure to allow reimbursement for the unemployed, uninsured or low-income individuals who are a major proportion of the population and who are more likely to experience financial hardship as a result of donation hinders the effectiveness of the legislation. This study suggests that the current legislation related to reimbursement of living donors should be amended in order to cover a broader group of beneficiaries of the legislation to ensure that the barriers to living donation are lowered and that the provisions of the amendment should be independent of whether beneficiaries of the legislation are employed or not. However this might be a difficult task considering the indistinct line between offering modest rewards and outright payments prohibited by the NOTA of 1984.

5. *The Impact of Reimbursement Legislation on Living Donation: Evidence from the US*

A second but equally important contribution of this chapter was to identify the impact of PKE programs on living donations. We found that states that initiated PKEs do not exhibit higher living donation rates. This suggests that such efficient organ allocation mechanisms may not be effective in order to raise overall living donations.

Evidence of a deceased donor substitution effect indicate that kidney donations for transplantation may be intertemporally related. On the other hand the finding that a unilateral living donor substitution effect exists in the US points that if chronic organ shortages persist and unrelated donations continue to grow, we might expect a shrinkage in the number of living related donors. This shift in the composition of living donors might place additional burden on UNOS and its affiliated OPOs to investigate the motivation behind living unrelated persons to donate and to explain the ongoing eclipse in biological altruism.

The empirical study in this chapter imposes several problems and limitations. First, doubts can be cast upon the instrument relevance especially for the unrelated living donation rates¹². For the fact that correcting the bias introduced by endogeneity requires at least one instrument that is uncorrelated with the unobservable confounder variables, that is sufficiently correlated with related or unrelated living donation rates and that can neither have a direct influence on living donation rates nor be correlated with error term of the equation, any set of good instruments other than their lagged values may be difficult to find. Given the data, such strong instruments are proved to be nonexistent. Therefore the results rely upon the instrumentation of related and unrelated living donation rates by their lagged values and should be treated with extreme caution as the endogeneity problem may be severe leading to little confidence in the estimation results. Second, there will be some bias due to failure of accounting for the differences in the period of paid leave of absence in the legislation. In some states the legislation allows for only 10 days of paid leave while in other states this period is up to 30 days. Second, this study failed to distinguish between states that allow tax deduction and states that allow tax credit in the estimations due to lack of sufficient data. Given the inequity concerns about tax deduction, tax credit schemes may not exhibit an adverse impact on living donation. Further evidence might be needed as more data become available.

¹²There is empirical and theoretical evidence that IV estimation with weak instruments may perform bad and even poorer than OLS (Stock et al., 2002).



Chinese inmates on death row waiting to be executed. They are shot on the head if a heart is needed or on the chest if a cornea is needed. After the execution the organs are procured to be sold to international patients from Japan, Malaysia, Singapore and Hong Kong. The remains are cremated to destroy any trace of evidence. According to Amnesty International China has executed at least 30,000 death sentences between 1990 and 2000. In 2007 China has put a ban on organ sales.

6. Organ Trafficking and Law Enforcement

“Organ transactions today are a blend of altruism and commerce; of science, magic and sorcery; of voluntarism and coercion; of gift, barter and theft.” Nancy Scheper-Hughes

6.1. Introduction

The international trade of human organs and its prevention has been the subject of a growing debate in Europe and other western countries. Human organ procurement and transplantation is a controversial and delicate issue which becomes even more amplified if these procedures are commercialized. Due to increasing shortages some patients who are in desperate need for an organ face extensive waiting times on the transplant list and seek kidneys on the black market.

This chapter analyzes the legal and the economic aspects of trafficking in human beings for the purposes of organ removal. Section 6.2 provides the background on the sale and the purchase of human organs, describes how the black market operates and map the trafficking routes around the globe. Section 6.3 reviews the international standards and legal instruments to combat trafficking and discusses their applications with a comparative analysis of criminal provisions for thirty-eight countries by focusing on the magnitude of sanctions and the scope of criminal liability in national criminal codes. Despite organ trafficking being an international crime legislations concerning such criminal activities are local with suboptimal sanctions and inadequate provisions of enforcement. This problem not only requires the identification of an optimal magnitude and mix of penalty that should be imposed on offenders engaging in organ trafficking, but also necessitates criminal provisions for organ trafficking to expressly distinguish between criminal agents and severe and otherwise punishable violations.

For this purpose, section 6.4 develops a simple model of law enforcement that illustrates a way to determine the optimal mix of sanctions under two deterrence policies. Organ trafficking is socially undesirable because payment for a kidney dilutes deterrence; thus it has to be controlled. The analysis suggests that under conventional deterrence, trafficking should be penalized by maximal fines together with a maximum ban of practice term for the surgeon; however, imprisonment should not be used because it is a costly sanction. The analysis also suggests that organ recipients who are insured against the cost of illegal transplants should be subject to severer punishments than those who are not insured. Under target deterrence, the enforcement authorities should always impose imprisonment together with a maximal fine to the surgeon despite it lowers welfare. The implications of the model and what should be embodied in the specific legislation are discussed in Section 6.5.

6.2. Trafficking in humans for the purposes of organ removal

Analyzing the criminal network and the socioeconomic profiles of those who engage in the commercialization of human organs is crucial in order to understand the motives behind becoming a criminal and to identify the tools to combat organ trafficking. Organ trafficking is a demand-driven problem; it runs from West to East, from rich to poor and from medically desperate to financially desperate individuals. Since the current organ procurement system relies on altruism and there is a chronic shortage of transplantable organs, some wealthy individuals who are on the waiting list find alternative, illegal means to obtain a kidney which would perhaps be impossible otherwise.

Although the transplant laws and the penal procedures established against the commercialization of organs date back to the late 1960s, the emergence of organ trafficking as a transnational phenomenon only dates back to 1980s. Organ trafficking is known to be extremely well-organized and mobile, yet infrequently hierarchical, involving a network of travel agents, insurance companies, religious organizations, charitable trusts, patient advocacy organizations, organ brokers, lab technicians, medical directors of transplant units, qualified medical doctors and nursing staff (Vermot-Mangold, 2003; UNGIFT, 2008). According to the WHO, organ trafficking accounts for up to 10 percent of all transplants and 20 percent of all kidney transplants performed worldwide (Nullis-Kapp, 2004; Abbud-Filho et al., 2008). Organ trafficking activities are not exclusive to trafficking of organs from living donors although no reliable evidence has been substantiated regarding cases of murder. It is believed that trafficking occurs in morgues, laboratories, prison hospitals, even in disaster sites (Scheper-Hughes, 2000; Carreon, 2005; Goodwin, 2006). The operations usually take place in private facilities known to be actively involved in illegal transplants. Sometimes the donor is smuggled into the country by a broker who intermediates the delivery of kidneys. To this end, a significant aspect of trafficking in human beings for the purposes of removal of organs is corruption (Caplan et al., 2009). As noted by Scheper-Hughes (2003b), strong links with the police and customs officials have been established through bribes to law enforcement agents in return for not reporting the violation (i.e. forgery of travel documents, passports, fake ID's) or to secure entry. Corruption takes place at the private level as well, in the form of bribes to doctors to prepare forged medical documents under the name of "charitable donations" (Sanal, 2004).

Organ trafficking runs between medically desperate and financially desperate individuals.

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Wealthy patients, diagnosed with organ failure are willing to exhaust all their means to obtain a healthy organ to survive whereas financially desperate individuals are willing to sell their kidneys to pay off debts. Studies report that donors typically live under poverty and unsanitary conditions with extreme debt and selling a kidney has been misgauged as a way to escape poverty (Goyal et al., 2002; Scheper-Hughes, 2000). A recent study conducted by Mendoza (2010) in the Philippines shows that about 89 percent of the surveyed kidney vendors were low income class or extremely poor and the vast majority of kidney vendors reported annual incomes below the poverty line. According to a field study conducted by Goyal et al. (2002) in India, most of the donors stated that they would not have sold their kidney if they had known its consequences. This includes chronic pain at the nephrectomy site, renal failure and inability to perform manual labor which is the primary source of income for donors. This problem is more pronounced in countries like India and Pakistan where kidney sellers cannot get post-operative medical care because the government is financially unable or unwilling to provide them.

Figure 6.1 displays the international recipient and donor routes and hubs of trafficking. Recipients from the Arab Peninsula travel to India and Egypt to receive a transplant and patients in the Far Southeast Asia travel to China and India. It is believed that there exists a surgeon network linking Turkey and Israel to South Africa where most of the recipients come from Israel and donors come from Brazil. A striking fact of this network is that China, India and Turkey hold central positions in the sale of organs which are known as the hubs of organ trafficking¹.

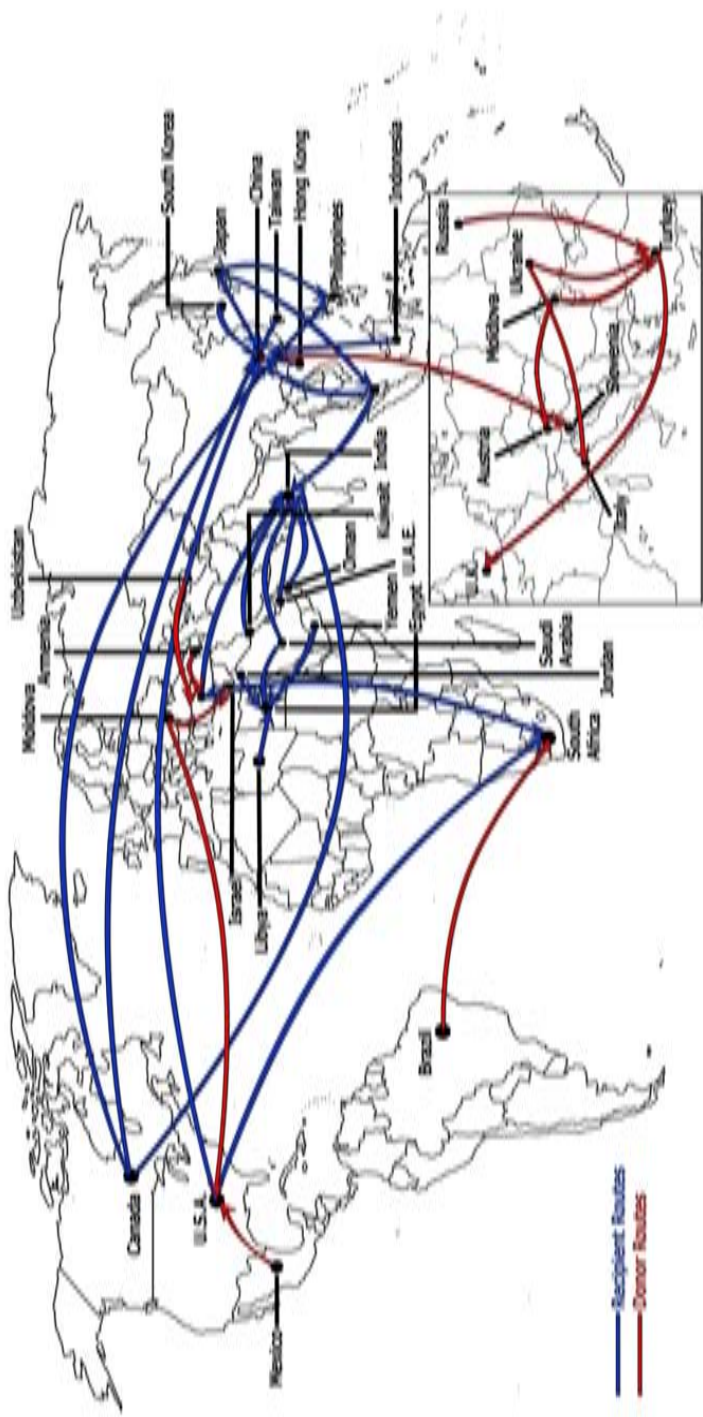
The global traffic in human organs is ruled by the dominance over the geographical areas in which Turkey operates in Eastern Europe and the Middle East, China and India operate over Far East and Southeast Asia. A distinguishing feature of Turkey and India is that Turkey is a “donor importer” whereas India is a “donor exporter” country. Organ donors are smuggled into Turkey from former Soviet countries and local donors almost do not exist. In India the majority of the population have either been a kidney seller or are willing to sell one. A characteristic shared by these countries is that the law enforcement is relatively weak. This includes legislative loopholes in national criminal codes as well as high levels of corruption².

In China, the government holds the monopoly power over the sale and the procurement of

¹See EHC (2004) and Pearson (2004). The WHO identified these countries as “hot spots” in organ trafficking.

²According to Jha (2004), countries known to be active in illegal transplants have performed poorly on corruption-perception index.

Figure 6.1.: Transnational network and hubs of organ trafficking



Source: Trafficking activities within the last 20 years based on past allegations, mapped by the author. Compiled from various sources including Halstead and Wilson (1991), Rothman et al. (1997), Schepers-Hughes (2000, 2003a,b, 2004), Goyal et al. (2002), Kumar (2001, 2003), Sanal (2004), Sidley (2005), Ionescu (2005), Sarig (2007), Kates (2002), Jalbuena (2007), Findlay (2001), Lloyd-Roberts (2001), Trucco (1989), Johnston (2003) and Siddle (2001). Illustration: Cem Yicelten.

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human organs which has been made through the extraction of organs of executed prisoners. In 1984, the Chinese government issued a document entitled “Rules Concerning the Utilization of Corpses of Organs from the Corpses of Executed Prisoners”. This law allowed the government to extract the organs of executed prisoners although no government official admitted the practice and claimed that the prisoners have given consent. The execution of prisoners in China is believed to coincide with the transplant operations although no evidence has been available. In 2007, the Chinese government has admitted the sale of organs from executed prisoners and imposed a temporary ban on organ sales. China has also been a transplant center in Far East Asia for international patients. In Japan, the Shinto tradition prohibits the use of cadaver donors and deems organs of cadavers to be unclean. Therefore Japanese organ procurement almost completely consists of directed living donations. Patients who need heart, pancreas, lung and liver turn to China where they are procured from executed prisoners and sold to international patients from Japan, Malaysia, Singapore and Hong Kong. A tradition similar to Shinto exists among Orthodox Jewish in Israel. The deceased donation rates in Israel are very low because Orthodox Jewish define death as the cessation of the heart and not the brain activity which makes impossible to procure deceased organs (Steinbuch, 2008). Therefore Israeli patients seek organs in Turkey, Romania and Moldova (Rothman, 1999). Furthermore, insurance companies subsidized by the government are funding these illegal transplants up to \$80,000 for which there is a wide-spread demand in Israel (Goodwin, 2006). This practice further impedes enforcement against trafficking.

The soaring demand for kidney which is not matched by the current altruistic organ procurement system exhorted individuals to become organ brokers who identified this lucrative organ shortage. A broker and a potential donor agree over a kidney price as low as thousand dollars whereas the same kidney is sold to a wealthy recipient for a price that is substantially higher. Rothman et al. (1997) states that organ brokers who intermediate the transaction between potential poor donors and wealthy recipients take large payments and physicians who are a part of this transaction provide substandard medical care characterized by the incompetence of medical staff and the poor quality of organs. Opponents of the commercialization of organs further argue that it exploits the poor, violates the bodily integrity of the donors, drag them to deeper poverty and impedes justice and fairness by differentiating between wealthy patients who are able to pay for an organ and patients who are on the waiting list.

6.3. International Standards and Legal Instruments

Organ trafficking is closely related to trafficking in human beings by the Article 3 of the Protocol to Prevent, Suppress and Punish Trafficking in Persons, Especially Women and Children, supplementing the UN Convention against TOC. Examining organ trafficking as a form of TOC is important towards determining how the laws are framed, how investigations and prosecutions are conducted and how the international police collaborations are carried out. Defining organized crime is therefore important for public policy so as to determine the allocation of financial and personnel resources to combat organ trafficking.

The UN Convention defines transnational crime as an offence that is committed in more than one country; in one country but a substantial part of its preparation, planning, direction and control takes place in another country; in one country but involves an organized criminal group than engages in criminal activities in more than one country; or in one country but has substantial effects in another country. On the other hand, the Task Force on Organized Crime of the US President's Commission defines organized crime as the supply of illegal goods and services to countless number of citizen customers. This definition does not represent today's organized criminal activity in which the main problem comes from the word "organized" and not "crime". This view alters the definition of organized crime and shifts the focus from crime to the group by which the criminal activity is carried out by the use of ideology, hierarchy, continuity, violence or the threat of violence, bonding, illegal enterprises, involvement in legitimate business and corruption (Finckenauer, 2005).

The UN Protocol to Prevent, Suppress and Punish Trafficking in Persons is considered to be the first binding legal instrument that has been globally ratified (Caplan et al., 2009). Article 3 of the UN protocol and Article 4 of the COE Anti-Trafficking Convention define "trafficking in persons" by *"the recruitment, transportation, transfer, harbouring or receipt of persons, by means of the threat or use of force or other forms of coercion, of abduction, of fraud, of deception, of the abuse of power or of a position of vulnerability or of the giving or receiving of payments or benefits to achieve the consent of a person having control over another person, for the purpose of exploitation"*. Trafficking of human beings including those for the purposes of organ removal constitutes a crime when an action by certain means is carried out for the purpose of exploitation.

Most international organizations such as the UN, the WHO and the COE prohibit and

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oppose the commercialization of human organs and the trafficking of human beings for the purposes of organ removal. In resolution 59/156 of 2004, the UN General Assembly condemned trafficking in human body parts and urged member states to adopt the necessary measures to prevent, combat and punish trafficking in human organs. A report by the UN Secretary-General pointed out that it became more difficult to understand and analyze the problem and its extent and to take necessary measures at national and international levels in the absence of internationally agreed definitions and legal standards to provide a framework for cooperation in combatting organ trafficking (Caplan et al., 2009).

Organ trafficking has been condemned by the WHO on the grounds that it contravenes basic human values, the Universal Declaration of Human Rights and the WHO constitution. The WHA condemned the commercialization of living donor organs and issued a set of guiding principles through resolution WHA 44.25 on human organ transplantation in 1991 which was adopted by 192 countries. While the Guiding Principles 5 and 6 respectively called for the prohibition of commercialization of human body parts and commercial advertisements of the need for and the availability of organs, the choice of methods to combat commercial dealings including the type and the magnitude of sanctions is left at the discretion of the states (Caplan et al., 2009).

The COE Parliamentary Assembly report stated that organ trafficking should not remain the sole responsibility of donor exporter countries of Eastern Europe and recommended measures to minimize incidences of trafficking in Europe (Vermot-Mangold, 2003; Caplan et al., 2009). This report was the basis of the COE Parliamentary Assembly Recommendation 1611 which was adopted in 2003. The COE recommended that states shall establish those who are criminally responsible for organ trade in their national criminal codes including brokers, hospital and nursing staff, lab technicians and medical staff who encourage and provide information on transplant tourism. The COE Parliamentary Assembly report expressly stated that donors should not be criminally responsible because most of them are compelled by economic hardship and deceived to sell their organs. The parliamentary assembly also recommended that all member states sign and ratify the Convention on Human Rights and Biomedicine and its Additional Protocol concerning Transplantation of Organs and Tissues of Human Origin, the Protocol to Prevent, Suppress and Punish Trafficking in Persons, Especially Women and Children supplementing the UN Convention against TOC and the Protocol on the Sale of Children, Child Prostitution and Child Pornography supplementing the Convention on the

Rights of the Child.

The protocol supplementing the COE Anti-Trafficking convention recommended that potential donors shall be prevented through raising awareness and education. Donor exporter countries in Europe were called to restrict organ donation by prisoners, and to implement national strategies to reduce poverty and corruption. The protocol also called donor importer countries to expressly distinguish medical staff involved in the commercialization of human organs in their criminal codes and to deny reimbursements for illegal transplants performed abroad as well as for the follow-up care of recipients.

6.3.1. The Scope of Criminal Liability

Article 19 of the COE Anti-Trafficking Protocol states that countries must adopt provisions that criminalize persons who receive transplants knowingly that the organ is obtained from a trafficking victim. None of the other international protocols includes this provision. On the other hand, if the potential recipient is unaware that the organ to be transplanted is obtained from a victim of trafficking, she cannot be held criminally liable according to Article 19 of the COE protocol. The criminal liability of persons who make use of the “services” of the victim of trafficking for the purposes of organ removal differs significantly from the criminal liability of persons who make use of the “services” of victims of trafficking for other purposes such as labor or sexual exploitation (Caplan et al., 2009). The reason is that in the former the potential organ recipient who makes use of the services of the exploited donor is in a desperate situation in which she has to choose between remaining on the waiting list to receive an organ that is donated voluntarily and procured through legal means but one that may never come and resorting to other ways to receive an organ that is paid and procured by means of coercion and exploitation in the black market. Almost all patients who obtain organs in the black market are compelled to do so because the alternative is either death or lifetime debilitation. Therefore the criminal liability of potential recipients should be assessed delicately and differently than persons who make use of the services of other trafficking victims. Caplan et al. (2009) note that several states objected this provision and that no agreement among the EU member states could be reached because of the complexity of the issue.

The criminal liability of living organ donors is an equally sensitive issue because they are deceived or coerced to sell their kidneys due to poor economic prospects and debts. This group

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of persons are mostly thought to be the victim of trafficking and treated as such unless they become intermediaries or brokers after selling their kidney. UNGIFT (2008) and Caplan et al. (2009) state that countries should refrain from holding these individuals criminally liable because they are likely to suffer from the dire consequences of kidney removal. This view is implemented in the Article 26 of the COE Anti-Trafficking protocol by a non-punishment provision that suggests that countries must adjust their criminal provisions so as to not impose penalties on organ donors as long as they do not become brokers.

The UN as well as the COE protocols call for vigorous pursuit of intermediaries, brokers, medical staff and hospitals involved in organ trading. Under Article 5 of the UN protocol, the criminal liability of intermediaries and brokers is straightforward because they mostly recruit, transport and transfer other accessories by illicit means. The criminal liability of medical staff and hospitals on the other hand is contingent upon several conditions. Physicians are criminally liable if they engage in the trafficking of persons defined as in Article 3 of the UN protocol and Article 4 of the COE Anti-Trafficking Convention; aid and abet traffickers and deceive organ donors about the risks of operation; explicitly refer their patients to receive organs obtained from donors known to engage in commercial dealings; fail to inform authorities, where required by law, about cases of trafficking and commercial dealings; and perform transplants knowingly that the organ is obtained from a paid donor. Physicians cannot be held criminally liable if they merely inform the patient about transplant tourism without any further involvement, and confront with or provide follow-up care on recipients known to have received transplants, in their own or other countries through paying for the organ (Caplan et al., 2009).

Hospitals and medical clinics can also be held criminally liable if they harbour and allow physicians to transplant organs obtained through illegal means in their premises, facilitate commercial dealings or offer payment to persons to become donors.

Article 23 of the COE Anti-Trafficking Convention requires that states adopt measures to ensure that the criminal offences established in the convention are punishable by effective, proportionate and deterrent sanctions including deprivation of liberty which can give rise to extradition (Caplan et al., 2009). Article 24 of the COE Anti-Trafficking Convention regards the following offences as aggravating when determining the penalty: the offence deliberately or by gross negligence endangered the life of the victim; the offence was committed against a child; the offence was committed by a public official in the performance of her duties; and the

offence was committed within the framework of a criminal organization. The convention notes that states shall take into account previous convictions and final sentences passed by other states while determining the range and the magnitude of sanctions. The convention further stipulates that any establishment used as a harbour to carry out illegal transplants shall be subject to temporary or permanent closure and the medical staff intentionally participating in any activities related to trafficking in humans for the purpose of organ removal shall be denied the right to exercise their duties.

6.3.2. **Comparative Analysis**

This section attempts to analyze criminal provisions against trafficking in humans for the purposes of organ removal in selected countries with a focus on the scope of criminal liability and highlight potential loopholes and inconsistencies in accordance with the international standards set forth by the UN, the WHO and the COE. We first examine the types of sanctions imposed by the states in our sample and then focus on the provisions in detail by taking into consideration whether the law distinguishes between donors, (insured) recipients, medical staff, chronic offending; impose closure of establishment; impose sanctions based on the consequences of trafficking to the victim and the legal age of the victim; specify sanctions based on the liability rule; deny the right to exercise duty and whether the law punishes offences committed abroad.

The criminal provisions against the trafficking of human organs for 38 countries are compiled in table 6.1. To facilitate comparison, all fines are converted to US dollar and Euro. As of 2008, countries that impose a pecuniary sanction only are China, Denmark, Norway, Finland, Austria and Panama. Denmark, Norway and Finland do not specify the magnitude of sanctions, however the latter two countries may impose stiffer sanctions stipulated elsewhere in the law. China is the only exception in the whole sample by imposing a fine of eight to ten times the value of the trade.

Countries that impose an imprisonment term only are Brazil, Italy, Czech Republic and Romania. The length of imprisonment term in these states ranges from 2 to 20 years. The remaining countries in the sample impose both a fine and an imprisonment term. Across the sample, there is a great variability in terms of the length of imprisonment ranging from one month to twenty years as well as in pecuniary sanctions ranging from a couple of dollars to

Table 6.1.: Criminal provisions against the commercialization of organs

Country	Type of Sanction		Country	Type of Sanction	
	Fine	Imprisonment		Fine	Imprisonment
Australia	\$ 264 to \$ 3,301	3 to 6 months	Italy	-	2-12 years
Austria	€ 2180	-	Japan	\$ 5.21 million	yes
Belgium	€ 1,000 to € 10,000	3 to 12 months	Kuwait	\$ 10,252 - \$ 20,505	≤ 3 or 6 years
Brazil	-	3 to 20 years	Lebanon	yes	1 to 12 months
Bulgaria	€ 10,227 to € 255,681	3 to 5 years	Luxembourg	€ 61 to € 4957	8 days to 3 years
Canada	\$ 80,919	≤ 1 year	Morocco	€ 4500 to € 9000	2 to 5 years
China	value of trade × 8-10	-	Netherlands	€ 11,250	1 year
Czech Republic	-	2 to 8 years	New Zealand	\$ 26,290	≤ 1 year
Denmark	yes	-	Norway	yes	-
Estonia	yes	≤ 1 year	Pakistan	\$ 12,492	≤ 10 years
Finland	yes	-	Panama	\$ 5,000	-
France	€ 100,000	7 years	Poland	€ 1,120	3 to 10 years
Germany	yes	≤ 5 years	Romania	-	3 to 7 years
Greece	€ 5869 - € 29,347	≥ 3 years	Singapore	\$ 65,316	≤ 10 years
Hong Kong	\$ 1,289 - \$ 3,224	1 year	South Africa	yes	≤ 5 years
Iceland	yes	≤ 3 years	Switzerland	\$ 86,259 - \$ 431,294	6 months to 5 years
India	\$ 206 - \$ 412	2 to 7 years	Turkey	\$ 87 to \$ 174	2 to 4 years
Iraq	yes	≤ 1 year	UK	yes	≤ 1 or 3 years
Ireland	-	-	US	\$ 50,000	≤ 5 years

millions of dollars. Countries with the lowest amount of pecuniary sanctions are India and Turkey which stipulate a fine less than a couple hundred US dollars. Countries with the lowest imprisonment term in the sample are Australia, Canada, Estonia, Hong Kong, Iraq, Lebanon, the Netherlands and New Zealand all of which stipulate an imprisonment term for trafficking that is at most 1 year.

Table 6.2 shows the descriptive statistics for 36 countries in order to give a snapshot of the distribution of monetary and non-monetary sanctions. Columns (1) and (2) respectively show means and standard deviations for 11 COE member states that ratified the COE Anti-Trafficking Convention and 10 COE member states that did not ratify the convention. Similarly, columns (3) and (4) respectively show means and standard deviations for 8 COE non-member states that ratified the UN protocol to Prevent, Suppress and Punish Trafficking in Persons and 9 COE non-member states that did not ratify the protocol. Columns 5 and 6 show means and standard deviations for the entire sample. The first number at the bottom row of table 6.2 shows the sample size for the fines and the second number shows the sample size for the imprisonment term.

Both the average fine and the average imprisonment term imposed for organ trafficking are substantially higher in states that did not ratify the COE convention or the UN protocol than states that did ratify³. The reason for the former is that the high fines imposed by Switzerland (one of the COE members that did not ratify the convention) substantially increase the mean within the COE member states. The reason for the latter is that Japan, which did not ratify the UN protocol, is known to be the most strict country in terms of the laws governing donation and transplantation with highly disproportional fines for trafficking⁴. As shown in column (6) the average fine imposed for trafficking dramatically falls after removing Japan from the sample. As shown by the standard deviations, average monetary sanctions imposed for organ trafficking are dispersed across a wide range of values indicating an ambiguity so as to what should be its optimal level. Concerning the imprisonment term states in the sample have more or less an equal length of average imprisonment term with relatively small variance.

Identifying those who ought to be subject to penal procedure and the magnitude of penalties for the criminally responsible is a controversial issue. Some analysts suggest that donors should not be criminally charged of organ trafficking because most of them are in economic

³This does not indicate that the differences are statistically significant. On the other hand testing the statistical significance of these differences is misleading because the sample size is too small.

⁴See the Appendix A.3.

Table 6.2.: Descriptive statistics, means and standard deviations

Type of sanction	COE member		COE non-member		Entire Sample	
	ratified the COE convention		ratified the UN protocol		includes Japan	
	Yes (1)	No (2)	Yes (3)	No (4)	Yes (5)	No (6)
	mean (s.d)	mean (s.d)	mean (s.d)	mean (s.d)	mean (s.d)	mean (s.d)
Fine (€)	31939 (53030)	55302 (113998)	23321 (27772)	634436 (1642731)	196654 (850553)	30229 (58701)
Imprisonment (yrs)	2.546 (2.622)	3.306 (2.128)	3.052 (3.967)	4.313 (3.891)	2.843 (3.098)	2.843 (3.098)
Sample size	9-11	5-9	6-8	7-8	27-36	26-36

hardship or they are deceived to sell their organs. Similarly, the criminal liability of (potential) organ recipients should be established carefully. In accordance with this view, the German law explicitly stipulates that the court has discretionary power to remove or to reduce the punishment for donors and recipients⁵. In contrast, the legislations of Finland, Morocco, the Netherlands and New Zealand either criminalize the recipient or both the recipient and the donor without any mentioning of health professionals. None of the countries in the sample address the issue of insured recipients or the reimbursement of illegal transplants.

Concerning medical staff, most of the countries do not explicitly distinguish between medical staff and other accessories and impose a uniform penalty. The exception to this case is Switzerland which explicitly sets a higher penalty for health professionals. Switzerland is also the only country in the sample that distinguishes between actions that result from negligence and otherwise punishable actions.

Some legislations specifically impose a fine and/or an imprisonment term for medical staff (e.g. Brazil, Romania) and emphasize that the medical staff is only criminally liable if they knowingly implant an organ obtained through illegal means. Only in Czech Republic, Iceland, Ireland, Panama and recently in China, the law stipulates a ban of medical practice for health professionals involved in trafficking. Furthermore, the latter two countries specifically mention that the licences of medical establishments involved in the removal of organs from victims of trafficking may be temporarily or permanently revoked and the establishments may be shut down.

A close examination of criminal provisions reveals that the concept of repeat or chronic offending has not been embodied in the law; however there is a clear distinction between those who commit this illegal act once (i.e. donor, recipients) and those whose offense is of chronic nature (i.e. medical staff, mediators). The exceptions to this case are Belgium, Germany, Hong Kong and Kuwait. Even though trafficking is accepted universally as a demand driven problem, the legal distinction between repeat and one-time offending is one of the most important points in deterring worldwide trafficking.

None of the countries in the sample distinguish based on the legal age of the victim; however the legislation in Brazil specifically stipulates that in cases of organ removal resulting in disability for work, incurable disease, loss of function, permanent deformity or death of the victim, the sanctions are gradually increased.

⁵ A bill with a similar provision is introduced in the Israeli parliament.

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Some national legislations sanction violations outside the country or refer to international criminal organizations. Countries that punish the purchase or the sale of organs or illegal transplantations abroad are Belgium, Bulgaria, Czech Republic, France, Germany, Italy and Switzerland (EHC, 2004). The legislation in Bulgaria further imposes stiffer penalties for those involved in the international exchange of human organs. This provision expressly acknowledges the involvement of criminal organizations in trading human body parts because international trafficking implies, among others, an organized crime network and the possibility of corruption.

National legislative differences indicate that neither the legal framework nor the magnitude of sanctions might be optimal. As Rothman et al. (1997) point out:

“Despite the unanimity that commercialization is unethical, the international proclamations fail to provide a rationale for their position and contain no provisions for enforcement, no consideration of how these policies should be implemented or what penalties ought to be imposed for violations.”

The COE states that laws in many countries are not clear about who is criminally responsible for organ trafficking. Sanctions are not enforced and prosecutions have tended to focus on brokers rather than on medical staff and recipients do not fall under the criminal law because most of them leave the jurisdictional domain after committing the crime (Pearson, 2004). Such inconsistencies necessitates cooperative international law making, policing and call for further analysis of the identification of an optimal penalty that should be imposed on offenders engaging in organ trafficking.

6.4. A Simple Model of Law Enforcement

In this section, a model of optimal law enforcement in organ trafficking is outlined. Albeit simple, the model has two important implications. Under conventional deterrence, trafficking should be fined to the fullest extent for all offenders, together with a maximum ban of medical practice term for the surgeon, and severer punishments for recipients who are insured against the cost of transplant; however imprisonment should not be used except otherwise indicated because it is a costly sanction. Under target deterrence, the enforcement authorities should always impose imprisonment together with a maximal fine to the surgeon despite it lowers social welfare. This model not only presents simple and normative results in the enforcement of law but also provides guidelines concerning criminal provisions the law is ought to stipulate.

There has been a fair growth in the literature of the economic analysis of criminal law enforcement since the seminal paper of Becker (1968). Becker's analysis was based on the utility maximization of a rational criminal who faces the decision to commit crime given he is subject to a probability of detection and a fine if caught and aimed to identify the certainty and the severity of punishment that deter crime. Most of the studies following Becker focused on the maximization of social welfare as the objective of public policy. The primary concern in the maximization of social welfare is that the social planner bears the cost of detecting as well as the cost of imposing sanctions. Therefore the social planner tries to identify the optimal probability of detection and the optimal fine that maximizes social welfare. The main result of Becker's analysis is that the optimal fine is the maximal which is equal to the wealth of the criminal. This finding is based on the assumption that fines are costless transfers and that the wealth of the individual is observable. This type of analysis has been criticized for that (1) *the type of crime is not internalized by the analysis; that is there are crimes (i.e. rape, serial murder) for which fines are useless in deterring and that imposing a non-monetary sanction may be optimal despite it lowers welfare*⁶, (2) *the wealth of the agents is usually unobservable and requires the state to bear the cost of wealth auditing to identify the level of wealth*⁷, (3) *there are asymmetries between the government and the enforcer*⁸, (4) *criminals usually engage in deterrence diluting activities (i.e. corruption)*⁹, (5) *individuals may not be risk neutral*¹⁰, (6) *organized crimes may differ from individual crimes (i.e. target deterrence may be needed)*¹¹, (7) *the criminal domain may be beyond the control of a single government or a group of enforcers (i.e. transnational crimes) and (8) the analysis is essentially static and that a dynamic framework would produce a completely different result*¹².

6.4.1. Conventional Deterrence

The following cases are assumed given the enforcement, specific to organ trafficking: The liability is strict; the enforcement is act based; detection is a policy instrument; the wealth of

⁶ See Shavell (2004) for a comprehensive analysis of the theory of law enforcement.

⁷ See Polinsky (2006).

⁸ See Jellal and Garoupa (1999).

⁹ See Polinsky and Shavell (2001) and Garoupa and Klerman (2004).

¹⁰ See Polinsky and Shavell (2000).

¹¹ See Gambetta and Reuter (1995), Grossman (1995), Fiorentini (1995), Posner (1998), Garoupa (2000), Kugler et al. (2005), Chang et al. (2005), Mansour et al. (2006) and Ballester et al. (2006).

¹² See Feichtinger (1983), Davis (1988), Leung (1995), Feichtinger (1999), Feichtinger and Tragler (2002), Fent et al. (2002) and Garoupa and Jellal (2004).

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the individual is known; the sanctions are both monetary and non-monetary; the agents are risk neutral in sanctions and the act is irreversible.

The liability is strict in the sense that the offender will be convicted even though he was negligent under *actus reus* and fault is not required. Strict liability imposes an additional burden on the offender and relatively easy to establish for the enforcement authority¹³.

Legal intervention is act-based. Under act-based enforcement the sanction is imposed with respect to the act irrespective of whether the act imposed harm. Under harm-based enforcement the imposition of harm precedes legal intervention. The sanction should be higher the greater the probability or the magnitude of harm (Shavell, 2004).

The enforcement authorities use the probability of detection as a policy instrument. The enforcer first determines the optimal probability of detection and then devotes public resources necessary to achieve the chosen probability of detection. Therefore public expenditures devoted to detect and to apprehend offenders is also a policy variable.

Standard law enforcement theory states that the optimal fines for an illicit activity should be maximal, that is should equal the agents' wealth, assuming that the agents are risk neutral in fines¹⁴.

Both monetary and non-monetary sanctions are considered as means of deterrence. Non-monetary sanctions under organ trafficking may come about in two ways. First, as is the case in the US and most of the European countries, offenders may face imprisonment in addition to monetary sanctions. Another non-monetary sanction is the ban of medical practice which prevents health professionals from practicing medicine.

The final aspect of the analysis is that the removal of kidney and transplant cannot be undone once it is performed.

The agents in kidney sale from living donor are the surgeon who will perform the operation, the middleman, the donor and the recipient. It is assumed that the existence of middleman is necessary to match the recipient with the donor and that the surgeon and the middleman are not the same person¹⁵.

¹³Under the negligence rule as opposed to strict liability, the enforcement authority has to prove that the trafficker was at fault and that he was negligent. If a negligence rule is assumed to prevail, doctors who were involved in trafficking would not be held liable as long as they were proved to be not negligent. This contradicts the legal ground to ban trafficking.

¹⁴It is assumed that imposing fine is costless. Further, if the wealth of the individual is unknown, then the optimal fine may not be maximal so either overdeterrence or underdeterrence occurs assuming that some agents are wealthier than others (Polinsky, 2006).

¹⁵This condition is imposed to make the case realistic and more interesting. Note that most of the donors sell

When the middleman matches a recipient and a donor, he buys the kidney from the donor and sells it to the recipient for a price, p . The difference between the purchasing and the sales price is the gain that middleman obtains from kidney sale which is the middleman's share from sales proceedings, denoted by γ ($0 < \gamma < 1$). Let q be the probability of being detected by the enforcer with $0 < q < 1$. If detected, the middleman is subject to a fine for selling organs, f_m , which is bounded by his wealth, w_m ($0 < f_m \leq w_m$). Therefore if the middleman goes into kidney trade, he will pay a fine, f_m if detected, in which case the kidney payment will be undone. If he is not detected, he will gain γp ¹⁶. The individual will choose to become a middleman if his expected payoff is greater than zero.

$$\Pi_m = (1 - q) \gamma p - q f_m > 0 \quad (6.1)$$

For donor's choice to sell a kidney, let δ be the donor's share from sales proceedings, h be the expected harm of the operation and f_d be the fine imposed on a donor who is caught selling his kidney. If the individual chooses to become a donor and sell one of his kidneys, he will not be detected with some probability and receive a portion of the purchasing price. The middleman and the donor share the total purchasing price of the kidney ($\gamma + \delta = 1$). At the same time, the donor agrees to undergo nephrectomy (surgical removal of kidney) and he is subject to harm¹⁷. If the donor is detected while selling his kidney, it is assumed that the enforcement authorities do not impose a sanction because she is victimized ($f_d = 0$). In that case the payment is undone; however the harm is not reversible. The individual will choose to become a donor if his expected payoff is greater than zero:

$$\Pi_d = (1 - q) (\delta p - h) - q h = (1 - q) (1 - \gamma) p - h > 0 \quad (6.2)$$

Similarly, the recipient benefits g_r after the transplantation but also pays the cost of transplantation, c_x , including the surgeon fee and the clinic fees. If detected, he will be required to pay the fine, f_r , which is bounded by the wealth of the recipient, w_r ($0 < f_r \leq w_r$) and

their kidneys through a middleman although there are cases in which the kidney is sold directly to a clinic.

¹⁶ If the individual chooses to become an organ broker, he allocates all his working time to illicit activity and does not earn legal wage.

¹⁷ Illegal organ transplantations are performed under much less hygienic conditions which involve risk of infection. A recent study by Goyal et al. (2002) in India showed that 86 percent of the participants indicated a decline in their health status and in the ability to perform physical labor after nephrectomy.

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the kidney payment is undone; however, the gain and the harm are not reversible¹⁸. Note that when the recipient is not insured against the costs of criminal activity, the sum of kidney price and the cost of transplant will be bounded by his/her wealth. On the other hand if the recipient does not engage in trafficking, he will remain on dialysis which costs c_d . Therefore, the recipient will choose to involve in this illegal activity if his expected payoff exceeds that of undergoing dialysis.

$$\Pi_r = (1 - q)(g_r - p - c_x - h) - q(f_r - g_r + h) > -c_d \quad (6.3)$$

If the surgeon decides to perform the operation, he will not be detected with probability $(1 - q)$ in which case he will be paid by the amount c_x for performing the operation. If detected, he will pay a fine, f_s , which is bounded by his wealth, w_s with $0 < f_s \leq w_s$ and the payment for transplant will be undone. On the other hand, the surgeon's gain for not performing the operation equals his wage¹⁹. The surgeon will only perform this operation if

$$\Pi_s = (1 - q)(c_x + \Lambda) - qf_s > \Lambda \quad (6.4)$$

Next, consider the willingness of the middleman and the recipient to enter into a sales agreement. The middleman, the donor and the recipient agree over the kidney price, p whereas surgeon and the recipient agree over the transplant fee, c_x . For an agreement between the middleman and the recipient to be feasible, (6.1) and (6.3) imply that

$$\frac{qf_m}{(1 - q)\gamma} < p < \frac{g_r - h + c_d}{1 - q} - c_x - \frac{qf_r}{1 - q} \quad (6.5)$$

It follows from (6.5) that an agreement between the middleman and the recipient occurs if and only if

$$f_m + \gamma f_r < \frac{\gamma(g_r - h + c_d) - \gamma(1 - q)c_x}{q} \quad (6.6)$$

Similarly, for an agreement between the recipient and the donor to be feasible, (6.2) and

¹⁸If the kidney payment is not undone, then the recipient's ability to pay a fine for engaging in kidney sale would decline by p and the middleman's and the donor's ability to pay a fine for engaging in kidney sale would increase by γp and $(1 - \gamma)p$ respectively.

¹⁹The surgeon continues to perform his daily activities and engaging in organ trafficking does not exclude him from receiving his wage. This condition is imposed so that the surgeon can cover his illicit activity and gain access to medical equipment.

(6.3) imply that

$$\frac{h}{(1-q)(1-\gamma)} < p < \frac{g_r - h + c_d}{1-q} - c_x - \frac{qf_r}{1-q} \quad (6.7)$$

It follows from (6.7) that an agreement between the recipient and the donor occurs if:

$$qf_r < g_r - h + c_d - (1-q)c_x - \frac{h}{1-\gamma} \quad (6.8)$$

and using (6.6),

$$qf_m < \left(\frac{\gamma}{1-\gamma} \right) h \quad (6.9)$$

The interpretation of (6.9) is that the middleman will engage in kidney sale if and only if the expected fine is less than the expected harm borne by the donor, multiplied by the ratio of their shares from kidney sale. Hence, the commercialization of kidney can be deterred if the expected fine is sufficiently high or if the donor's share from the sale is sufficiently high. However, the latter case is not relevant because donors do not have a bargaining power in this trade (Pearson, 2004).

Finally, consider the willingness of the surgeon and the recipient to enter into a transplant agreement. For a transplant to be feasible (6.3) and (6.4) imply that

$$\frac{q(f_s + \Lambda)}{1-q} < c_x < \frac{g_r - h + c_d}{1-q} - p - \frac{qf_r}{1-q} \quad (6.10)$$

It follows from (6.10) that a transplant occurs if and only if:

$$q(f_s + f_r) < g_r - h + c_d - (1-q)p - q\Lambda \quad (6.11)$$

and

$$qf_s < (1-q)(c_x - p) + \frac{h}{1-\gamma} - q\Lambda \quad (6.12)$$

From (6.11), the enforcement authority has at least three tools at its disposal to control organ trafficking. Organ trafficking can be deterred if the expected sum of fines for engaging in trafficking is sufficiently high or if the surgeon's wage is sufficiently high or if the cost of dialysis is sufficiently low.

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The individual gains, denoted by g , are $g_m = \gamma p > qf_m / (1 - q)$; $g_d = \delta p > h / (1 - q)$; $g_r > h - c_d + (1 - q)(p + c_x) + qf_r$; $g_s = c_x > q(f_s + \Lambda) / (1 - q)$.

The total gain would be the sum of individual gains which implies:

$$g_r > \frac{q(f_m + f_s + \Lambda) + h(2 - q)}{1 - q} - c_d - q(p + c_x) + qf_r \quad (6.13)$$

The critical value of gain or deterrence, denoted by \hat{g}_r , is defined as the level of gain below which the recipient will not involve in organ trafficking and above which he will. Thus from (6.13)

$$\hat{g}_r = \frac{q(f_m + f_s + \Lambda) + h(2 - q)}{1 - q} - c_d - q(p + c_x) + qf_r \quad (6.14)$$

Note that even though the kidney payment and the cost of transplantation are mere transfers they affect the deterrence level because nephrectomy and transplantation are not reversible acts. On the other hand one would obtain a deterrence level unaffected by p and c_x if these operations were reversible, which is unrealistic.

From (6.14), the dilution of deterrence is twofold; one is related to the price of kidney and the other is related to the costs associated with dialysis. Observe that organ trafficking dilutes deterrence by lowering \hat{g}_r . The reason is that if p is zero, then those who are willing to sell their kidney will have no incentive to do so those who seek kidney will have no incentive to resort to black market, anticipating that no one will supply the kidney at a zero price. Therefore the deterrence diluting effect of kidney payment makes organ trafficking a socially undesirable phenomenon²⁰.

Second, observe that dialysis also dilutes deterrence because marginal increases in the cost of dialysis make it favorable for the recipient to choose the lesser-cost option in the black market. Another implication given by the deterrence level in (6.14) is that an increase of fines

²⁰This result is conditional upon the mechanism by which the legal organ procurement system functions. Currently organs are legally procured under systems based on altruism although exceptions do exist. If the procurement system is based on market mechanism, that is individuals do not donate but rather sell their organs, then commercialization may or may not be socially undesirable. Further, the question of social undesirability of organ trafficking is not concerned with whether there is payment or not. The reason is that payment is why organ trading is illegal in the first place; thus if there were no payment at all, 6.14 would certainly be higher. The social undesirability of organ trafficking rather stems from the fact that the enforcement authority has no direct control over the price and fluctuations in the price or the operation fees in black markets. This means that given there is a black market and a price above zero, any upward movement in the price weakens deterrence and the enforcer's efforts to reduce incidences of trafficking.

for the surgeon and the middleman increases the deterrence level.

Conventionally it is assumed that the social welfare is the gain that the agents create minus the harm they cause minus enforcement costs. It is further assumed that the enforcement authorities do not know the gain a particular recipient obtains but the distribution of the gains. To examine the social welfare implications of organ trafficking, let H be some measure of social harm caused by trafficking, $c(q)$ be the enforcement cost to detect offenders ($c'(q) > 0$) and $z(g_r)$ be the density of gains among recipients, $z(g_r)$ is positive on $[0, \infty)$ ²¹. Thus, social welfare can be expressed as:

$$W = \int_{\hat{g}_r}^{\infty} (g_r - H) z(g_r) dg_r - c(q) \quad (6.15)$$

The objective of enforcement authorities is to choose the fines and the probability of detection that maximize the social welfare in (6.15). The optimal levels of sanctions are denoted by an asterisk.

Proposition 1

If the agents are assumed to be bounded by wealth, then:

- i. *The optimal fines for the middleman and the surgeon are maximal, $f_m^* = w_m$; $f_s^* = w_s$.*
- ii. *Without health insurance, the optimal fine for the recipient is maximal, $f_r^* \geq p + c_x = w_r$.*
- iii. *With health insurance, the optimal fine for the recipient should be accompanied by an imprisonment term.*

Proof

part (i): Whenever $f_m < w_m$ and $f_s < w_s$, fines can be raised to the agents' respective wealth levels and q can be lowered accordingly so that the deterrence level is unaltered but the state saved some enforcement costs because q is lower, thus social welfare is higher if f_m and f_s are maximal. Therefore the optimal fines for these agents that are not maximal cannot be optimal.

part (ii): If the fines, f_m, f_s and f_r can be raised to f'_m, f'_s and f'_r respectively and the probability of detection, q , can be lowered to q' without affecting behavior, this implies

²¹For our purposes it is not essential to elaborate and quantify what H exactly signifies. The social harm of trafficking is generally interpreted as an impediment to fairness and justice.

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$$\frac{\partial \hat{g}_r}{\partial f_m} + \frac{\partial \hat{g}_r}{\partial f_s} + \frac{\partial \hat{g}_r}{\partial f_r} = \frac{\partial \hat{g}_r}{\partial q} \Rightarrow \frac{3q - q^2}{1 - q} = \frac{\Phi_1 + (1 - q)^2 \Phi_2}{(1 - q)^2} \quad (6.16)$$

where $\Phi_1 = f_m + f_s + \Lambda + h > 0$ and $\Phi_2 = f_r - p - c_x$. (6.16) will always hold if:

$$f_r^* \geq p + c_x \quad (6.17)$$

From (6.17), the optimal fine for the recipient should be greater than or equal to the total cost of trafficking ($p + c_x$), which is assumed to be bounded by the recipient's wealth under no insurance²². However, since the fine cannot exceed the agent's wealth, the optimal fine for the recipient equals his/her wealth. This normative result is standard when individuals are risk neutral in fines and wealth is observable and would not be altered if $p + c_x < w_r$ because the fine for the recipient can be raised to maximum without incurring costs. The inequality in (6.17) is also a benchmark for the enforcer given the total of cost trafficking can be identified by the enforcement authority. Given the optimal fines, $f_m^* = w_m$; $f_s^* = w_s$ and $f_r^* = w_r$, the optimal probability is then determined by maximizing $\int_{\Phi_0}^{\infty} (g_r - H) z(g_r) dg_r - c(q)$ over q where $\Phi_0 = \frac{q(w_m + w_s + \Lambda) + h(2 - q)}{1 - q} - c_d - q(p + c_x) + qw_r$.

part (iii): Some recipients are insured against the costs incurred due to illegal transplantation including the cost of tissue typing and laboratory tests. This problem has been pointed out by Vermot-Mangold (2003). If recipients are insured, the total cost of trafficking may exceed his/her wealth. In this case, $p + c_x = w_r + \varepsilon$ where $\varepsilon > 0$. From part (ii), we know that $f_r^* = w_r$ which implicitly assumed that $\varepsilon = 0$. Under health insurance, the optimal fine for the recipient is greater than the sum of kidney price and the cost of transplant which is in turn greater than the recipient's wealth²³.

$$f_r^* > p + c_x = w_r + \varepsilon \quad (6.18)$$

The optimal fine is greater than the recipient's wealth however he/she will not be able to

²² (6.16) may still hold under certain conditions even if $f_r^* \leq p + c_x$. Since the recipient is bounded by wealth, both cases lead to $f_r^* = w_r$.

²³ Here, the health insurance that partially covers the costs of transplantation refers to a moral hazard problem which, unlike the conventional definition of moral hazard, indicates a tendency of insurance protection to alter the potential recipient's behavior to engage in illegal transplantation. The incentive conducive to insurance and that engages the individual to seek organs in illegal ways may also be interpreted as an indirect motive to prevent loss for as waiting for an organ through legitimate means may impose a loss on the individual. See Shavell (1979) on how moral hazard affects the behavior under typical insurance protections.

pay f_r^* but only w_r . This result suggests that the optimal deterrence cannot be reached by solely relying on fines and that those who are insured against the costs of criminal activity should be subject to more severe punishment than those who are not insured, possibly by an imprisonment term since the pecuniary penalty is exhausted. ■

Now suppose that there exists a medical board that supervises and licenses medical doctors in the country. It is now possible to introduce ban of medical practice for surgeons who engage in trafficking. According to Caplan et al. (2009) the ban of medical practice would be an effective tool to combat organ trafficking. It is assumed that the imposition of ban of medical practice is costless.

Proposition 2

If the state is able to impose a ban of medical practice given it is costless, then:

- i. *Monetary sanctions should always be accompanied by a ban of medical practice*
- ii. *The optimal ban of medical practice term is maximal, $t_b^* = T$*

Proof

part (i): The ban prevents surgeons from practicing medicine thus earning wage as long as the ban is in effect. The disutility caused by the ban is the foregone wage which can be expressed by the net present value. Let T be the maximum ban of medical practice term that can be imposed on the surgeon and t_b be the duration of ban of medical practice, $0 < t_b \leq T$. The disutility of ban of medical practice of duration t_b is $\Lambda\mu = \Lambda \int_0^{t_b} (1+r)^{-t} dt$ where r is the discount rate ($0 < r < 1$) and t denotes time. If the state uses ban of medical practice together with fines, the surgeon will perform the operation if $c_x > q(f_s + \Lambda\mu) / (1 - q)$. Upon the introduction of ban of medical practice, the deterrence level is:

$$g'_r = \frac{q(f_m + f_s + \Lambda\mu) + h(2 - q)}{1 - q} - c_d - q(p + c_x) + qf_r \quad (6.19)$$

The deterrence in (6.19) is higher than the case where such ban is absent. In this framework, the ban of medical practice introduces a higher foregone wage for the surgeon, thus it is optimal to use whenever possible because it only affects legitimate earnings and it is assumed to be costless to impose.

part(ii). Suppose that the optimal ban of medical practice term is t_b' and that $t_b' < T$. Then

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the ban of medical practice term can be raised to maximum possible term that can be imposed without decreasing social welfare since it is a costless non-monetary sanction. This maximum term could be lifetime or some term less than lifetime due to moral reasons²⁴. Therefore a ban term that is not maximal cannot be optimal. ■

If the state imposes ban of practice even at a zero marginal cost, the surgeon may or may not be deterred because ban of practice does not incapacitate him²⁵. Upon the introduction of ban of medical practice, the social welfare is given by (6.15) where now the deterrence level is replaced by (6.19). Once the ban term and fines are determined optimally, the objective of enforcement authorities is to choose the probability of detection that maximizes social welfare.

6.4.2. Target Deterrence

In organ trafficking as opposed to other criminal organizations, each agent except the broker has a strictly complementary role such that the removal of any of those agents is sufficient to dissolve the network. The broker only intermediates the exchange of organ between donor and the recipient and he is not a vital member of this organization, therefore none of the agents other than the surgeon could be the key player. First, surgeon's skills to perform a transplant cannot be substituted by another agent; however the tasks performed by a broker can be substituted by a surgeon. Second, surgeon is the only member whose offending is of chronic nature whereas the recipient and the donor are assumed to commit the underlying offense once. Therefore the surgeon is entitled to be the key player. If there is a particular agent whose detection and apprehension is sufficient for the dissolution of the crime network the enforcement authorities may detect and sanction only the key player so that no other agents can establish the necessary conditions to commit crime²⁶. The rationale behind this is that the enforcement authority intends on deterring all but does not actually want to impose a sanction on non-key players. This is referred to as *the decriminalization* of the agents who

²⁴ Not only a lifetime ban of medical practice may be a disproportional punishment on the grounds of justice and fairness but it may also be socially costly because it permanently cuts back on the health workforce.

²⁵ An additional impact of introducing ban of medical practice, which is beyond the scope of this analysis, is that under circumstances in which the surgeon is not deterred by the ban and continues to perform illegal transplants, he/she will be performing an illegal medical practice without the licence, over and above performing illegal transplants. In this case, the surgeon should be brought to punishment for both organ trafficking and illegal medical practice.

²⁶ Commercialization will not take place if agents anticipate that there is no surgeon willing to do the operation. It is acknowledged that not all surgeons can be deterred but if some surgeons could be adequately deterred there is less incentive to sell and buy kidneys.

are not key players.

Proposition 3

If the enforcement authorities sanction only the key player, the recipient cannot be deterred by monetary sanctions alone imposed on the surgeon.

Proof

The deterrence level is given by (6.14) where now $f_m = f_r = 0$.

$$\hat{g}_r'' = \frac{q(f_s + \Lambda) + h(2 - q)}{1 - q} - c_d - q(p + c_x) \quad (6.20)$$

The deterrence in (6.20) is lower by $(qf_m^*/(1 - q)) + qf_r^*$ where $f_s^* = w_s$. The only way for the enforcement authorities to deter the recipient (i.e. to keep the deterrence constant) is to increase the fine imposed on the surgeon. The optimal fine for the surgeon was equal to his wealth and cannot be raised further. Since the fine is used to the fullest extent, the optimal sanction can be achieved through imposing a non-monetary sanction in addition to fine, possibly imprisonment. Let t_s be the imprisonment term imposed on the surgeon. It is assumed that the disutility to the surgeon of an imprisonment term of length t is t . Then, the deterrence level is:

$$\hat{g}_r''' = \frac{q(f_s + t_s + \Lambda) + h(2 - q)}{1 - q} - c_d - q(p + c_x) \quad (6.21)$$

where $f_s^* = w_s$ and the optimal imprisonment term, $t_s^* \equiv f_m^* + (1 - q)f_r^*$. ■

Upon the introduction of imprisonment the social welfare will be lower than in (6.15) because the public has to bear the cost of imprisonment which was costless for imposing fines²⁷. In practice the enforcement authorities may not identify the recipient or the surgeon to impose the sanction simply because he may have left the purview of the authority. This problem occurs because the laws are usually not clear about who is subject to punishment and there are cross-country inconsistencies in criminal laws pertaining to organ trafficking which offenders take

²⁷Notice that the enforcement authority could impose a ban of medical practice instead of an imprisonment term in which case social welfare will not be lower than 6.15 because imposing ban of medical practice is assumed to be costless. However, as mentioned in Proposition 2, a ban of medical practice will not incapacitate the surgeon whereas the imprisonment term will. Therefore it may be optimal to impose an imprisonment term instead of ban of practice whenever the authority pursues a target deterrence policy.

advantage of.

6.5. Concluding Remarks

This chapter analyzed the legal and the economic aspects of organ trafficking. The soaring demand for transplants and the prohibition of the sale of transplantable human organs made organ trading a seventy-five-million-dollar industry in twenty years²⁸. Most of the international organizations condemned this practice by issuing a set of resolutions. We first examined the legal instruments and the international standards set by the UN, the WHO and the COE. Although some of these international standards are allegedly binding, they did not counteract the growth of black markets because they have no enforcement powers or funding to help especially the underdeveloped countries trace illegal organ sales (Goodwin, 2006). The inspection of the legislations of a sample of countries reveals that despite the widespread ratification of international conventions and protocols, a standard framework is missing in terms of the magnitude of sanctions as well as in terms of the scope of criminal liability for organ trafficking.

In section 6.4 a simple model of law enforcement is developed to address the embodiment of specific legislation and the implementation of an optimal deterrence policy. The results of the model, albeit normative, suggest that criminal provisions concerning organ trafficking should expressly stipulate a higher penalty for health professionals, consisting of a mix of maximal pecuniary sanctions and a maximum ban of medical practice term to reinforce the deterring effects of the law because they offend repeatedly and their mediation is essential, unlike brokers'.

An increase in the legal wage of transplant surgeons would increase the maximum pecuniary penalty since the maximum fine that can be imposed on the surgeon is assumed to be bounded by his wealth. Therefore the wage of the surgeon may be used as a policy instrument to deter him from performing illegal transplants. This is especially a useful tool because past experience shows that trafficking is difficult to detect and prove, and raising the probability of detection or the rate of investigation is costly. Increasing the wage of transplant surgeons would also reinforce the deterring effect of ban of medical practice through increasing the net present

²⁸This value is based on Havoscope, an online database of black market activities. See <http://www.havoscope.com/blackmarket/human-trade/organ-trafficking/>

value of forgone wage. When the enforcement authority engages in a target deterrence policy this mix of sanctions should further include an imprisonment term for the health professional because targeting the key player requires higher penalties in order to deter potential recipients.

Insurance against illegal transplants typically seen in Israel is a serious deterrence diluting issue which requires severer penalties than situations under which insurance does not exist. Under a conventional deterrence policy insured recipients should be subject to maximal pecuniary sanctions and an imprisonment term.

The model presented relies on several simplifying assumptions and spatial aspects have been left out. Cooperation is an important tool to combat trafficking that aims to increase the probability of detection through pooling of resources, expanding the jurisdictional domain and exchanging information on ongoing investigations. It is a crucial strategy to deal with organ trade syndicates that operate in more than one country whose apprehension may be difficult if states adhere to conduct investigations at a national level.

It is known that organ trafficking remains active and intense in countries with relatively weak jurisdictions if there are relatively strong jurisdictions in the domain of criminal activity (Feichtinger, 1999). Enforcing the law and setting dissuasive sanctions may eliminate trafficking in a particular jurisdiction. However failure to take into consideration the enforcement in other and particularly vulnerable states will not eradicate trafficking incidences but will merely shift criminal activity elsewhere. This spill-over effect, as Scheper-Hughes notes, stimulates trafficking in a neighboring country and leads to the emergence of trafficking hubs such as Turkey, India, South Africa and China where illegal transplants are booming and medical regulations are inadequate to supervise health professionals. This suggests that brokers, recipients and physicians not only observe sanctions but they also estimate, perhaps inaccurately, the probability of detection and locate themselves where the expected sanctions are minimal and the scope of criminal liability is highly limited. The legal asymmetries across jurisdictions should be eradicated in order to cope with organ trafficking by committing to impose a uniform expected sanction and a uniform legal framework that takes into account the aggravating circumstances in determining the magnitude of sanctions and the scope of criminal liability.

7. The Future of Organ Procurement

“Transplant is not a cure. It is exchanging one medical condition for another.”

Norm Barber

7. The Future of Organ Procurement

Hundreds of thousands of lives depend upon the resolution of the organ shortage conundrum. With increasing burden of disease and advances in the biotechnology, the demand for transplantable human organs will continue to rise. The supply of organs will not be able to catch up with the demand unless revolutionary solutions in the fields of xenotransplantation and stem cell research to clone fully compatible internal organs become feasible. Currently the legal, ethical and medical barriers impede the implementation of these alternatives and they are unlikely to be ready for routine use within the next twenty years. In their absence, three main possibilities lie ahead to shape the future of organ donation and procurement.

7.1. A Praise for Market Reform

The first scenario is that the exchange in transplantable human organs will be taken over by pure market reforms in which individuals will be legally entitled to sell their organs or the organs of the deceased. Whether such reforms are centralized, competitive, contemporaneous or intertemporal, most people would be concerned in many ways about the systematic vulnerability and the risks of exploitation of the donors. When people's needs are greatest, they will voluntarily enter into a contract that exploits them. It is not the contract that is the source of exploitation but the willingness of the buyer to take advantage of another's vulnerability (Healy, 2006). Perhaps the exploitation of the donors may not be so easily dismissable; however market-based reforms do not automatically qualify for being exploitative. Therefore a market-based reform that is centralized, highly supervised and monitored may not be a bad choice after all. Healy (2006) suggests that there are two ways to prevent donor exploitation. The first is to enforce prohibition on the commercialization of organs so that people will not have the opportunity to enter into exploitative contracts. The second is to redistribute the bargaining power in such a way that any exchange that does happen will not be exploitative.

With respect to Healy's second suggestion, the axiomatic analysis in chapter 2 reveals two equitable paths that market reforms in cadaveric organs may take. The first path leads to a contemporaneous government monopsony. The mediation of a private non-profit institution will minimize systematic exploitation of the donors and ensure an equitable, efficient and effective procurement and distribution of organs. Although the detailed mechanics of a contemporaneous monopsony is beyond what this research could offer, few conditions for an equitable procurement along the lines defined in chapter 2 are the *sine quibus non* of this

policy. First, a donor registry should be maintained so that the risks of failure associated with the interference of the next-of-kin are minimized and the donor autonomy is ensured. Second, a monopsonist should allocate the organs of the deceased solely based on medical criteria to further ensure that buyers do not take advantage of the vulnerability of the donors. Third, the offered price by the government should be as close as possible to the market clearing price to ensure that donors are not financially exploited and that the system works somewhat efficiently, if not as efficiently as a free market.

The second path leads to a future delivery market that is more accustomed, morally less repugnant but also less effective than the first. The life insurance markets of the 19th century show that monetary incentives for procurement can be incorporated into the world of death (Healy, 2006). Future contracts that stipulate payments to the contractor induce time inconsistent behavior and restrict the actual number of donors at the time of delivery. Future contracts are also likely to impinge upon the autonomy of the contractor if families are allowed to veto the contractor's decision. Although extending the scope of life or health insurance policies by including a simple clause on future delivery of organs may seem to do the trick, the scale of national coverage of such insurance policies remains to be solved. Therefore, the *sine quibus non* of future delivery markets are that the government should be the only authority to procure and to distribute transplantable human organs and that the health insurance coverage should be sufficiently broad and preferably universal before implementing a future delivery market. With respect to the contract terms the time inconsistent behavior induced by making payments to the contractor can be solved in two ways. First the decision of the individual can be made irreversible by law if the payments are going to be made to the contractor. Second, the payment can be made to the next-of-kin after donation instead of the contractor while alive. In both cases, the next-of-kin should not be allowed to veto the contractor's decision.

In the case of living donors opponents of market reforms point to potential problems of qualitatively and medically inferior outcomes, infringement of donor dignity, exploitation, impingement of free will and violation of donor allocation protocols in a way that results in unfair outcomes. These potential problems, some plausible some are not, highlight that although market reforms in living donors are preferable as there is no family to complicate the decision making, it may be difficult if not impossible, to establish a morally permissible market for living donors. An important question is how a shift from gift-giving to markets in the procurement of one type of donors (i.e. deceased or living) will affect the procurement

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in the other. The empirical analysis in Chapter 5 points that related living adult donations thus total living adult donations may be intertemporally substituted by deceased donations. This finding suggests that if a market reform is implemented only for cadaveric organs this may boost deceased procurement rates but may also decrease living donation rates. This will possibly result in a decrease in the medical effectiveness of organ transplants in the long-run because using living donor organs have survival advantages compared to deceased organs. But most importantly it will wipe out altruism in the procurement of living donors. It is not the market in cadaveric organs that is the source of this erosion but the intertemporal substitution effect between deceased and living donors. Therefore a shift from gift-giving to market-based reforms may have to be implemented simultaneously for deceased and living donors or should not be implemented at all. Scholars overlook this point when they propose market reforms.

7.2. **A Praise for Altruism**

The second scenario is that the altruistic donation will become indispensable in the exchange of transplantable human organs and any monetary incentive will be perceived as repugnant, coercive and exploitative. In the case of deceased donors, it is argued that a first-person informed consent policy is the only equitable option according to the criteria set forth in chapter 2. This policy entails that the procurement is based solely on the documented intent of the donor and the families are not allowed to revert this decision. The downside of this policy is that its effectiveness is unknown. But the evidence suggests that an informed consent policy that relies on family consent will not be effective relative to a presumed consent policy. According to Goodwin (2006) a presumed consent legislation that requires waiver of constitutional rights in order to save others may be a burdened choice. But it may be the only effective policy that does not rely on monetary incentives. In Chapter 3 we constructed an international dataset on the legislative defaults, health expenditures, death rates caused by cerebro vascular diseases, motor vehicle accidents and homicides, legal systems, family consent, civil rights and liberties and donor registry systems for 24 countries over the period of 1993-2006. The empirical analysis reveals that there are two ways in which a presumed consent default rule itself could be responsible for higher deceased donation rates relative to an informed consent regime once the remaining potential factors are controlled for. The first is to enact a presumed consent regime that does not always seek family consent and that maintains

at most a non-donor registry. The second is to always seek family consent irrespective of the documented preferences of the deceased and to maintain a combined registry which records both consent and objections. Off these conditions a presumed consent regime is unlikely to be effective. This suggests that switching to a presumed consent regime may help reduce the size of organ shortages provided that the above conditions are met, a timely procurement process is managed and a solid infrastructure and social support is built prior to legislative action.

In the case of living donors the second scenario relies on organ allocation mechanisms. Their current performance in terms of the number of transplants they can produce is limited given their size. Our analysis in chapter 5 confirms that PKEs are unlikely to be effective in increasing living donation rates. However, a nation-wide implementation of these mechanisms may substantially increase the number of transplants from living donors.

As long as the demand for transplants is left uncontrolled, an exchange in transplantable human organs that is purely altruistic will not eliminate the risks of exploitation but only shifts them to black markets. This brings us back to Healy's first suggestion. Whether banning the commercialization of organs deters people from entering into exploitative contracts depends on the legislative criminal provisions and how these provisions are enforced. For this purpose in Chapter 6 we examined the legal instruments and the international standards set by the UN, the WHO and the COE; analyzed the criminal provisions for a sample of thirty-eight countries and developed a simple model of law enforcement to address the scope of criminal sanctions and the optimal deterrence for organ trafficking. The analysis suggests that a unified international framework in terms of the magnitude of sanctions as well as in terms of the scope of criminal liability for organ trafficking should be implemented and that the enforcement authorities should treat unequal offenders differently. This translates into punishing health professionals by higher penalties consisting of a mix of maximal pecuniary sanctions and a maximum ban of medical practice term. The analysis does not specifically address the optimal scope of criminal liability; however there may be moral or otherwise reasons not to punish or severely punish certain offences. In a state in which it is desirable to deter but inappropriate or infeasible to punish recipients, an imprisonment term should be imposed to health professionals in addition to pecuniary sanctions.

Organ trafficking became a tremendous industry in twenty years with billions of dollars changing hands among doctors, recipients and brokers although it is impossible to give a reliable estimate of the size of this industry. Transplant tourism has serious redistributive and

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judicial consequences for the society. The wealthy but medically desperate patients of the West turn to healthy but financially desperate individuals of the East and to the prisoners in death-row while those who cannot afford to pay or dare to resort to black markets wait for years for a kidney that they may never receive. Those who receive the gift of life at the expense of paying for and taking someone else's health argue that everybody is better off after all. However, donors not only risk their health in return for as little as few hundreds of dollars but they become poorer in the long-run for not being able to work and unhealthier because the government is unable or unwilling to take medical care of them. Recipients also face serious post-operative complications and even death due to lack of health safety measures and unmonitored quality of organs. The enforcement experience proves that deterring acts of desperation through the penal system is difficult and renders undesired consequences. The transnational nature of organ trafficking and the lack of capacity to punish offences committed beyond the jurisdictional domain render difficult to punish violators. Further the sensitive issues complicate to reach a consensus on the scope of criminal liability. In a purely altruistic system these problems will not go away. Therefore a benevolent social planner should weigh the total burden of a purely altruistic system that unnecessarily exacerbates black markets against the total burden of a market reform that naturally inhibits black markets.

7.3. Reconciliation

The third scenario is a reconciliation of the first and the second scenarios, characterized by the introduction of compensation in a way that is more ethically and politically acceptable. The idea is to provide some monetary compensation while retaining the giftlike features of the exchange (Healy, 2006). Avoiding the language of the market allows both the transplant community and the public to regard reimbursement or compensation as a slight modification of the current system without resorting to drastic changes (Mahoney, 2009).

It is argued that the reimbursement of hospital and burial expenses and the reimbursement of non-medical costs of living donors must be routinely offered to compensate the families of the deceased for the pain and suffering they have experienced during the donation process and to compensate living altruistic donors for the disutility of weeks of convalescence and foregone earnings. If everyone else is paid at each stage of this process from the extraction of the organs to the processing of body parts in secondary markets, so should be those who provide

the organs.

Proponents of payment believe that the supply would rise if families of the deceased or living donors are offered a small payment in return to agree to donate the organs. Critics raise the theoretical objection that as much as there will be many individuals exhorted by payment there are also many individuals who would not agree to donate if the payment is not sufficiently large. In this case, there may be hardly any individuals who would agree to donate for a small amount of payment, a phenomenon known as the discontinuity in the supply (Healy, 2006). As a result the procurement rates may remain unchanged unless the payment is sufficiently generous rendering the reimbursement or the compensation scheme no longer ethically and politically acceptable.

Analyzing the consequences of compensating the families of the deceased is currently difficult to address empirically. On the other hand, few reimbursement or compensation schemes for living donors have been introduced whose effectiveness could be examined. For this purpose, in Chapter 5 we constructed a dataset on reimbursement legislation, the number of living related, living unrelated and total living adult donation rates, the combined deceased kidney and liver transplant rates, real per capita GDP, the number of transplant centers, the prevalence of ESRD and PKEs for 50 states in the US for the period 1988-2009. The empirical analysis shows that the tax deduction and the paid leave of absence legislations have no impact on living donation rates. If the aim is to lower the barriers to living donation by offering modest monetary incentives that are ethically and politically acceptable, it is suggested that the current legislation should be amended. First, the tax deduction law should be repealed. Second, the legislation should cover not only public employees but also the unemployed, uninsured and low-income individuals who are a major proportion of the population and who are more likely to experience financial hardship as a result of donation.

7.4. Limitations and Future Research

Organ donation and transplantation lies at the intersection of law, economics and medicine. Recent advances in social research conjecture and necessitate to pursue an interdisciplinary approach to fully assess and help resolve the controversial issues arisen in this or other multi-dimensional subject areas.

As much as there is a prolific literature on the neoclassical analysis of the liberalization

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in the exchange of deceased human organs, exploring other future non-market procurement alternatives through economic and legal tools might be very useful in order to assess the efficiency, feasibility and the effectiveness of these alternatives. Further research might explore the foundations of reciprocal systems, both theoretically and through experiments, before prejudicially ruling them out or considering them on a wider scale. Since these procurement systems rely upon memberships, the minimum and the maximum efficient network scales have to be determined respectively for opt-in and opt-out reciprocal systems. This translates into finding the optimal membership size in mutual insurance pools.

In order to conduct further empirical analyses it seems imperative to construct detailed national, local, qualitative and quantitative data sets on existing practices. Currently, the US collects the most comprehensive data set on transplantation medicine including data on legal framework. Equal data collection efforts by other countries would enable detailed cross-country comparisons. Specifically, the dynamics of the relationship between living and deceased donation is currently not well known and the use of larger and international panel data sets could help identify their interaction.

In the exchange of living organs, the exchange algorithms developed by Roth et al. (2004, 2005a,b) and Roth et al. (2007) should be fine-tuned, updated and their use should become widespread in order to increase their efficiency, scope and accessibility. At the extreme, with the advances in the medical technology new exchange mechanisms could be developed. These mechanisms may involve not only the living (i.e. kidneys and livers) but also other solid and life-saving organs in the future. The extent to which these mechanisms are ethically, medically and politically acceptable depends on how eager, radical and aggressive we would like to be so as to reduce organ shortages.

The main limitation of this research is that it almost exclusively focused on governmental or policy problems related to the supply of human organs and did not address demand-related problems or remedies. Despite the intensive economic research on finding solutions to increase the supply of human organs, on the demand side there is a great untapped potential that could help decrease the prevalence of organ failure. For instance, glomerulonephritis is a highly prevalent kidney disease in which the part of the kidneys that filter waste and fluid is damaged. The primary cause of glomerulonephritis in underdeveloped regions is lack of hygiene and sanitation. Malnutrition and obesity are also the primary causes of heart diseases. Therefore maintaining a standard of hygiene and a proper diet would greatly reduce incidences

of these diseases. Similarly, diabetes is the main risk factor for most of the kidney and liver failures whose cure could substantially reduce the number of patients with kidney and liver failures. Therefore research on increasing the supply through market mechanisms, improving the management of donors or raising awareness about organ donation should be combined with medical research aimed at reducing the demand for organs.

7.5. Closing Arguments

The prolific literature on organ procurement discloses that some desirable properties of markets simply may not coexist in the highly controversial context of organ donation and transplantation. Most of the undesirable consequences of monetary incentives would be rectified by proper precautionary measures such as centralization of the procurement system, enforcement of stringent medical requirements, thorough post-operative follow-up of donors, ingenious pricing mechanisms etc... However, there are fundamental problems with the institution of monetary payments that are not so easily rectifiable. First, while market reform may reduce the family refusal rates, it can neither boost the raw supply of cadaver organs (ie. the supply is naturally restricted by the number of brain-dead cases) nor remove any of the logistical problems or some of the organizational problems associated with the procurement of deceased donors discussed in Chapter 1. Second, currently the commercialization of human organs is prohibited by law everywhere except Iran. This prohibition also comprises experimentation with monetary incentives unless an exemption is legislated. In fact the only mean to test the effectiveness of a market whose impact on society and the potential repercussions are mere foresight, is to set up an experiment or a pilot region. But the positive outcome of such experimentation may not eliminate the adverse or even the catastrophic results that could be experienced in reality. From that moment on it might be impossible to revert to the current altruistic system. In Richard Titmuss' words, *"once a commodity, always a commodity"*. Therefore the altruistic system may have to be developed to its full potential before resorting to market solutions whose fate is unknown without experimentation (Horton and Horton, 1993). This suggests that the procurement possibilities under a nonmonetary system should be exhausted before resorting to alternative ways to seek out donations. This point of view might be comforting for those who defend the idea of gift giving. But it shall not be forgotten that by imposing a price level below what it would naturally prevail and expecting every

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person to voluntarily donate whenever conditions allow but paying dialysis centers, transplant surgeons, hospitals, OPOs, procurement teams and companies that process human body parts while giving the necessary care only to those who can afford it, we, as a society, reside in a paradox.

David Kaserman was an economist, a prolific author and a passionate advocate of full liberalization in the exchange of transplantable human organs. He was also suffering from kidney failure and fought for almost 20 years before passing away in 2008 after a brief period of illness and hospitalization. Perhaps Kaserman would not have been so passionate about the implementation of a free market if he had not been suffering from kidney failure. Or perhaps he would not have thought about this issue at all. Nor would someone who frowns upon liberalization dissented markets if he had experienced heart failure that would lead to a slow and painful death. As John Rawls said *"no one knows his place in society, his class position or social status; nor does he know his fortune in the distribution of natural assets and abilities, his intelligence and strength, and the like"* (Rawls, 1971). The moral permissibility of markets cannot be truly determined unless we vote behind the veil of ignorance where we do not know whether we are the healthy or the ill. Once the veil is lifted and we all know our place in the society, it is easy to flirt with or to frown upon markets.

The implausibility of the arguments against monetary incentives does not necessarily imply feasibility. The past twenty years of debate on the implementation of an OPP that is efficient and conformable to human rights, dignity and morality has retrospectively realized that the major obstacle against the implementation of a "better" system is not the outrageousness of or repugnance against these proposals per se. However, market designs of Alvin Roth and his colleagues reveal an important fact: repugnance might constrain market transactions¹. Three decades have been devoted to change the paradigm of gift giving by offering monetary incentives for prospective donors and the political infeasibility and repugnance for such incentives will continue to be insurmountable at least in the foreseeable future.

The failure to act upon the deficiencies of the current system indicates that political actors deem the current state to be so far tolerable even preferable over equally acceptable alternatives. Given the morally imperative discourse and the current political and legal infeasibility of offering explicit monetary payments, the *status quo* should unfortunately be taken for granted to the extent that the size of the waiting lists and the unnecessary suffering and the death of

¹See Roth (2007) and Leider and Roth (2010).

the many is no longer bearable.

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Australia: Australian Capital Territory, Transplantation and Anatomy Act No. 44 of 1978. New South Wales, Human Tissue Act No. 164 of 1983. Northern Territory, Human Tissue Transplant Act 1995. Queensland, Transplantation and Anatomy Act 1979. South Australia, Transplantation and Anatomy Act 1983. Tasmania, Human Tissue Act 1985 amended by Act No. 51 of 1987 and later by Act No. 3 of 2008. Victoria, Human Tissue Act No. 9860 of 1982. Western Australia, Human Tissue and Transplant Act No. 116 of 1982.

Austria: Federal Law of 1 June 1982 amending the Hospitals Law. Bundesgesetzblatt für die Republik Österreich, 18 June 1982, No.113, 1161-1162, IDHL (1986), 37(1), 32-33

Belgium: Law of 13 June 1986 on the removal and transplantation of organs. Moniteur Belge, 14 February 1987, No. 32, 2129-2132. IDHL (1987), 38(3), 523-525

Brazil: Law No. 9434 of 4 February 1997 on the removal of organs, tissues, and parts of the human body for the purposes of transplantation and treatment. Diário Oficial, 5 February 1997, No.25, 2191-2193. IDHL (2007), 58(2)

Bulgaria: Law of 30 July 2003 on the transplantation of organs, tissues, and cells. IDHL (2007), 58(1)

Canada: The Uniform Human Tissue Donation Act of April 1990. Uniform Law Conference of Canada

Czech Republic: Transplant Act No. 285 of 30 May 2002 on donation, removal, and transplantation of organs and tissues and amending certain acts. IDHL (2002), 53(2)

Denmark: Law No. 402 of 13 June 1990 on the examination of cadavers, autopsies and transplantation, etc. Lovtidende for Kongeriget Danmark, 14 June 1990, No. 63, 1331-1334. IDHL (1991), 42(1), 30-32

Estonia: Law of 30 January 2002. Riigi Teataja 1 No. 21, 118, IDHL (2001), 52(4)

Finland: Law No. 101 of 2 February 2001 on the use of human organs and tissues for medical purposes. Finland Författningssamling, 8 February 2001, Nos. 101-105, pp. 249-256, IDHL, (2001) 52(2)

France: Law No. 94-654 of 29 July 1994 on the donation and use of elements and products of the human body, medically assisted procreation, and prenatal diagnosis. Journal officiel de la République Française, Lois et Décrets, 20 July 1994, No. 175, pp. 11060-11068. IDHL (1994), 45(4), 473-482

Georgia: Law of February 2000 on taking of human organs, parts of organs, tissues and their usage.

Germany: Act of 5 November 1997 on the donation, removal, and transplantation of organs (the Transplantation Act). Bundesgesetzblatt, Part I, 11 November 1997, No. 74, pp. 2631-2639.

Greece: Law No. 1383 of 2 August 1983 on the removal and transplantation of human tissues and organs. Ephemeris tes Kyberneseos tes Hellenikes Demokratias, No:106, 5 August 1983, Part 1, 1917-1920.

Hong Kong: Human Organ Transplant Bill of 27 March 1992. CAP 465 Human Organ Transplant Ordinance, L.N. 291 of 2006

Iceland: Biobanks Act No. 110 of 25 May 2000. IDHL (2002), 52(2)

India: Act No. 42 of 1994 to provide for the regulation of removal, storage and transplantation of human organs for therapeutic purposes and for the prevention of commercial dealings in human organs and for matters connected therewith or incidental thereto. Date of assent by the President: 8 July 1994. (The Transplantation of Human Organs Act, 1994) IDHL (1995), 46(1), 34-38

Iraq: Decree No.698 of 27 August 1986 of the Revolutionary Command Council promulgating Law No.85 of 1986 on the Transplantation of Human Organs. Alwawai Aliragiya (The Official Gazette of the Republic of Iraq), 15 September 1968, No.3115, 559

Israel: Law of Anatomy and Pathology of 26 August 1953. Sefer Ha-Chukkim, 4 September 1953, No.134, 162

Italy: Law No. 644 of 2 December 1975 regulating the removal of parts of cadavers for purposes of therapeutic transplantation and prescribing rules governing the removal of the pituitary gland from cadavers with a view to producing extracts for therapeutic purposes. Gazzetta Ufficiale della Repubblica Italiana, Part I, 19 December 1975, No. 334, pp. 8869-

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8871. IDHL (1977), 28(3), 621-627

Italy. Law No. 91 of 1 April 1999 on the removal and transplantation of organs and tissues. Gazzetta Ufficiale della Repubblica Italiana, 15 April 1999, No. 87

Japan: Law No. 104 of 16 July 1997 on organ transplantation. Kappo, 16 July 1997, No. 2181, 3-5.

Kuwait: Decree-Law No.55 of 20 December 1987 on organ transplantation.

Lebanon: Decree No.109 of 16 September 1983 on the removal of human tissues and organs for therapeutic and scientific purposes.

Luxemburg: Law of 25 November 1982 regulating the removal of substances of human origin. Mémorial: Journal Officiel du Grand-Duché de Luxembourg, Part A, 3 December 1982, No:98, 2020-2022. IDHL (1983), 34(2), 263

Morocco: Dahir No. 1-99-208 of 25 August 1999 promulgating Law No. 16-98 on the donation, removal, and transplantation of human organs and tissues. Bulletin Officiel du Royaume du Maroc, 16 September 1999, No:4726, 728-732. IDHL (2000), 51(1)

Netherlands: Law of 24 May 1996 on laying down rules governing the availability of organs. Staatsblad van het Koninkrijk der Nederlanden, 1996, 11, IDHL, 47(4), 469-475

New Zealand: Human Tissue Act No.28 of 18 April 2008. New Zealand Gazette (Te Kahiti o Aotearoa).

Norway: Law No. 31 of 8 June 2001, amending Law No. 6 of 9 February 1973 on transplantation, hospital autopsies and the donation of cadavers etc. Norsk Lovtidend, Part I, 4 July 2001, No:7, 818-819.

Panama: Law No. 52 of 12 December 1998 regulating the removal, preservation, storage, transportation, intended use, and final disposal of organs or anatomical parts, and also the procedures for their transplantation into human beings. Gaceta Oficial, 13 December 1995, No. 22929, 143-190.

Pakistan: Transplantation of Human Organs and Tissues Ordinance No. XLIII of 2007.

Poland: Law of 26 October 1995 on the removal and transplantation of cells, tissues, and organs. Dziennik Ustaw of: Rzeczypospolitej Polskiej, 6 December 1995, No. 138, pp. 2008-3012, Text No. 682

Romania: Law of 8 January 1998 on the removal and transplantation of human tissues or organs. Monitorul al României, 13 January 1998, No. 8. IDHL (2002), 53(4)

Singapore: The Human Organ Transplant Act no. 15 of 1987. IDHL (2003), 54(2)

Slovak Republic: Law of 24 August 1994 of the national council of the Slovak Republic on the protection of the health of persons. Zbierka Zbáonov Slovenskej Republiky, 7 October 1994, No. 76, 1302-1310. IDHL (1995), 46(2), 151-157

Slovenia: Law of 26 January 2000 on the removal and transplantation of human body parts. Uradni List Republike Slovenije, 11 February 2000, No. 12, 1569-1572, IDHL (2002), 53(4)

South Africa: National Health Act No.61 of 2003 on the control of use of blood, blood products, tissue and gametes in human organs. Government Gazette, No: 26595, 23 July 2004, 60-70

Spain: Law No. 30 of 27 October 1979 on the removal and transplantation of organs. Boletín Oficial del Estado, Gaceta de Madrid, 6 November 1979, No. 266, Serial No. 26445, pp. 25742-25743. IDHL (1980), 31(2), 379-382

Sweden: Law no. 190 of 15 May 1975, repealed by Law no. 831 of 8 June 1995 amended in 2003, 2004, 2005 and 2006. Svensk författningssamling.

Switzerland: Federal Law No. 810.21 of 8 October 2004 on the transplantation of organs, tissues and cells. Recueil Officiel du Droit Fédérales, No.19, 8 May 2007, 1935-1960

Turkey: Law No. 2238 of 29 May 1979 on the removal, storage, transfer and grafting of organs and tissues. T.C Resmi Gazete, 3 June 1979, No. 16655 1-4, IDHL (1980), 31(4), 866-869

UK: The Human Tissue Act of 2004. IDHL (2006), 57(3)

US: The UAGA of 1968, revised in 1987, 2006 and amended in 2008.

A.1. Deceased donation and legislative defaults

Australia: Informed consent country by Law of 1982. The exact date varies by state/territory (See above). There is a donor registry since 2000 in which objections are also recorded. Donor card exists both for consent and objections. Legally, if the deceased has signed a donor card for consent, the removal of organs is allowed regardless of the wishes of the family and the hospital may, in all States and Territories, ignore the family. According to the Australian Code of Practice of 1989 for Transplantation of Cadaveric Organs and Tissues, a patient is considered dead if the circulation of the blood in the body or all the functions of the brain are irreversibly ceased. The code of practice also defines the criteria for the clinical assessment of brain death.

Austria: Presumed consent country by Federal Law No. 273 of 1 June 1982, Section 62A. There is a non-donor registry since 1995. According to the law, the family does not have the right to be informed or to veto donation and the removal of organs is prohibited if the deceased donor or the next-of-kin premortem expressed an opposition against such removal. Donor card does not exist.

Belgium: Presumed consent country by Law of 13 June 1986 on the removal and transplantation of organs. There is a combined registry since 1987. Donor card does not exist. Legally, organs and tissues of a deceased person may be removed unless an objection by the donor or by a close relative has been expressed. However, if the objection is made by the close relative, it may not override the expressed wishes of the donor.

Bulgaria: Presumed consent country by Law of 30 July 2003 on the transplantation of organs, tissues, and cells.

Brazil: Informed consent country by Law No. 9434 of 4 February 1997. Brazil was already an informed consent country but switched to presumed consent for a short period and then switched again to informed consent.

Canada: Informed consent country by Uniform Human Tissue Donation Act of 1990. The exact date varies by province: Alberta, Human Tissue Act 30 March 1967. British Columbia, Human Tissue Gift Act 1974. Manitoba, Human Tissue Gift Act 17 July 1987. New Brunswick, Human Tissue Gift Act 18 June 1986. Newfoundland, Act No. 78 of 1996. Nova Scotia, Human Tissue Gift Act 18 March 1964. Ontario, Human Tissue Gift Act 1982. Prince Edward Island, Human Tissue Donation Act 1992. Quebec, Civil Law of 1993. Families

cannot overrule the wishes of the donor because donor card is a legal document. There is no national donor registry in place so far. The Canadian government has approved \$35 million in funding for a national organ donor registry in 2009.

Czech Republic: Presumed consent country by Law of 1984. Donor registry since 2000, non-donor registry since 2002.

Denmark: Informed consent country by Law No. 402 of 13 June 1990, amended by Law No. 259 of 12 April 2000 and later by Law No. 432 of 2001. Prior to 1990, Denmark was a presumed consent country by Law no. 246 of 9 June 1967. There is a combined registry since 1990. According to the Law No. 402 of 1990, family consent was not required if the donor has expressed a will to donate. The law defines that a person's death is ascertained by the irreversible cessation of respiration and heart activity or by the irreversible cessation of all brain function.

The Law No. 432 of 2001 states that the registered donors shall decide premortem whether they allow the family to challenge the donor's decision and the next-of-kin cannot oppose donation unless such a preference is expressed in writing by the donor. Donor card exists both for consent and objections. According to the Guideline No. 101 of 8 December 2006 on consent for transplant from deceased persons, if no written or oral statement is expressed by the deceased, transplantation can take place only if the deceased's next of kin gives consent to surgery. Transplantation cannot be performed if the deceased has not indicated any preference and the immediate next-of-kin cannot be found.

Estonia: Informed consent country by the Transplantation of Organs and Tissues Act of 30 January 2002. The determination of death is based according to total and irreversible cessation of brain function, or total and irreversible cessation of circulation. According to the Act of 2002, no other person can prohibit the removal and an organ or tissue may be removed from a deceased person if he or she had expressed premortem a wish to donate organs or tissues for transplantation after his or her death. If no information is available whether a deceased person had expressed premortem an opinion on the post-mortem removal of organs and tissues for transplantation purposes, the doctor who provided treatment to the deceased donor is required to ascertain, through the next-of-kin, the opinion of the donor during his or her lifetime.

Finland: Presumed consent country by Law No.355 of 26 April 1985 and Ordinance No.724 of 23 August 1985, repealed by Law No. 101 of 2 February 2001. Section 9 of the Law No. 101

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on the medical use of human organs and tissues states that organs and tissues of a deceased person may be removed unless there is reason to assume that the person would have objected while still alive, or that a near relative or other close person objects. No registry in place.

France: Presumed consent country by Caillavet Law No. 76-1181 of 1976, modified by Law No. 94-654 of 1994 and later by Law No.2004-800 of 2004. There is a non-donor registry since 1990.

Georgia: Presumed consent country by the Law of February 2000. Article 8 of the law stipulates that the removal of the organs of the deceased is allowed if it does not contradict the religious beliefs of the deceased or if the family gives consent. Family veto is allowed and family consent is always sought in Georgia. If the deceased has not given consent during lifetime and the closest next-of-kin cannot be found procurement is not allowed.

Germany: Informed consent country by Donation, Removal and Transplantation of Organs Act of 1997. The organs can be removed for transplantation only if the deceased donor has consented to the removal. In the absence of any written statement by the donor during his or her lifetime, the removal of organs is allowed if the next-of-kin is informed about the removal and asked to give consent given the presumed will of the deceased donor. There is no registry in place. Donor card exists both for consent and objections. The law defines death as the irreversible loss of all function of the cerebrum, the cerebellum, and the brain stem.

Greece: Presumed consent country by Law No. 2737 of 1999. It was already a presumed consent country by Law No. 821 of 1978 modified by Law No. 1383 of 2 August 1983. Section 4 of Art. 4 of Law No. 2737 of 1999 states that if the deceased donor did not express any preference, the removal of an organ or tissue is allowed if the next-of-kin does not oppose donation. This practice of seeking family consent was not embodied in the previous Law of 1983. The law neither defines brain death nor the standards of definition or the necessary diagnostic tests on brain death.

Hong Kong: Informed consent country although there is no legislation regulating deceased organ donation in Hong Kong. Expressed consent is sought from relatives prior to organ donation.

Iceland: Informed consent country by the Biobanks Act no.110 of 25 May 2000.

India: Informed consent country by the Transplantation of Human Organs Act No.42 of 8 July 1994. According to the law, organs of a deceased donor can be removed and used for therapeutic purposes if the donor during his or her lifetime consented to donation in writing

and in the presence of two or more witnesses. If neither consent nor objection was made by the deceased donor, the person who is lawfully in possession of the dead body may authorize the removal of organs unless there is no reason to believe that any next-of-kin of the donor has objected to such removal. The law neither defines brain death nor the standards of definition or the necessary diagnostic tests on brain death, however, it defines (vaguely) a deceased person as a person who does not exhibit evidence of life by reason of brain-stem death or cardiopulmonary cessation.

Iraq: Informed consent country by Decree No.698 of 27 August 1986. The consent must be given in writing.

Ireland: Informed consent country. There is no registry in place. Ireland does not have laws governing organ donation and procurement but follows UK guidelines.

Italy: Presumed consent country by Law No. 458 of 1967, modified by Law No. 644 of 1975 and later by Law No. 91 of 1 April 1999. There is a donor registry since 2000 and a non-donor registry since 2002.

Israel: Presumed consent country by the law of Anatomy and Pathology of 1953. There is a non-donor registry since 1989.

Japan: Informed consent country by Law No. 104 of 16 July 1997 on organ transplantation. Family consent is always sought in Japan. According to the law, the organs of a potential donor can be removed if; (1) the deceased person has premortem expressed consent, in writing, to donate his or her organs for the purposes of transplantation and (2) the family, given the preference of the donor, has not objected to such removal. The law defines brain death as the irreversible cessation of the functions of the entire brain, including the brain stem and leaves the determination of brain death on the basis of generally recognized medical knowledge. Donor card exists both for consent and objections.

Luxemburg: Presumed consent country by Law of 25 November 1982. Article 6 of the Law states that the organs of a deceased person may be removed if the decedent did not express written pre-mortem objection to such removal. No registry in place.

Morocco: Presumed consent country by Dahir No. 1-99-208 of 25 August 1999. Family veto is allowed in Morocco.

Netherlands: Informed consent country by the Organ Donation Act of 24 May 1996. There is combined registry. Section 9(2) of the act states that consent or objection may be given or recorded by completing and submitting a donor registration form. A person may choose to

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leave a decision regarding the removal of his organs after his death to his surviving relatives or to another named individual. Section 11(1) further states that if a person is not known to have made a statement of will regarding removal of their organs, consent for removal may be given following his death by a cohabiting spouse or other life partner.

New Zealand: Informed consent country by the Human Tissue Act of 2008 No. 28. It was already an informed consent country by the Human Tissue Act of 1964. Non-donor registry since 1999.

Norway: Presumed consent country by Law No. 6 of 9 February 1973 on transplantation, hospital autopsies, and the donation of cadavers amended by Law No. 31 of 8 June 2001. No registry in place.

Pakistan: Informed consent country by the Transplantation of Human Organs and Tissues Ordinance No. XLIII of 2007. According to the ordinance, the organs may be removed for transplantation if the deceased person, during his or her lifetime, consented to donate any of his organs or tissues in writing. The ordinance does not prescribe any rules so as to the procedure to follow if the donor neither consents nor opposes donation. Section 6 subsection 2 of the ordinance states that a person is deemed to be medically and legally dead when there is an absence of natural respiratory and cardiac functions and attempt at resuscitation that is unsuccessful in restoring those functions; or an irreversible and permanent cessation of all brain-stem functions and future attempt of resuscitation or continued supportive maintenance would not be successful in restoring such natural functions.

Panama: Presumed consent country by Law No. 10 of 11 July 1983 regulating the transplantation of organs and anatomical parts, repealed by Law No. 52 of 12 December 1995. Organs of a deceased person can be removed for transplantation if; the donor, during his lifetime, had not objected to have his organs removed, or the family of the deceased had not expressed an objection to such removal within six hours of the determination of brain death. The presumed will of the deceased prevails over the contrary opinion of the next-of-kin.

Poland: Presumed consent country by Law of 26 October 1995 on the removal and transplantation of cells, tissues, and organs amending the Law of 30 August 1991 on health care institutions. Section 4(1) of the Law states that the removal of cells, tissues, and organs from a deceased person may be carried out if that person expressed no pre-mortem objection. There is a non-donor registry since 1996.

Romania: Informed consent country by Law No. 2 of 8 January 1998 on the removal and

transplantation of human tissues or organs. There is a combined registry in place since 1996. The transplants of human tissues and body parts can be done only with the written consent of the patient. In February 2008, the Romanian Parliament adopted a legislation regarding the modification of the Law no. 95 of 2006 concerning the Healthcare System reform. The proposed amendment replaced informed consent system by presumed consent.

Singapore: Presumed consent country by the Human Organ Transplant Act No.15 of 10 June 1987, revised in 1988 and 2004 and amended in 2009.

Slovak Republic: Presumed consent country by Law No. 277 of 24 August 1994. There is a combined registry since 2004.

Slovenia: Presumed consent country by Law of 26 January 2000. There is a donor-registry since 2004.

South Africa: Informed consent country by the National Health Act No.61 of 2003.

Spain: Presumed consent country by Law No.30 of 30 October 1979. No national registry in place although there are regional registries.

Sweden: Sweden was a presumed consent country prior to 1987. Between 1987 and 1996 it was an informed consent country. By Law of 1996, Sweden again switched to presumed consent system. There is a combined registry since 1996.

Switzerland: Informed consent country by Federal Order of 1996. However, the legislation varies by canton. The following majority of cantons have presumed consent legislation: Appenzell (1974, 1992), Argovie (1987), Bale-Campagne (1988), Bale-Ville (1981), Berne (1984), Geneva (1996), Grisons (1984), Lucerne (1981), Neuchatel (1995), Nidwald (1981), St-Gall (1979), Turgovia (1985), Valais (1996), Vaud (1985), Zurich (1991). The Federal Law No. 810.21 of 2004 on the transplantation of organs, tissues and cells came into force in 2007. Family consent is routinely sought in Switzerland. Section 2. Art. 8 states that, the organs, tissues or cells can be procured if the deceased person has expressed a consent to donate. In the absence of any document confirming consent or refusal, the next-of-kin is asked if such a consent is known. If the next-of-kin are not aware of such a declaration, the organs cannot be removed unless the family gives consent. The decision of the family should respect the presumed will of the deceased whose will prevails that of the family. If the deceased does not have next-of-kin or the next-of-kin cannot be reached, the removal of organs is not allowed. Donor card exists for expressing consent. No registry in place.

Turkey: Presumed consent country by Law No.2238 of 29 May 1979 on the removal, storage

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and transplantation of organs and tissues. If a person had not expressed a consent in writing, the organs and tissues can be removed for therapeutic and research purposes, if the next-of-kin gives consent. Transplantation is not allowed if the deceased has premortem objected to the removal of his or her organs and tissues. The Law neither defines brain death nor the standards of definition or the necessary diagnostic tests on brain death. Donor card exist. No registry in place. On 3 July 2003, an amendment of the Law of 1979 on the removal, storage and transplantation of organs and tissues has been introduced in the parliament. The bill stipulates that during his or her lifetime, if a person consents, in writing, the removal of his or her organs after his or her death, he or she will be given a special national identification card by which the next-of-kin will not be allowed to overrule the donor's wishes after his or her death.

UK: Informed consent country by the Human Tissue Act of 1961, revised by the Human Organ Transplants Act of 1989 and the Human Tissue Act of 2004. There is a donor registry since 1994.

US: Informed consent country by the UAGA of 1968. 34 States have enacted the UAGA of 2006. The revised act explicitly states that the family cannot amend or revoke donation, expressed by the donor. This was not embodied in the UAGA of 1987. There is no national registry in place although several states maintain donor registries.

A.2. Reimbursement of living donors

Australia: The legislations of Australian Capital Territory, South Australia, New South Wales, Tasmania, Northern Territory and Western Australia state that the reimbursement of any expenses necessarily incurred by a person in relation to the removal of tissue shall be permitted. The legislations of Victoria and Queensland do not explicitly state the reimbursement of expenses incurred by the donor.

Belgium: Section 4(2) of the Law of 13 June 1982 on the removal and transplantation of organs states that the compensation of living donor covers both the cost and the loss of income that are directly connected with the transfer of organs.

Canada: Canada does not have a national compensation or reimbursement policy for living donors. However few provinces established reimbursement programs for living donors. In July 2006, The British Columbia initiated the first Living Organ Donor Expense Reimbursement Program (LODERP). LODERP reimburses travel expenses up to \$1500, accommodation up to seven nights hotel accommodation at a maximum of \$125/night, parking up to ten days at a maximum of \$12/day and \$25/day for meals post surgery for up to seven days. Loss of Income Subsidy is only provided when all other sources of funding have been exhausted and for a maximum of 50 percent of the living organ donor's weekly net income to a maximum of \$350/week. In April 2008, Ontario and Manitoba initiated similar programs to reimburse expenses of living organ donors.

Finland: Section 18 of Law No. 101 of 2 February 2001 on the use of human organs and tissues for medical purposes states that the donor of an organ or tissue who suffers lack of income for a whole day because of removal of an organ or tissue to meet a vital transplantation need or for essential related tests and examinations, and does not get paid or receive corresponding compensation for this period, is entitled to a daily allowance as provided concerning daily allowance in the Sickness Insurance Act no. 364 of 1963.

France: According to Decree no.2000-409 of 11 May 2000 on the reimbursement of expenses incurred during the removal of elements or the collection of products of the human body for therapeutic purposes, the health care establishment that carries out the removal of the kidney shall compensate the living donor for the cost of transportation, cost of accommodation and loss of earnings.

Germany: Section 17(1) of Donation, Removal and Transplantation of Organs Act of 1997

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states that the payment or acceptance of an appropriate compensation for the measures necessary to achieve the objective of the treatment regime especially for the removal, preservation, the further processing including measures to prevent infection, the storage and transport of the organs shall be permitted. However, the act does not define the content of such compensation for living donors.

Israel: Section 22 of the Law of 24 March 2008 states that the MoH is the deciding authority, subject to the approval of the Parliament Committee, on a fixed sum of compensation of the living donor for loss of income, leave of absence, life insurance and psychological treatment.

Japan: Section 11(6) of Law No. 104 of 16 July 1997 on organ transplantation states that reimbursement for the costs of communication and correspondence, expenditure incurred during removal, the storage or transportation of organs intended for transplantation, or transplantation itself, or the ordinary costs inevitably involved in the donation or acceptance of organ donation intended for transplantation or in acting as an intermediary with a view to donation or the acceptance of the donation of such organs shall be allowed.

Luxemburg: Articles 16 and 17 of the Law of 25 November 1982 state that the transfer of any substance should be free without prejudice to the reimbursement of lost income and all expenses incurred by the donor.

Morocco: Article 5 of the Law of 25 August 1999 on the donation, removal and transplantation of human organs and tissues states that the human organ donation cannot, in any case or any way, subject of remuneration except for the costs related interventions required by the removal and transplantation or organs and hospital expenses incurred therein.

Netherlands: Section 2 of the Organ Donation Act of 24 May 1996 states that costs, including expenses and loss of income, incurred by the donor as a direct result of organ removal shall be reimbursed.

Poland: Section 18(2) of the Law of 26 October 1995 on the removal and transplantation of cells, tissues, and organs states that the reimbursement of expenditure actually incurred in connection with the removal, storage, transportation, processing, and transplantation of cells, tissues, and organs from a living donor or a deceased person shall not constitute monetary compensation or a benefit, breaching section 18(1) of the act concerning prohibitions in commercial dealings.

Spain: Article 2 of the Law No. 30 of 30 October 1979 states that under no circumstances will exist any financial compensation to the donor or recipient. However such compensation

is not onerous for the living donor or the family of the deceased.

UK: The Human Tissue Act of 2004 states that the costs incurred by living organ donors shall be reimbursed by the NHS and the reimbursement does not constitute a reward for organ donation, breaching section 32 of the Act. The reimbursement scheme consists of tax-exempt personal expenses (e.g. travel costs) and loss of earnings. For employed living donors, the reimbursement of loss of earnings following donation are paid of net income and are not taxable. For self-employed living donors, the reimbursement is paid on gross income and are taxable. Non-employed or retired living donors are reimbursed only for personal expenses and are not liable for tax.

US: At the Congressional level, two bills have been (re)introduced at the 111th Congress to amend the Internal Revenue Code of 1986 to provide a nonrefundable personal credit to individuals who donate certain life-saving organs (H.R.218) and to amend the Family and Medical Leave Act of 1993 and title 5, US Code, to allow leave for individuals who provide living organ donations (H.R.2776). At the state level, the following states have enacted legislation to compensate living donors either in the form of a tax deduction or a paid leave of absence or both.

Arkansas: HB.1393 enacted on March 9, 2005. The legislation allows a \$10,000 tax deduction which may be claimed for only travel expenses, lodging expenses, lost wages and medical expenses. HB.1289 enacted on March 20, 2003. The legislation allows for a maximum 7 days of paid leave of absence to state employees for bone marrow donation and a maximum of 30 days paid leave of absence for organ donation.

California: AB.1825 enacted on September 25, 2002. The legislation allows for a maximum of 5 days of leave of absence for bone marrow donation and a maximum of 30 days paid leave for organ donation.

Colorado: Colorado Statutes 24-50-104 enacted on May 18, 1998. The legislation allows state employees for up to 2 days of paid leave for organ, tissue or bone marrow donation.

Delaware: SB.45 enacted on July 9, 2001. The legislation allows state employees and teachers 30 days of paid leave for organ donation and 7 days of leave for bone marrow donation.

Georgia: HB.1410 enacted on April 29, 2004. The legislation allows a \$10,000 tax deduction. HB.1049 enacted on April 24, 2002. The legislation allows for 7 days of paid leave of absence to state employees for bone marrow donation and a maximum of 30 days of paid leave for organ donation.

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Idaho: SB.1373 enacted on July 1, 2006. The legislation allows a \$10,000 tax credit, 30 days paid leave of absence for state employees to donate an organ and 5 working days leave of absence for bone marrow donation.

Illinois: HB.0411 enacted on August 2, 2002. The legislation allows for 30 days paid leave of absence for organ or bone marrow donation.

Indiana: HB.1030 enacted March 28, 2002. The legislation allows a state employee 30 days paid leave of absence to serve as an organ donor and 5 days leave for bone marrow donation.

Iowa: HF.801 enacted on May 12, 2005. The legislation allows a \$10,000 tax deduction. HB.381 enacted on August 28, 2003. The legislation allows state employees a maximum of 30 workdays of paid leave of absence and a maximum of 5 workdays of leave for bone marrow donation.

Louisiana: SB.26 enacted on June 29, 2005. The legislation allows a \$10,000 tax deduction.

Maryland: SB.17 enacted on May 11, 2000. The legislation allows all employees 30 days paid leave of absence to serve as an organ donor and 7 days paid leave to serve as a bone marrow donor.

Massachusetts: Chapter 149 (Section 33E) of the General Laws of Massachusetts amended on September 29, 2005. The legislation allows a state employee to take a maximum of 30 days of paid leave to serve as an organ donor.

Minnesota: HF.785 enacted on July 14, 2005. The legislation allows a \$10,000 tax deduction. Minnesota Statute 181.945 enacted in 1990 allows paid leave of absence up to 40 work hours to serve as a bone marrow donor.

Mississippi: HB.1512 enacted on March 23, 2006. The legislation allows a \$10,000 tax deduction. SB.2639 enacted on July 1, 2004. The legislation allows state employees for up to 30 days of paid leave of absence to serve as an organ or a bone marrow donor.

Missouri: HB.679 enacted on July 6, 2001. The legislation allows state employees 5 workdays paid leave to serve as a bone marrow donor and 30 workdays paid leave to serve as an organ donor.

New Mexico: HB.105 enacted on April 5, 2005. The legislation allows a \$10,000 tax deduction.

New York: AB.372 enacted on August 16, 2006. The legislation allows a \$10,000 tax deduction. AB.4138 enacted on August 29, 2001. The legislation allows state employees 30 days paid leave of absence to serve as an organ donor and 7 days paid leave to serve as a bone

marrow donor.

North Dakota: HB.1474 enacted on March 14, 2005. The legislation allows a \$10,000 tax deduction. SB.2298 enacted on April 20, 2005. The legislation allows employees a maximum of 20 workdays paid leave of absence to serve as an organ donor or a bone marrow donor.

Ohio: HB.119 enacted on June 30, 2007. The legislation allows a \$10,000 tax deduction. HB.326 enacted on Jul 10, 2001. The legislation allows state employees 240 hours of paid leave to serve as an organ donor and 56 hours of paid leave to serve as a bone marrow donor.

Oklahoma: SB.806 enacted on May 25, 2007. The legislation allows a \$10,000 tax deduction. SB.1628 enacted on May 8, 2002. The legislation allows state employees 30 workdays paid leave of absence to serve as an organ donor and 5 workdays to serve as a bone marrow donor.

South Carolina: SB.830 enacted August 6, 2002. The legislation allows state employees 30 workdays of paid leave to serve as an organ donor.

Texas: HB.89 enacted on May 29, 2003. The legislation allows for 30 days paid leave to donate an organ and five days for bone marrow donation.

Utah: SB.164 enacted on March 21, 2005. The legislation allows a \$10,000 tax credit. SB.125 enacted on April 8, 2002. The legislation allows employees 30 days of paid leave for organ donation and 7 days of leave for bone marrow donation.

Virginia: HB.1642 enacted on March 26, 2001. The legislation allows state employees up to 30 days of paid leave to serve as a bone marrow or organ donor.

West Virginia: SB.240 enacted on May 11, 2005. The legislation allows state employees 120 hours of paid leave to serve as an organ donor and 56 hours of paid leave to serve as a bone marrow donor.

Wisconsin: AB.477 enacted on January 30, 2004. The legislation allows a \$10,000 tax deduction. AB.545 enacted on May 9, 2000. The legislation allows state employees 30 days of paid leave for organ donation and 7 days of leave for bone marrow donation.

Similar legislations that allow \$10,000 tax deduction are being considered in California, Connecticut, Florida, Illinois, Indiana, Kansas, Kentucky, Maryland, Massachusetts, Michigan, Missouri, New Jersey, North Carolina, Oregon, Rhode Island, Texas, Vermont, Virginia and Washington.

A.3. Prohibition on the commercialization of human organs

Australia: The criminal provisions in Australia vary by state/territory.

Australian Capital Territory, New South Wales & Tasmania: According to Transplantation and Anatomy Act No. 44 of 1978, a person who enters into a contract or arrangement under which a person agrees, for valuable consideration whether given or to be given to himself or to another person, to sell or supply tissue from his body or from the body of another person, before or after death, is subject to a maximum fine of 500 Australian dollars. The exact provision in New South Wales (Human Tissue Act No. 164 of 1983) sets a fine of 400 Australian dollars and/or an imprisonment term of 6 months. The exact provision in Tasmania (Human Tissue Act 1985) sets a fine of 500 Australian dollars and/or an imprisonment of 3 months.

Northern Territory: According to Human Tissue Transplant Act of 1995, a person who enters, agrees to enter, offers to enter, holds himself out as being willing to enter or inquires whether a person is willing to enter into a contract or arrangement under which a person agrees, for valuable consideration whether given or to be given to himself or to another person, to sell or supply tissue from his body or from the body of another person, before or after death, is subject to a fine of 500 Australian dollars or an imprisonment term of 3 months.

Queensland: According to the Transplantation and Anatomy Act 1979, a person who; buys, agrees to buy, offers to buy, holds himself out as being willing to buy or inquires whether a person is willing to sell to the person or another person; tissue, tissue being organ, blood or part of a human body or a substance extracted from, or from a part of the human body; or the right to take tissue from the body of another person is punishable by 1,000 Australian dollars and/or 6 months imprisonment; sells, agrees to sell, offers to sell, holds himself out as being willing to sell or inquires whether a person is willing to buy from the person or another person; tissue or the right to take tissue from the body of another person is punishable by 500 Australian dollars; publishes or disseminates by newspaper, other periodical, book, broadcasting, tv or other means, exhibit to public view an advertisement related to buying tissue or the right to take tissue from the bodies of persons unless the minister approval are subject to a fine of 500 Australian dollars and/or an imprisonment of 3 months.

South Australia & Western Australia: According to Transplantation and Anatomy Act 1983, a person who; enters into a contract or arrangement under which a person agrees,

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for valuable consideration whether given or to be given to himself or to another person, to sell or supply tissue from his body or from the body of another person, before or after death, is subject to a fine not exceeding 5,000 Australian dollars. The exact provision in Western Australia (Human Tissue and Transplant Act No. 116 of 1982) sets a fine of 1,000 Australian dollars; publishes or disseminates by newspaper, other periodical, book, broadcasting, TV or other means, exhibit to public view an advertisement related to selling or buying in Australia of tissue or of the right to remove tissue from the bodies of persons unless the minister approval is subject to a fine of 5,000 Australian dollars. The exact provision in Western Australia (Human Tissue and Transplant Act No. 116 of 1982) sets a fine of 500 Australian dollars and/or imprisonment of 3 months.

Victoria: According to Human Tissue Act No. 9860 of 1982 Section 38, a person who; sells or agrees to sell, tissue (including his own tissue) or the right to take tissue from his body is subject to a fine of 500 Australian dollars; buys, agrees to buy, offers to buy, holds himself out as being willing to buy, or inquires whether a person is willing to sell to the person or another person tissue or the right to take tissue from the body of another person is subject to a fine of 1,000 Australian dollars and/or an imprisonment term of 6 months.

Austria: Section 62A paragraph 4 and section 62C of the Federal Law No. 273 of 1 June 1982 state that body parts or organs of deceased persons may not subject to monetary transactions. A person who contravenes section 62A is subject to a fine of 30,000 Schilling (approx. 2180 Euros). The provision is not applicable if the sale or the purchase of organs or tissues occurred abroad.

Belgium: Articles 17 of the Law of 13 June 1986 states that parties involved in the removal of organs for profit are punishable by a prison sentence of three to 12 months or a fine of 1000 to 10,000 Euros or both. Article 18 further states that in case of recurrence of such acts within five years from the date of the final court order, the sentence shall be doubled.

Brazil: Article 14 Section 1 of the Law No. 9434 of 4 February 1997 on the removal of organs, tissues, and parts of the human body for the purposes of transplantation and treatment states that removing tissues or parts of the body of a person in return for payment or promise of reward is punishable by a fine and an imprisonment term of 3 to 8 years. If the person is a living whose organs, tissues or parts of the body are removed and the offence results in disability for work, incurable disease, loss of function, permanent deformity or abortion, then the penalty is an imprisonment term of 4 to 12 years. If the crime results in the death of the

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living person, then the penalty is an imprisonment term of 8 to 20 years.

Bulgaria: According to Article 349a of the Penal Code, a person who violates the rules concerning the removal and transplantation of organs in exchange of monetary gain is subject to an imprisonment term of 3 to 5 years. Article 40a of the Law of 30 July 2003 on the transplantation of organs, tissues, and cells states that advertising organs, tissues and cells to search for material benefit or providing material benefit for supplying organs, tissues and cells under article 6 is subject to a fine of between 20,000 and 40,000 Leva. Article 41 of the Law of 2003 further states whoever operates on an international exchange of organs, tissues and cells in breach of the provisions of this Act is punishable by a fine of 100,000 to 500,000 Leva unless subject to a severer punishment.

Canada: Sections 15-16 of the Uniform Human Tissue Donation Act of 1990 state that a person who buys or sells or otherwise deal in, directly or indirectly, any tissue, body or body part for the purpose of a transplant or for a therapeutic purpose, medical education or scientific research is subject to a fine not exceeding 100,000 Canadian dollars and/or an imprisonment term not exceeding 1 year.

China: Until 2006, China did not have any rules and regulations governing the sale of human organs. On 27 March 2006, The Chinese Ministry of Health issued a temporary regulation banning the sale of human organs. The regulation states that; any physician found to be involved in human organ trading will have their license revoked; clinics will be suspended from doing transplants for at least three years; fines will be imposed at between eight to ten times the value of the trade; hospitals are banned from performing transplants to foreigners under medical tourism and medical staff will not be allowed to perform transplants abroad. However, the regulation does not stipulate expressly the prohibition of removal of organs from executed prisoners.

Czech Republic: Section 29 of the Transplant Act No.285 of 30 May 2002 stipulates an imprisonment term of up to 2, 4 or 8 years. The provisions stipulate a prohibition of medical practice and are applicable if the sale or the purchase of organs or tissues occurred abroad.

Denmark: Section 20 paragraph 3 of the Law No. 402 of 13 June 1990 on the inquest, autopsy and transplantation states that anyone who makes or receives payment or other economic benefit of the removal or transfer of tissues and other biological material to the treatment is punishable by a fine. The provisions are not applicable if the sale or the purchase of organs or tissues occurred abroad.

A.3. Prohibition on the commercialization of human organs

Estonia: Section 3 of the Transplantation of Organs and Tissues Act of 30 January 2002 states that offering reward or seeking financial gain for the donation of organs or tissues is prohibited, and is punishable pursuant to this Act and the Penal Code (RT I 2001, 61, 364; 2002, 86, 504; 105, 612) by a fine and an imprisonment term not exceeding 1 year. The provisions are not applicable if the sale or the purchase of organs or tissues occurred abroad.

Finland: Section 25 of Law No. 547 of 11 May 2007 amending Law No. 101 of 2 February 2001 on the use of human organs and tissues for medical purposes does not expressly stipulate the magnitude of pecuniary sanctions but states that anyone who intentionally pay for the removal of organs, tissues or cells is punishable by a fine, unless more severe penalty for the offense is provided elsewhere in the Finnish law.

France: The Law No.2004-800 of 2004 states that any person obtaining one of another's organs for a payment of any form is punishable by a fine of 100,000 euros and an imprisonment term of 7 years. The same penal provision applies to cases in which the organ is obtained abroad.

Georgia: Article 52 of the Law of 2000 on taking of human organs, parts of organs, tissues and their usage prohibits organ trading but does not specify criminal sanctions.

Germany: Article 18 of the Donation, Removal and Transplantation of Organs Act of 1997 states that a person who trades in organs or removes, transplants organs or has an organ transplanted to him/herself is punishable by a fine and an imprisonment term not exceeding 5 years. Repeat offending is punishable by an imprisonment term from 1, up to 5 years. Pursuant Section 49, paragraph 2 of the Penal Code, in the case of organ donors whose organs have been the object of prohibited trade, and in the case of organ recipients, the court shall be entitled to remove the punishment or may reduce the punishment at its discretion. The provisions are applicable if the sale or the purchase of organs or tissues occurred abroad.

Greece: Article 20 of the Law No. 2737 of 1999 states that a person who; receives or agrees to receive a monetary gain for giving his organs for a transplant is punishable by a fine of at least 2,000,000 Drachma ; receives or offers to receive human tissues or organs for a monetary gain is punishable by at least 1 year imprisonment. When the organ or tissue is acquired for sale, the penalty is an imprisonment term of at least 3 years and a fine of 10,000,000 Drachma.

Hong Kong: Section 4 of Human Organ Transplant Bill of 1992 states that a person who; makes or receives any payment to supply or offer to supply an organ from a dead or living person to be transplanted to another person on Hong Kong or elsewhere; seeks to find

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a person willing to supply or offers to supply an organ for payment; initiates, negotiates any arrangement involving any payment for the supply of or offer to supply an organ; causes to be published or distributed or knowingly publishes or distributes an advertisement inviting persons to supply or to receive an organ for payment is, upon a first conviction, a fine of 10,000 Hong Kong dollars and upon a subsequent conviction, a fine of 25,000 Hong Kong dollars and an imprisonment term of 1 year.

Iceland: Iceland does not have specific provisions prohibiting the sale and purchase of organs. However, Article 15 of the Act No.110 on Biobanks of 2000 states that biological samples (includes organs and tissue) shall be acquired for clearly defined and lawful purposes, and not used for other purposes whose violation is punishable by pecuniary penalties or an imprisonment term not exceeding 3 years. Article 14 further states that the Ministry may revoke the licence of those who do not comply with the Act.

India: Article 19 of Transplantation of Human Organs Act No.42 of 1994 states that whoever; makes or receives any payment for the supply of, or for an offer to supply, any human organ; seeks to find a person willing to supply for payment any human organ; offers to supply any human organ for payment; initiates or negotiates any arrangement involving the making of any payment for the supply of, or for an offer to supply, any human organ; publishes or distributes or causes to be published or distributed any advertisement, inviting persons to supply for payment of any human organ is punishable by an imprisonment term between 2 to 7 years and by a fine between 10,000 and 20,000 Rupees.

Iraq: According to Section 3 of the Decree No.698 of 1986 of the Revolutionary Command Council promulgating Law No.85 of 1986 on the Transplantation of Human Organs, persons involving in the sale and purchase of organs in any form are punishable by an imprisonment term not exceeding one year and/or a fine not exceeding 1000 Dinars. The same punishment scheme applies to physicians who proceed with a transplant knowingly that organs have been subject to commercialization.

Ireland: Ireland does not have legal provisions prohibiting the sale and purchase of organs. However, the medical council may prohibit medical practice.

Israel: Law of 24 March 2008 on Organ Transplantation prohibits receiving or giving remuneration for an organ removed during life or after death. However, section 29 of the law does not prohibit payment of funeral expenses.

Italy: Article 411 of the Criminal Code stipulates an imprisonment term of 2 to 7 years.

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Articles 482, 483 of the Criminal Code stipulate an imprisonment term of 6 to 12 years if the removal of organs is from a living donor. The provisions are applicable if the sale or the purchase of organs or tissues occurred abroad.

Japan: Article 20 of the Law No. 104 of 16 July 1997 on organ transplantation in accordance with article 11 prohibiting organ trafficking states that a person who; accepts or requests a financial benefit as monetary compensation in exchange for giving or having given organs, or for serving or having served as an intermediary for organ donation for the purposes of transplantation or for accepting such a donation or concludes an agreement to this end; provides or proposes a financial benefit as monetary compensation in exchange for agreeing or having agreed to donate organs, or for agreeing or having agreed to act as an intermediary for organ donation for the purposes of transplantation or for accepting such a donation, or concludes an agreement to this end; removes such organs or uses them for the purposes of transplantation knowingly that the organs are associated with an act that contravenes the provisions is subject to a fine of 500 million Yen and/or an imprisonment term.

Kuwait: Articles 7 and 10 of the Decree-Law No.55 of 20 December 1987 on organ transplantation state that persons who sell or buy organs in any fashion or obtains any material benefit in relation, including physicians who proceed with a transplant knowingly that organs have been subject to commercialization are punishable by a fine not exceeding 3000 Dinars and/or an imprisonment term not exceeding three years. The penalty is doubled if repeat offending occurs within two years following the final judgment of the first offence.

Lebanon: Section 7 of the Decree No.109 of 16 September 1983 on the removal of human tissues and organs for therapeutic and scientific purposes states that any form of compensation provided in relation to the donation of tissues and organs (of living donors) is punishable by a fine between 1000 and 10000 Lebanese Pounds and/or an imprisonment term between 1 to 12 months.

Luxemburg: Article 18 of the Law of 25 November 1982 states that unless subject to more severe penalties enacted by any other laws, whoever makes or accepts a payment shall be punished by imprisonment from eight days to three years or a fine of 2,501 to 200,000 francs or both.

Morocco: Article 30 of the Law of 25 August 1999 on the donation, removal and transplantation of human organs and tissues states that however proposes, through any means, remuneration except for the costs related interventions required by the removal and trans-

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plantation or organs and hospital expenses shall be subject to an imprisonment term of 2 to 5 years and a fine of 50,000 to 100,000 dirhams.

Netherlands: Section 32 of Organ Donation Act of 24 May 1996 states that a party who openly offers payment or who puts himself forward as a donor in return of such payment is subject to an imprisonment term of 1 year or a fourth-category fine (11,250 euros). The provisions are not applicable if the sale or the purchase of organs or tissues occurred abroad.

New Zealand: Section 56 of the Human Tissue Act No.28 of 2008 states that a person who intentionally or knowingly requires or accepts, or offers or provides financial or other consideration for human tissue is subject to a fine not exceeding 50,000 New Zealand dollars or an imprisonment term not exceeding 1 year.

Norway: Section 14 of Law No. 6 of 9 February 1973 on transplantation, hospital autopsies, and the donation of cadavers amended by Law No. 31 of 8 June 2001 states that anyone who makes a decision regarding the removal of any organs except subject to the condition prescribed by the act is punishable by fine, unless the case is punishable under stricter penal prohibitions. The provisions are not applicable if the sale or the purchase of organs or tissues occurred abroad.

Pakistan: Section 11 of the Transplantation of Human Organs and Tissues Ordinance No. XLIII of 2007 states that whoever; makes or receives any payment for the supply of, or for an offer to supply, any human organ; seeks to find a person willing to supply for payment of any human organ; offers to supply any human organ for payment; initiates or negotiates any arrangement involving the making of any payment for the supply of, or for an offer to supply any human organ; takes part in the management or control of a body of persons, whether a society, firm, or company, whose activities consist of or include the initiation or negotiation of any arrangement; publishes or distributes or causes to be published or distributed any advertisement, inviting persons to supply for payment of any human organ; offering to supply any human organ for payment; or indicating that the advertiser is willing to initiate or negotiate any arrangement is subject to a fine of up to one million Rupees (approx. \$ 12,492) and an imprisonment term up to 10 years. Before 2007, there was no prohibition of trading in human organs.

Panama: The Law no.52 of 12 December 1995, regulating the transplantation of organs and anatomical parts does not explicitly stipulate a penalty against the commercialization of human organs and tissues. However, articles 8-9 prohibit remuneration or compensation for

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organs or anatomical parts intended for transplantation or other therapeutic purposes and the exportation organs, anatomical parts, or organic fluids for profit-making purposes. Article 108 in accordance with articles 8-9 of the Law states that anyone violating the provisions of the Act are punishable by a fine of up to 5,000 Balboas, suspension or cancellation of license and temporary or permanent shut-down of the establishment.

Poland: Sections 19 and 20 of the Law of 26 October 1995 on the removal and transplantation of cells, tissues, and organs state that any person who; advertises for the sale or purchase, or for a mediatory service aimed at the sale or purchase, of cells, tissues, or organs for the purposes of transplantation is subject to a fine of 5,000 Zloty (approx. 1,120 euros); for profit-making purposes, buys or sells cells, tissues, or organs from other persons, acts as an intermediary for their purchase or sale, or takes part in the transplantation of cells, tissues, or organs from living or deceased persons, obtained in violation of the law is subject to an imprisonment term of 3 to 10 years. The provisions are not applicable if the sale or the purchase of organs or tissues occurred abroad.

Romania: Article 17 of the Law of 8 January 1998 on the removal and transplantation of human tissues or organs states that organizing, removing and transplantation of human organs and tissues with the aim of making profit through the sale and purchase of organs or tissues is subject to an imprisonment term between 3 to 7 years.

Singapore: Section 14 of the Human Transplant Act No.15 of 10 June 1987 states that a person who; enters into a contract or arrangement for valuable consideration, whether given or to be given to himself or to another person, to the sale or supply of any organ or blood from his body or from the body of another person, whether before or after his death or the death of the other person is subject to a fine not exceeding 10,000 Singapore dollars and/or an imprisonment term not exceeding 12 months; issues or causes to be issued any advertisement relating to the buying or selling in Singapore of any organ or blood or of the right to take any organ or blood from the body of a person is subject to a fine not exceeding 10,000 Singapore dollars and/or an imprisonment term not exceeding 12 months. On 19 January 2009, The Human Organ Transplant (Amendment) Act is introduced in parliament which stipulates a higher fine of 100,000 Singapore dollars and a higher imprisonment term of up to 10 years.

South Africa: Human Tissue Act no.65 of 20 May 1983 did not have an explicit prohibition against trading of human organs, however Section 34 of the Act stated that any person who acquires, uses or supplies a body of a deceased person or any tissue, blood, gamete of a living

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or deceased person in any other manner or for any other purpose than that permitted by the act is subject to a fine not exceeding 2000 Rand and/or an imprisonment term not exceeding 1 year. Penal provisions against trading of human organs and tissues have been updated by section 60, subsections 4-5 of the National Health Act no.61 of 2003 which state that a person who; receives any form of financial or other reward for donating tissue, a gamete, blood or a blood product, except for the reimbursement of reasonable costs incurred by him or her to provide such donation; sells or trades in tissue, gametes, blood or blood products is liable on conviction to a fine and/or an imprisonment term not exceeding five years.

Switzerland: Article 69 of the Federal Law No. 810.21 of 2004 on the transplantation of organs, tissues and cells states that a person who trades human organs, tissues or cells, or remove and transplant human organs, tissues or cells in or from Switzerland or abroad for monetary or any other gain not pursuant article 7 of the Law, is subject to an imprisonment term and a maximum fine of 200,000 Swiss francs. If the offender is a health professional, he/she is punishable by a maximum fine of 500,000 Swiss francs and an imprisonment term of at most 5 years. The offender is punishable by a maximum imprisonment term of 6 months and a fine of at most 100,000 Swiss francs if acted through negligence.

Turkey: Article 15 of the Law No.2238 of 29 May 1979 on the Removal, Storage and Transplantation of Organs and Tissues states that those who buy, sell, intermediate and commercialize organs and tissues are subject to a fine between 50,000 and 100,000 Turkish Liras and an imprisonment term between 2 and 4 years unless the act stipulates a higher penalty. Pecuniary penalties of this law have been increased 786 times in accordance with the Law no.4421 of 1999.

UK: Section 32 of Human Tissue Act of 2004 states that a person who; gives or receives a reward for the supply of, or for an offer to supply, any controlled material; seeks to find a person willing to supply any controlled material for reward; offers to supply any controlled material for reward; initiates or negotiates any arrangement involving the giving of a reward for the supply of, or for an offer to supply, any controlled material; takes part in the management or control of a body of persons corporate or unincorporate whose activities consist of or include the initiation or negotiation of such arrangements are subject to a fine not exceeding the statutory maximum and/or an imprisonment term not exceeding 12 months on summary conviction, and subject to a fine and/or an imprisonment term not exceeding 3 year on conviction on indictment.

US: Section 16 of the UAGA of 2006 states that a person that knowingly, for valuable

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consideration, purchases or sells a part for transplantation or therapy if removal of a part from an individual is intended to occur after the individual's death is subject to, upon conviction, a fine not exceeding 50,000 US dollars and/or an imprisonment term not exceeding 5 years.

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English Summary

Kidney transplantation is a well-known and routine treatment today for patients with end-stage renal disease (ESRD). Despite the early successful related living donor kidney transplants, the long-term success from unrelated or deceased donors was unattainable because the recipient's immune system have begun to resist the new organ. The research on transplant immunology aimed at finding compounds that could adequately inhibit rejection while preserving other functions of the immune system whose discovery made it possible to perform transplants from biologically unrelated donors and greatly increased the survival rates.

For centuries death was regarded as the irreversible cessation of spontaneous respiration and circulation. However, transplantation of solid organs from cardiac-dead donors was not possible because heart, liver and lungs suffered from irreversible damage after disconnected from the body. Advances in medical technology allowed maintenance of cardiac and respiratory functions artificially through life-support machines. In 1968, the ad hoc committee of Harvard Medical School declared a new criterion called brain death and defined it as the state of irreversible coma. The definition and the determination of brain death together with the extensive research and development on immunosuppressive therapy, organ preservation and advances in surgical techniques enabled to perform thousands of transplants from deceased donors every year in the United States and in Europe.

Although there are many lifestyle-related, genetic or idiopathic factors that might lead to the failure of a particular organ, certain known causes of organ failure are associated with today's challenging public health issues. Obesity, diabetes, malnutrition, abuse of alcohol, narcotics and tobacco use have largely contributed to the increasing burden of disease and the rising demand for transplantable organs. While the rise of the demand has been unprecedented the supply of organs on the other hand remained stagnant due to a number of factors.

Organ procurement is a very complex phenomenon that enhances and treats altruism as a resource-extraction problem. Organizational problems initially emerge in identifying potential

donors which is contingent upon an individual mostly going through a violent accident and being brought to a hospital. Converting an accident victim into a donor requires the hospital and the procurement teams to overcome tight schedules and other organizational challenges. First, a group of doctors who are unrelated to the procurement process determines if brain death has occurred. Once brain death is confirmed, the physician is required to inform the relevant authority about a potential donation. Hospitals and physicians are not only delegated to solve the logistic problems of identifying, preserving and transporting suitable organs but also to obtain consent from the next-of-kin. For each donor that passes the medical clearance once the family consents to donate, potential recipients are ranked on the waiting list according to a set of medical and non-medical criteria. Once a potential recipient is located and matched to a recipient, the donor must be transported to a hospital for the transplant where two transplant teams must be ready for the extraction and transplantation of organs. These steps must be completed in a very short period to keep the donor's organs viable and a poorly managed procurement process is likely to compromise the transplantation and keep the procurement rates down.

While the medical community contends that amending the organizational deficiencies of organ procurement could substantially increase procurement rates, such a strategy would be conditional upon identifying why people are reluctant to donate. Potential donors feared that their organs might be procured prematurely before brain death occurred. This fear of premature determination of death discouraged potential donors to sign up for organ donation and was largely associated with the failure to contemplate with one's own death and the wide spread tendency to avoid the discussion of post-mortem donation with relatives.

Organ procurement systems are no different than in-kind economies characterized by severe restrictions and transactions costs in the absence of money because they are based on altruism and gift-giving. A sale prohibition imposed by the government on the mediation of wants and needs, amplified by an increasing demand for transplants caused patients to seek organs through illegal means. This government prohibition further led to the emergence of a growing body of policy proposals which polarized in a considerable number of mutually exclusive policy prescriptions in lieu of a system based on pure altruism. These proposals ranged from conscription on one hand to competitive markets on the other. The majority of economists and legal scholars contends that a zero-price policy imposed by the government has been responsible for low donation rates. If liberalization was allowed by introducing money organ shortages

and suffering of the many could have been reduced greatly if not completely eliminated.

This research aims to propose policy prescriptions through supply-driven regulatory, legislative and institutional changes that would directly or indirectly help eliminate the organ shortage and the trafficking of human organs. Chapter 1 presents a detailed account of the roots of increasing demand for and the causes of stagnating supply of transplantable human organs. Chapter 2 reviews eleven deceased organ procurement policies that have been proposed in the literature. These are presumed and informed consent, mandated choice, conscription, reciprocal systems, free market, government monopsony, future delivery markets and reimbursement schemes. Each policy is evaluated by invoking to an axiomatic approach which takes into account three important and detailed notions of policy evaluation: equity, efficiency and effectiveness. An axiomatic approach not only offers a systematic and complete treatment for policy evaluation but also allows exploring notions of fairness and justice which may be highly relevant in the assessment of social welfare. In order to evaluate the fairness of a policy, five absolute notions of equity have been considered. These are non-discrimination, non-coercion, autonomy, horizontal equity and vertical equity. On the other hand, the efficiency has been evaluated in terms of Pareto and in relative terms of distributional efficiency. The analysis suggests that even though a monopsony is inferior relative to a free market system with respect to efficiency, a paid, government-funded and regulated contemporaneous monopsonistic market with highly set safeguards to ensure an equitable distribution of deceased human organs is the most preferable policy that conforms to fairness, efficiency and effectiveness, followed by an opt-in futures market and first-person informed consent policy respectively.

The chronic organ shortage has become a daunting health policy issue in Europe, the United States and other western countries. In most of the European countries, deceased organ procurement is based on the principle of presumed consent on the anticipation that it could yield higher deceased donation rates. A great debate has emerged about whether the default rule itself could be partly responsible for higher deceased procurement rates. Chapter 3 purports to advance the literature on the impact of presumed consent laws on deceased donation rates by examining the interactions between a presumed consent legal regime and other customs and institutions using data on health expenditure, death rates caused by cerebro vascular diseases, motor vehicle accidents and homicides, legislation, legal systems, family consent, civil rights and liberties and donor registry systems for 24 countries over a 14-year period. The evidence suggests that countries in which presumed consent is enacted produce substantially

higher deceased donation rates. However, the magnitude of this impact largely depends on the involvement of the family and the establishment of donor administration systems. Presumed consent laws may greatly increase deceased donations if hospitals cease to seek family consent and maintain at most a non-donor registry or always seek family consent irrespective of the documented preferences of the deceased but also give both organ retainers and donors the right to state preference through registration. Otherwise presumed consent legislation does not have a sizeable impact on deceased donation rates vis-à-vis informed consent.

Living donation differs significantly from deceased donation both in terms of the organs in question as well as in terms of the denouement of the donor. As backlogs continued to grow faster than the number of transplantable organs, some proposed minor compensation or a regulated market while others advocated that the current system of living donor organ procurement could be developed to its full potential by rectifying an efficient allocation of organs from living donors. Chapter 4 reviews five living donor organ procurement policies in this respect, namely monopsony, reimbursement, paired kidney exchange (PKE), non-simultaneous extended altruistic donor (NEAD) chain and list donation and proposes potentially effective solutions in order to increase the number of kidneys recovered from living donors.

Individuals willing to become living donors are exposed to serious financial and medical risks and these risks may generate disincentives or barriers to donation. An increasing number of proposals emphasizes the need to introduce reimbursement for living donors for non-medical costs incurred throughout the process of donation. In the United States, a number of states passed legislation that allows individuals to take paid leave of absence and/or to claim a \$10,000 tax deduction following organ or bone marrow donation. However, the impact of reimbursement legislation on living donation rates has not been studied extensively so far. Chapter 5 aims to purport some preliminary empirical evidence on the impact of tax deduction and paid leave of absence laws to serve as a living donor and the effectiveness of PKEs on living donation rates using data on the number of living related, unrelated and total living adult donation rates, combined deceased kidney and liver transplant rates, real per capita GDP, the number of transplant centers, the prevalence of ESRD and binary information on the legislation related to reimbursement of living donors and PKEs for 50 states in the United States over a 22-year period. The evidence shows that neither legislation related to tax deduction nor to paid leave of absence to serve as a living donor affects living unrelated or related adult donation rates. At the overall, compelling evidence is found to repeal tax deduction laws in

particular and to amend the legislation in general. Furthermore, the findings point out that states that initiated paired kidney exchanges do not exhibit statistically significantly higher living donation rates and that living and deceased donations may be intertemporally related.

The soaring demand for transplants and the prohibition of sale of transplantable human organs made organ trading a tremendous industry in twenty years with billions of dollars changing hands among doctors, recipients and brokers. Chapter 6 analyzes the legal and the economic aspects of organ trafficking. We first examine the legal instruments and the international standards set by the United Nations, the World Health Organization and the Council of Europe. Although some of these international standards are allegedly binding, they did not counteract the growth of black markets because they have no enforcement powers or funding to help especially the underdeveloped countries trace illegal organ sales. The inspection of the legislations of a sample of countries reveals that despite the ratification of international conventions and protocols, a standard framework is missing both in terms of the magnitude of sanctions as well as in terms of the scope of criminal liability for organ trafficking. A simple model of law enforcement is developed to address the embodiment of specific legislation and the implementation of an optimal deterrence policy. The analysis suggests that organ trafficking is socially undesirable because payment for a kidney dilutes deterrence thus it has to be controlled. Under conventional deterrence, trafficking should be penalized by maximal fines together with a maximum ban of practice term for the surgeon; however, imprisonment should not be used because it is a costly sanction. The analysis also suggests that organ recipients who are insured against the cost of illegal transplants should be subject to severer punishments than those who are not insured. Under target deterrence, the enforcement authorities should always impose imprisonment together with a maximal fine to the surgeon despite it lowers welfare. Organ trafficking remains active and intense in countries with relatively weak jurisdictions if there are relatively strong jurisdictions in the domain of criminal activity. Enforcing the law and setting dissuasive sanctions may eliminate trafficking in a particular jurisdiction; however failure to take into consideration the enforcement in other and particularly vulnerable states will not eradicate trafficking incidences but will merely shift criminal activity elsewhere. This suggests that legal asymmetries across jurisdictions should be eradicated in order to cope with organ trafficking by committing to impose a uniform expected sanction and a uniform legal framework that takes into account the aggravating circumstances in determining the magnitude of sanctions and the scope of criminal liability.

The prolific literature on organ procurement policies discloses that some desirable properties of markets simply cannot coexist in the highly controversial context of organ donation and transplantation. Most of the arguments against monetary incentives would be rectified by proper precautionary measures; however, there are fundamental problems with the institution of monetary payments. First, while market reform may reduce the family refusal rates, it can neither boost the raw supply of cadaver organs nor remove any of the logistical or organizational problems associated with the procurement of deceased donors. Second, the world-wide prohibition on the commercialization of human organs indicates that the only mean to test the effectiveness of a market whose impact on society and potential repercussions are mere foresight, is to set up an experiment, or a pilot region. But the positive outcome of such experimentation may it be, does not eliminate adverse or even catastrophic results that could be experienced in reality. Therefore the altruistic system should be developed to its full potential before resorting to market solutions whose denouement is unknown without experimentation.

The failure to act upon the deficiencies of the current system indicates that political actors deem the current state to be so far tolerable even preferable over equally acceptable alternatives. Three decades have been devoted to change the paradigm of gift giving by offering monetary incentives for prospective donors and the political infeasibility and repugnance for such incentives will continue to be insurmountable at least in the foreseeable future. Given the morally imperative discourse and the current political and legal infeasibility of offering explicit monetary payments, the *status quo* should unfortunately be taken for granted to the extent that the size of the waiting lists and the unnecessary suffering and death of the many is no longer bearable.

Samenvatting

Orgaanverwervingssystemen lijken op ruilhandel-economieën die, vanwege het ontbreken van geld, worden gekenmerkt door strenge beperkingen en transactiekosten, omdat ze gebaseerd zijn op altruïsme en schenkingen. Het feit dat de regering een verkoopverbod heeft opgelegd op de bemiddeling tussen vraag en aanbod, in combinatie met een steeds groter wordende vraag naar transplantaten, heeft geleid tot een wereldwijd toenemend tekort aan transplanteerbare menselijke organen. Door te focussen op aanbodgestuurde institutionele wijzigingen en wijzigingen op het gebied van wet- en regelgeving, worden in *The Law and Economics of Organ Procurement* de juridische en economische aspecten van verschillende beleidsregels ten aanzien van de verwerving van postmortale en levende organen vanuit een axiomatisch perspectief verkend, waarbij rekening wordt gehouden met drie cruciale begrippen voor beleidsbeoordeling, namelijk billijkheid, efficiëntie en effectiviteit. Het chronische orgaantekort is inmiddels een onrustbarende kwestie voor het gezondheidsbeleid in Europa, de Verenigde Staten en andere westerse landen. In de meeste Europese landen is de verwerving van postmortale organen gebaseerd op het principe van veronderstelde toestemming en is er een enorme discussie ontstaan over de vraag of de geen-bezwaar-regel gedeeltelijk kan hebben bijgedragen aan de hogere aantallen verworven postmortale organen. In de Verenigde Staten richt het debat zich op de invoering van een vergoeding op een wijze die in ethisch en politiek opzicht acceptabeler is. In *The Law and Economics of Organ Procurement* wordt empirisch bewijs geleverd vanuit de Verenigde Staten, Europa en andere ontwikkelde landen met betrekking tot de effectiviteit van geldende wetgeving inzake de donaties van postmortale en levende organen, waarbij gebruik wordt gemaakt van twee uitgebreide panelbestanden. Het onderzoek gaat verder in op de delicate en controversiële kwesties die gerelateerd zijn aan mensenhandel met het oog op orgaanverwijdering. De torenhoge vraag naar transplantaten en het verkoopverbod op transplanteerbare menselijke organen hebben in twintig jaar tijd van de orgaanhandel een enorme industrie gemaakt, waarin miljarden dollars heen en weer schuiven tussen artsen, ontvangers

en makelaars. In *The Law and Economics of Organ Procurement* worden de juridische instrumenten en de internationale normen onder de loep genomen die de illegale handel moeten bestrijden en worden de toepassingsmogelijkheden daarvan besproken. Er wordt een vergelijkende analyse van strafrechtelijke bepalingen gemaakt, waarbij wordt gefocust op de veelheid van sancties en de reikwijdte van strafrechtelijke aansprakelijkheid in nationale wetboeken van strafrecht. Het doel van deze analyse is het ontwikkelen van een eenvoudig handhavingsmodel dat de opname van bepaalde wetgeving en de implementatie van een optimaal afschrikbeleid mogelijk maakt. Honderdduizenden levens zijn afhankelijk van de opheffing van het orgaantekort. Vanwege de groeiende ziektelast en de vooruitgang die wordt geboekt in de biotechnologie zal de vraag naar transplanteerbare menselijke organen blijven toenemen. Het aanbod aan organen zal niet kunnen voldoen aan de vraag, tenzij revolutionaire oplossingen op het gebied van xenotransplantatie en stamcelonderzoek juridisch, ethisch en medisch haalbaar worden. Aangezien deze oplossingen er nog niet zijn, worden in *The Law and Economics of Organ Procurement* drie belangrijke mogelijkheden besproken die de toekomst van orgaandonaties en -verwerving vormgeven.

