

The Economics and Ethics of Alternative Cadaveric Organ Procurement Policies

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Under the National Organ Transplant Act of 1984, organ suppliers—usually the families of critically injured accident victims—are not allowed to receive compensation in exchange for granting permission to remove the organs of their deceased relatives. This organ procurement regime is therefore driven solely by potential donors' altruism. Due to the growing nationwide shortage of transplantable organs, the altruistic system has begun to draw considerable criticism. Focussing on the transplantation of kidneys, this Article challenges the theoretical and economic underpinnings of the altruistic system by comparing it to two alternative policies: a market system that allows demand and supply to equilibrate at a positive price, and a system which transfers property rights in cadaveric organs from potential donors to recipients. Blair and Kaserman subject these alternative policies to economic and ethical scrutiny, and conclude that the market system would not only generate the largest number of transplantable kidneys, but would also provide the greatest gain in overall social welfare.

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The authors gratefully acknowledge the helpful comments and encouragement of Andy Barnett, Sanford Berg, Robert Ekelund, Robert Emerson, Lawrence Kenny, Margie Makar, Scott Makar, John Mayo, Mark Rush, Henry Tosi, and David Sappington on a prior draft of this paper. The research assistance provided by Dean Foreman was most helpful. Finally, the advice of Co-Editors Peter Mostow and Marc Samuels greatly improved the paper. The usual disclaimer applies.

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Introduction

The National Organ Transplant Act of 1984¹ makes it a felony to buy or sell human organs for the purpose of transplantation. The Act states: "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."² Similar statutes complement this legislation at the state level.³

This body of legislation does not create a new public policy toward organ procurement, but rather serves to codify the de facto policy that has been in

1. National Organ Transplant Act, Pub. L. No. 98-507, 98 Stat. 2339 (codified as amended at 42 U.S.C. § 273-274 (e)) (Supp. IV 1986).

2. *Id.* at § 274(e).

3. *See, e.g.*, VA. CODE ANN. § 32.1 - 289.1 (1985).

place since organ transplants first became feasible in the late 1950s.⁴ Specifically, the existing policy requires that organ acquisition occur at a price of zero. Organ suppliers (who are generally the families of critically injured accident victims) are not allowed to receive compensation in exchange for granting permission to remove the organs of their deceased relatives. Their decision to allow such removal under the existing system must therefore be based entirely upon their altruistic desire to supply organs to unknown recipients in need of transplant operations.⁵ Altruism is thus the motivating force behind organ supply under the current system.⁶

This system of altruistic supply has consistently failed to yield an adequate number of organs for transplantation. The number of organs donated annually under this policy has fallen short of the number of organs desired by potential transplant recipients for at least the past twenty years.⁷ In recent years this chronic condition of undersupply has grown rapidly worse, and waiting lists of potential organ recipients have lengthened correspondingly. Expected waiting times are now measured in years rather than months, and many patients will die because a suitable donor organ cannot be found in time.⁸ The organ shortage, which has persisted for so long, is rapidly growing worse and is now approaching crisis proportions.

This glaring and egregious failure of the existing organ procurement policy is currently spawning much-needed debate concerning alternative policy options.⁹ In this paper, we examine three alternative policies for procuring

4. In fact, the Virginia statute, *supra* note 3, was passed in response to a physician's attempt to depart from the traditional policy by creating a brokerage firm to buy and sell kidneys from living donors. See Denise, *Regulating the Sale of Human Organs*, 71 VA. L. REV. 1015 (1985). The National Organ Transplant Act itself makes no distinction between purchases from living donors and purchases of organs obtained from deceased individuals.

5. Under the present system, the donor's family is provided very limited information about the recipient (or recipients). The actual identity of the recipient is withheld to avoid potential problems of emotional or even financial blackmail.

6. There are some amazing results under this system. For example, a California man died and made life possible for six people due to the successful transplants of his heart, lungs, kidneys, liver, and pancreas. *Six Can Live With Man's Seven Organs*, Gainesville Sun, Dec. 13, 1989, at 10A, col. 6. In another case, a fire killed three young boys. In their time of grief, the boys' parents donated the boys' organs for transplants. As a result, four people received a kidney, two people received a liver, and a woman received a heart. *Family Makes Loss A Gift of Life*, Gainesville Sun, Dec. 27, 1989, at 3A, col. 3.

7. See Chapman, *Retailing Human Organs Under the Uniform Commercial Code*, 16 J. MARSHALL L. REV. 393, 399 (1983). See also, Cohen, *Increasing the Supply of Transplant Organs: The Virtues of a Futures Market*, 58 GEO. WASH. L. REV. 1, 3 (1989); Dukeminier, Jr., *Supplying Organs for Transplantation*, 68 MICH. L. REV. 811 (1970).

8. In 1989, 1878 patients died while on official organ transplant waiting lists. Peters, *Life or Death: The Issue of Payment in Cadaveric Organ Donation*, 265 J.A.M.A. 1302 (1991).

9. The literature relevant to this debate is large and rapidly growing. See, e.g., Barney & Reynolds, *An Economic Analysis of Transplant Organs*, 17 ATLANTIC ECON. J. 12 (1989); Brams, *Transplantable Human Organs: Should Their Sale be Authorized by State Statutes?* 3 AM. J. L. & MED. 183 (1977); Butler, *The Law of Human Organ Procurement: A Modest Proposal*, 1 J. CONTEMP. HEALTH L. & POL'Y 195 (1985); Chapman, *supra* note 7; Cohen, *supra* note 7; The Council of the Transplantation Society, *Commercialisation in Transplantation: The Problems and Some Guidelines for Practice*, 8457 LANCET 715 (1985); Dukeminier & Sanders, *Organ Transplantation: A Proposal for Routine Salvaging of Cadaver Organs*, 279

cadaveric organs for transplantation: (1) the current system of altruistic supply at a zero price;¹⁰ (2) a market system that allows demand and supply to equilibrate at a positive price;¹¹ and (3) a system based on a redefinition of property rights in cadaveric organs.¹² These three systems are the primary options raised in discussions of alternative organ procurement policies. After describing these three options, we critically examine both the economic and the ethical arguments that have been raised concerning them.

In order to facilitate our discussion, we focus our attention on a single organ: the kidney. This concentration on a single organ is necessary in order to apply the basic economic concepts of supply and demand, upon which our analysis depends. Because different organs cannot be substituted for one another, one cannot legitimately draw a generalized demand curve for all transplantable organs.

We chose to use the kidney as a model organ for two reasons. First, not only was this the first organ to be transplanted successfully, but it is also the organ for which the greatest demand for transplants currently exists.¹³ And second, virtually all organ collection activities currently revolve around kidney procurements. The End Stage Renal Disease program of the Social Security Administration currently funds all organ procurement agencies in the U.S., and almost all cadaveric organs collected are located through these agencies. As a result, donors of hearts, livers, lungs, etc. were generally kidney donors first.¹⁴ Importantly, our focus on kidneys does not preclude extending our results to other organs. With a few obvious modifications, our analysis applies directly to other transplantable organs, and our conclusions are valid for these organs

NEW ENG. J. MED. 413 (1968); Freier, *Organ Selling for Transplantation*, 38 PROG. CLIN. & BIOL. RES. 141 (1978-79); Hansmann, *The Economics and Ethics of Markets for Human Organs*, ORGAN TRANSPLANTATION POLICY: ISSUES AND PROSPECTS (J. F. Blumstein & F. A. Sloan eds. 1989); Kaserman & Barnett, *An Economic Analysis of Transplant Organs: A Comment and Extension*, ATLANTIC ECON. J. (in press, 1991); Movrodes, *The Morality of Selling Human Organs*, 38 PROG. CLIN. & BIOL. RES. 133 (1978-79); Rinehart, *The Market Approach to Organ Shortages*, 8 J. HEALTH CARE MKTG. 72 (1988); Schwindt & Vining, *Proposal for a Future Delivery Market for Transplant Organs*, 11 J. HEALTH POL., POL'Y & L. 483 (1986); Silver, *The Case for a Post-Mortem Organ Draft and a Proposed Model Organ Draft Act*, 68 B.U.L. REV. 681 (1988); Steinbrook, *Kidneys for Transplantation*, 6 J. HEALTH POL., POL'Y & L. 504 (1981).

10. See, e.g., Council of the Transplantation Society, *supra* note 9.

11. See, e.g., Brams, *supra* note 9; Cohen, *supra* note 7; Hansmann, *supra* note 9; Schwindt & Vining, *supra* note 9.

12. See, e.g., Caplan, *Organ Transplants: The Cost of Success*, HASTINGS CTR. REP. (Dec. 1983); Dukeminier & Sanders, *supra* note 9; Silver, *supra* note 9; Stuart, Veith, & Cranford, *Brain Death Laws and Patterns of Consent to Remove Organs for Transplantation from Cadavers in the United States and 28 other Countries*, 31 TRANSPLANTATION 238 (1981).

13. Taylor, "Offering the Option": *Organ Transplantation*, 10 RENAL FAM. 27 (June 1988).

14. See Protas, *The Structure and Effectiveness of the U.S. Organ Procurement System*, 22 INQUIRY 365, 366 (1985).

as well.¹⁵ An analysis of kidney procurement represents a useful test case, the conclusions from which can be applied to all transplantable organs.

We also limit our focus to cadaveric donorship or supply of organs. While certain non-essential or reproducible body parts¹⁶ may be provided by living donors (e.g., a single kidney or bone marrow), the bulk of the vital organ supply must ultimately come from cadavers. We therefore avoid some of the more controversial issues associated with organ supply from living donors and direct our attention to the policy options available for harvesting transplantable organs from deceased individuals.¹⁷

Our analysis reveals the clear superiority of a market-based system of organ procurement over the two alternative policies on both efficiency and equity grounds. Moreover, the analysis also suggests that the current system, which depends on altruism, represents the worst choice from the set of policies considered. Nonetheless, both physicians and hospital professional societies defend the current system of altruistic supply and oppose the adoption of a market system of cadaveric organ procurement.¹⁸ The arguments made to support this policy position are examined in detail and are found to be supportable on neither logical nor empirical grounds.

I. The Kidney Shortage - Magnitude, Causes, and Consequences

Before examining the three policy options described above, we document the current shortage of cadaveric kidneys for transplantation, briefly explain the underlying causes of this growing shortage, and identify the major consequences of a chronically inadequate supply of kidneys.

15. The most important differences between kidneys and most other transplantable organs are that patients suffering from renal failure have an alternative treatment, dialysis, available to them, and that living donors can be used to supply kidneys. These differences influence the shape and location of the demand curve for kidneys relative to other organs, *see infra Part II*, but do not alter our analysis in any fundamental way.

16. In a pathbreaking transplant at the University of Chicago, a mother gave part of her liver to her 22-month old daughter. *A Mother's Gift of Love and Life*, NEWSWEEK, Dec. 11, 1989, at 91. A young man from Tennessee was a second living donor. *Living Donor Says His Daughter's Doing Just Dandy*, Gainesville Sun, Dec. 15, 1989, at 4A, col. 1.

17. To date, the only organ markets that have come into existence have involved living donors. The obvious reason for this is the relative ease of arranging a transaction between a living donor and the recipient. A market for cadaveric organs has never, to our knowledge, been organized.

18. The American Medical Association and the American Hospital Association oppose the formation of organ markets and support the current system. *See* Schwindt & Vining, *supra* note 9, at 485. Also, the American Society of Transplant Surgeons, the American Society of Transplant Physicians, and the International Transplantation Society have adopted resolutions that allow for expulsion of any member who takes part in a commercial organ market. *See* Cohen, *supra* note 7, at 24.

A. Size of the Shortage

In the United States, the demand for kidneys for transplantation far exceeds the supply.¹⁹ As a result, a shortage exists or, alternatively, we may say that there is excess demand. For most valuable assets for which a market exists, a shortage cannot persist because the forces of supply and demand automatically adjust to correct the imbalance.²⁰ These natural market forces are held in check in the case of cadaveric kidneys, however, by the existing government policy proscribing purchases and sales.

The current system's failure to provide a sufficient number of kidneys for transplantation has become increasingly and painfully apparent in recent years. Some authors have estimated that there are currently as many as 25,000 potential candidates for kidney transplants in the United States.²¹ Approximately 8,000 to 10,000 individuals are added each year to the list of patients needing kidney transplants.²² While the number of kidney transplants performed has risen from approximately 4,900 in 1981 to almost 9,000 in 1987, the number of cadaveric kidneys donated leveled off in 1986 and has remained virtually constant since then.²³ This relatively constant supply in the face of continually increasing demand increases the annual shortfall and continually lengthens the waiting list.²⁴ As this list grows, so do the expected waiting times and the probability of failing to find a suitable organ within some given period.

B. Causes of the Increasing Shortage

While the current policy's reliance on altruistic supply is a fundamental cause of the shortage of kidneys, three additional factors have contributed to the growing excess demand for these organs. First, significant technological advances have markedly improved the success rates of organ transplantation, thereby shifting the demand for transplants and transplantable kidneys outward. The principal discovery contributing to the improvement in transplant

19. The demand flow exceeds the supply flow each year, which yields a stock of patients who must wait for donor kidneys to become available. As annual supply falls short of annual demand in each year, this stock increases over time. Unfortunately, precise data on these annual flows are not available.

20. See, e.g., R. LIPSEY & P. STEINER, *ECONOMICS* 69-70 (6th ed. 1981).

21. Aroesty & Rettig, *The Cost Effects of Improved Kidney Transplantation*, RAND REP. R-3099-NIH/RC (1984); Schwindt & Vining, *supra* note 9.

22. Aroesty & Rettig, *supra* note 21.

23. Hull, *U.S. Donor Procurement in 1989: Same Song, Third Verse*, *NEPHROLOGY NEWS & ISSUES* 32 (March 1990).

24. See *Interchangeable Parts*, *NEWSWEEK*, Sept. 12, 1988, at 61; Ruth, Wyszewianski, & Herline, *Kidney Transplantation: A Simulation Model for Examining Demand and Supply*, 31 *MGMT. SCI.* 515 (1985). A symptom of excess demand is the continued reliance on living related donors in kidney transplants. Despite the fact that introduction of the drug cyclosporine narrowed the difference between the success rates of cadaveric and living related donor transplants, 20 to 30 percent of those waiting to receive kidney transplants continue to rely upon living related donors. This is largely because of delays involved in obtaining a well-matched cadaveric kidney. See Hull, *supra* note 23.

technology has been cyclosporine, an immunosuppressive drug that substantially reduces the risk of rejection of the transplanted organ.²⁵ This drug was introduced in the United States in 1979 and has been successfully applied to, among others, kidney, heart, and liver transplants.²⁶ The current overall success rates for transplants of these three organs are 85 percent, 80 percent, and 50-70 percent respectively,²⁷ which compare quite favorably to the precyclosporine success rates of approximately 70 percent for kidneys, 58 percent for hearts, and 25 percent for livers.²⁸

Second, a 1972 amendment to the Social Security Act authorizes the federal government to pay 80 percent of the cost of treatment (dialysis or transplantation) of all persons suffering from kidney failure.²⁹ The End Stage Renal Disease program, which is operated under Medicare, grew from \$228.5 million in 1974 to almost \$2 billion in 1982.³⁰ In addition, private insurance coverage has gradually expanded to include some heart and liver transplants as these procedures have become increasingly commonplace. These increases in funding and coverage have further stimulated the growth in transplant demand.

Third, after years of continual growth at approximately ten percent per year, cadaveric kidney donations abruptly leveled off in 1986 and have remained essentially steady since that time.³¹ Since kidney donors are the principal source of other organ donations, this unanticipated restriction in the growth of kidney supply is expected to reduce the growth of heart and liver supply as well.³² The cause of this sudden change in the trend in organ donation is subject to considerable debate at present, but no one has yet provided a definitive answer. Moreover, this reversal has occurred despite an increase in federal funding of organ procurement under the National Organ Transplant Act of 1984.³³

The increasingly inadequate supply of transplantable kidneys exists despite the expenditure of several hundred million dollars annually by the Health Care Financing Administration on organ procurement efforts.³⁴ The present system is operated by some seventy to eighty organ procurement agencies located

25. See Chapman, *The Life-and-Death Question of an Organ Market*, FORTUNE, June 11, 1984, at 108; Denise, *supra* note 4.

26. Another new drug, still known by its code name, FK-506, offers even greater promise than cyclosporine. See *Great Success With Drug in Transplants of Organs*, N.Y. Times, Oct. 18, 1989, at 1, col. 1.

27. These are one-year patient survival rates.

28. Kahan, *Organ Transplantation: Hearings on S.541-27 Before the Senate Comm. on Labor and Human Resources*, 98th Cong., 1st Sess. 177, 179 (1983); *The Impact of Cyclosporine on the Practice of Renal Transplantation*, 21 TRANSPLANT. PROC. 63 (1989).

29. See Chapman, *supra* note 7; Protas, *supra* note 14.

30. Aroesty & Rettig, *supra* note 21.

31. Hull, *supra* note 23.

32. See Protas, *Structure and Effectiveness*, *supra* note 14, at 366; Protas, *The Organization of Organ Procurement*, in TRANSPLANTATION POLICY: ISSUES AND PROSPECTS 44 (Blumstein & Sloan eds. 1988).

33. See Cohen, *supra* note 7.

34. Interview with Dr. P. Eggers, a policy analyst, Health Care Financing Administration, Mar. 18, 1989.

throughout the United States.³⁵ Moreover, the shortfall in supply persists despite the fact that the number of potential donors annually exceeds the number of organs needed. It has been estimated that between 17,000 and 26,000 people die annually under circumstances that would permit organ donation.³⁶ Theoretically, then, a minimum of approximately 34,000 kidneys could be collected, and as many as 52,000 kidneys may be obtainable annually. In each year from 1986 through 1988, however, only around 7,000 cadaveric kidneys were transplanted.³⁷ Thus, only 13 to 20 percent of potential donations result in usable harvested kidneys. Moreover, the wastage rate for kidneys is approximately 12 percent, and a "matched" recipient is found for virtually all usable kidneys.³⁸ In sum, the current organ shortage results from an insufficient rate of donation under the altruistic policy.

The low donation rate of kidneys appears to be due more to a failure to ask potential donors to donate than to outright refusals to donate.³⁹ The prospect of approaching a grieving family with a request to remove the organs of the recently deceased is uninviting; and, under the present system, no one has a financial incentive to undertake this unpleasant chore. Consequently, it frequently remains undone.

The organ shortage we are experiencing is not mandated by nature, but is the outcome of a failed public policy that provides insufficient incentives for cadaveric organ donation to occur.

C. Consequences of the Shortage

The shortage of kidneys for transplantation imposes substantial costs on society. These costs stem from a variety of sources. First, since hearts, livers, and other cadaveric organs are generally obtained from efforts to encourage kidney donation, any reduction or shortfall in collection rates for kidneys translates into an equivalent decrease in donations of these other organs. Shortages of these vital organs for transplantation often lead, in turn, to the deaths of patients awaiting such organs. At present, there are thousands of patients who die each year due to the lack of a suitable donor organ.⁴⁰ A

35. See Prottas, *Structure and Effectiveness*, *supra* note 14.

36. Prottas, *Organization of Organ Procurement*, *supra* note 32, at 48. Generally, to donate one's organs, death must occur in a hospital environment with the relevant organs functioning properly. Also, the patient must be within a certain age range and must be free of any serious infections (e.g., pneumonia). See Steinbrook, *Kidneys For Transplantation*, 6 J. HEALTH POL., POL'Y & L. 504 (1981).

37. Hull, *supra* note 23, at 34.

38. See Prottas, *Organization of Organ Procurement*, *supra* note 32, at 49. Wastage results from improper removal or handling of the kidneys or from inferior quality of the organ discovered upon removal.

39. A 1985 Gallup poll found that 73 percent of respondents would be willing to donate the organs of a recently deceased relative. See *Developments in the Law: Medical Technology and the Law*, 103 HARV. L. REV. 1519, 1621 (1990).

40. Peters, *supra* note 8, at 1302.

substantial increase in the collection rates for kidneys would save many of these lives.

Second, as a direct consequence of the kidney shortage, approximately 110,000 renal patients remain on dialysis in order to sustain life while waiting for a cadaveric kidney to become available for transplantation.⁴¹ Of these patients, estimates indicate that approximately one half could benefit from a kidney transplant.⁴² There are two major social costs associated with maintaining these patients on dialysis. First, dialysis is a more expensive treatment than transplantation. Research indicates that a successful kidney transplant saves as much as \$60,000 per patient over a five-year period compared to dialysis costs over the same period.⁴³ As noted above, these costs are paid by the Health Care Financing Administration under the End Stage Renal Disease program. Thus, if the entire waiting list of 25,000 renal patients could be transplanted, this program would reduce costs by approximately \$150 million over a five-year period. These savings would double if all renal patients who would benefit from a kidney transplant received a successful donor organ. The inability to achieve this cost reduction is directly attributable to the shortage of kidneys for transplantation created by the current procurement system.

Furthermore, although dialysis is capable of sustaining a renal patient's life indefinitely, it is far from a perfect substitute for a successful kidney transplant. Patients on dialysis must spend a considerable amount of time connected to the dialysis machine.⁴⁴ Moreover, many (or most) of these patients experience energy loss, nausea, weakness, hypertension, bone disease, infections, atherosclerotic disease, and other problems from the treatment itself. As a result, many (or most) of these patients are unable to work and experience substantial reductions in income and their overall quality of life.⁴⁵ While these costs do not appear on any formal ledger, they are, nonetheless, very real.

A third major consequence, a clear symptom of the chronic shortage of cadaveric kidneys is the use of living donors. Between 20 and 30 percent of all kidney transplants performed in the U.S. use living donors.⁴⁶ Although

41. Cohen, *supra* note 7, at 4.

42. Protas, *Structure and Effectiveness*, *supra* note 14, at 366.

43. Aroesty & Rettig, *supra* note 21, at 27. More recently, it has been estimated that annual savings could reach \$25,000 per patient. *Heart Transplants: The Beat Has Picked Up*, BUS. WK., Aug. 28, 1989, at 94.

44. There are two basic forms of dialysis - hemodialysis and peritoneal dialysis. The former is used far more often. The problems we identify in the text apply to both hemodialysis and peritoneal dialysis. With hemodialysis, the patient must spend two to four hours a day, three days a week connected to the machine. In addition, when disconnected, patients usually experience a "washed out" feeling for the rest of the day.

45. See Merrill, *Dialysis Versus Transplantation in the Treatment of End-Stage Renal Disease*, 29 ANN. REV. MED. 343 (1978). Perhaps the best indication of the reduced quality of life on dialysis is the fact that the rate of suicides among these patients is over 100 times that of the general population. Cohen, *supra* note 7, at 38.

46. See Hull, *supra* note 23.

long-term success rates are slightly higher with living donors, the marginal improvement in results is rapidly declining as new immunosuppressive drugs are discovered and, even now, the added costs associated with living donor transplants are unjustifiable. Such transplants place the donor (who is generally a relatively young and healthy individual) at a slight risk of subsequent renal problems or even death.⁴⁷ With much greater certainty, however, the operation required to remove the donated kidney (the nephrectomy) is painful and requires a substantial recovery period - as much as four weeks in the hospital with several more weeks (or even months) of restricted activity. Thus, the donor's lost time from work and his or her own unnecessary pain and suffering add to the costs of the current shortage situation.

We do not dispute that these costs yield substantial social benefits in terms of the recipient's health and productivity. But given the more than adequate supply of cadaveric kidneys that nature (or highway accidents) provides, they are unnecessary. An improved cadaveric organ procurement policy could obviate the need for living donors.

The current severe shortage of cadaveric kidneys is likely to grow worse in the coming years as demand continues to increase while supply remains stagnant. Moreover, the social costs imposed by this shortage are substantial by any measure. As a result, it has become imperative that alternative public policies be examined seriously. In the following sections, we describe the three principal alternative systems of organ procurement and analyze their economic and ethical implications.

II. The Current System: Altruism

We will argue that the organ procurement problem is primarily an economic problem with both medical and ethical ramifications. Economic analysts addressing this subject quite naturally refer to the supply and demand for organs, and describe the chronic shortage of organs as a case where the latter exceeds the former at the existing price. In comparing alternative organ procurement policies, we will make extensive use of these fundamental economic concepts.

Our use of the traditional tools of economic analysis enables us to make explicit analytical statements about alternative organ procurement systems. At the most fundamental level, these systems vary only in (a) the price at which the organ exchange takes place (zero or positive), and (b) the assignment of property rights in the transplantable organ (which, in turn, determines which

47. As of 1985, at least sixteen individuals have died while donating a kidney. Denise, *supra* note 4, at 1033. This translates into a death rate from kidney donation of approximately one in 10,000. Having a nephrectomy increases long-term risk by about the same amount as driving a car an extra fifteen miles a day. Freier, *supra* note 9, at 143.

party will receive payment in those systems permitting such payment). The use of supply and demand analysis will therefore allow us to highlight the basic differences between these systems in terms of how many transplantable kidneys each may be expected to provide. This permits us to address the issue of resource allocation directly and to explore the overall social welfare implications of alternative policy options.

The principal limitation of these analytic concepts is that presently we do not have reliable empirical information regarding the precise shape and location of the supply curve of cadaveric kidneys. As a result, we will be forced to speculate somewhat concerning the location of this curve. Nonetheless, we are able to draw certain broad inferences about cadaveric kidney supply from simple economic reasoning and prior information, and the major conclusions we shall draw remain valid over a relatively wide variation in the precise shape and location of this curve.

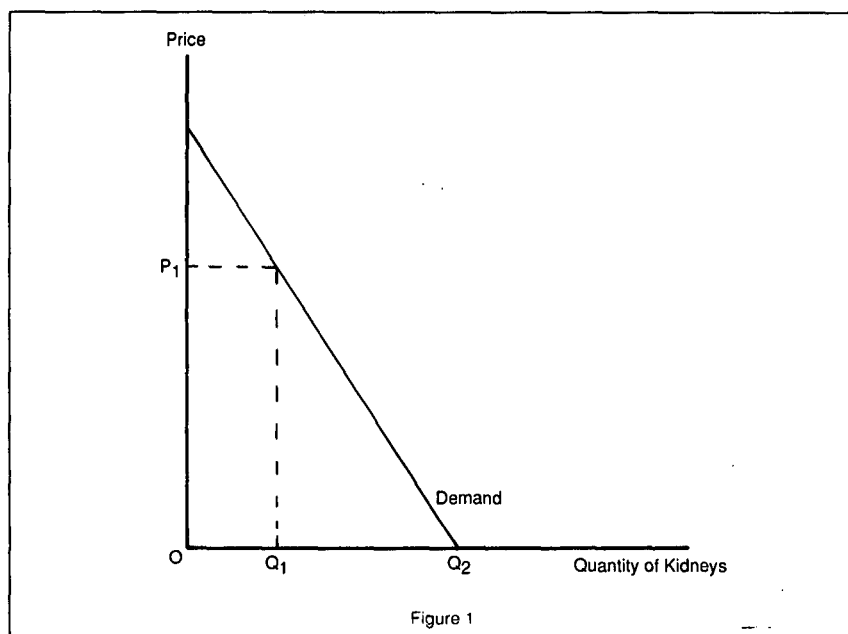
A. *Kidney Demand*

In Figure 1, we introduce the kidney demand curve. Here, we measure the price of kidneys on the vertical axis and the quantity of kidneys on the horizontal axis. The demand function is depicted as a straight line with a negative slope, although linearity of this function is not required for our analysis to hold (i.e., the demand curve need not be a straight line).

Several observations about the demand curve are in order. First, the demand for kidneys is essentially a demand for an input, as opposed to a demand for some output. Consumers do not wish to acquire kidneys for direct consumption. If kidneys were not employed as an input in the production of transplant operations, there would be no demand for these organs. Demands for inputs are referred to as derived demands, because they are derived from the demands for the outputs they are used to produce. In the case of kidneys, demand is derived from the demand for transplant operations which, in turn, is derived from the demand for health.

Moreover, each transplant operation requires exactly one transplantable kidney. There are no other inputs that may be substituted for the kidney in the production of the transplant operation. This one-to-one ratio between the kidney input and the operation output simplifies the derivation of kidney demand from the demand curve for kidney transplant operations. Specifically, the price a person is willing to pay for a transplantable kidney is equal to the price he or she is willing to pay for a completed transplant operation minus the cost of the surgery and hospital care required to put the new kidney in place.⁴⁸

48. Graphically, the derived demand curve for kidneys will equal the demand curve for transplant operations shifted downward (vertically) by the marginal cost of the operation. See R. BLAIR & D. KASERMAN, *ANTITRUST ECONOMICS* 295-98 (1985).

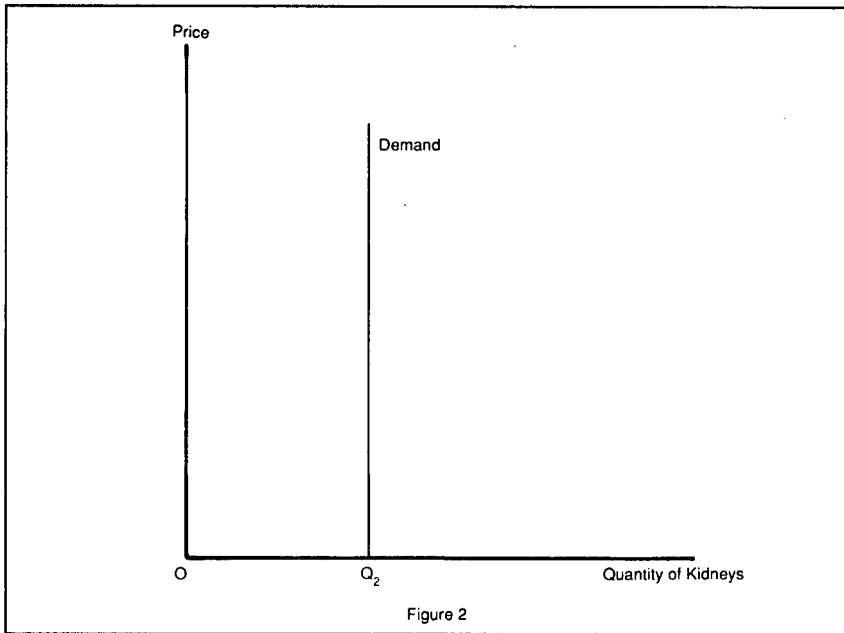


Second, it is very likely that the demand curve for transplantable kidneys is extremely steep over a wide price range. In economic terms, kidney demand is relatively price inelastic,⁴⁹ which means that the number of kidneys demanded for transplantation is unlikely to be substantially influenced by the price of kidneys over this range. In fact, it is quite possible that, over the price range relevant to our analysis (from zero up to the market equilibrium price), the demand curve for kidneys is completely vertical, as depicted in Figure 2. When changes in the price of kidneys have no discernable effect on the quantity of kidneys demanded, as in Figure 2, we say that the demand curve is perfectly inelastic.

This insensitivity of the quantity of kidneys demanded to price changes is due to two considerations. First, while a substitute treatment is available (dialysis), it is a much less attractive alternative. Patients for whom transplantation is a feasible alternative tend to opt for this form of treatment over dialysis due to the higher costs of dialysis in terms of both time and health. Second, since eighty percent of the costs of virtually all kidney transplants are covered under the End Stage Renal Disease program, renal patients are not required to bear the full financial burden of the transplant operation.⁵⁰ Consequently, the demand for transplant operations is extremely price inelastic; and, since the

49. On this point, there appears to be no disagreement. See, e.g., Cohen, *supra* note 7, at 31. As price elasticity increases the slope of the demand curve falls, i.e., it becomes flatter.

50. The federal government, through the End Stage Renal Disease Program, paid for 7073 of the total 7695 kidney transplants performed in 1985. *Developments in the Law*, *supra* note 39, at 1631.



demand for kidneys is derived from the demand for transplants, it, too, is likely to be highly price inelastic over a substantial range.

Third, it is difficult to know with certainty the actual number of kidneys demanded at the current price of zero. As a consequence of the shortage of transplantable kidneys, physicians and organ procurement officials prevent certain individuals from joining waiting lists if they feel that these individuals would not be good candidates for a transplant for either medical or behavioral reasons. As a result, some, and perhaps many, patients who might benefit from a kidney transplant never appear on official waiting lists. Thus, the current quantity demanded may be much greater than the number of people on these lists would suggest.

B. *The Shortage, Current Value, and Black Market Activities*

Under the current system, the potential donor or potential donor's family holds the property right in the organ or organs.⁵¹ As noted above, the current organ procurement system is driven by the National Organ Transplant Act of 1984, which makes it illegal to pay for organs to be used in transplants. Thus, public policy relies exclusively on altruism to generate the supply of much

51. In practice, the property rights in this area are ill-defined. See generally Schwindt & Vining, *supra* note 9. As these authors point out, problems invariably arise when a valuable asset exists without well-defined property rights. Clearly, this ambiguity of ownership is a major flaw of public policy in the organ procurement area.

needed organs.⁵² The problem this policy creates is illustrated in Figure 1. At a zero price, we observe that the quantity supplied is Q_1 while the quantity demanded is Q_2 . The shortfall in supply, or excess demand, is given by the difference between Q_2 and Q_1 . This difference represents the number of people who would like to receive a cadaveric kidney transplant but are unable to do so because of the absence of a donor.

The altruistic system of kidney procurement provides little information on the prices that would prevail under a market system. In Figure 1, we see that, at the current level of supply, there are people willing to pay P_1 for a kidney. This price reflects the value that these people place on having a kidney for a transplant. But this relatively high value flows from the restricted quantity supplied at the mandated price of zero. Under the shortage conditions that exist, certain individuals are willing to pay extraordinarily high prices for the rationed good.

In the United States, individuals have placed advertisements in newspapers indicating a willingness to sell one of their kidneys (live) for \$10,000 to \$50,000.⁵³ And in Germany, at least one firm has begun to broker kidneys from living donors, offering as much as \$45,000 per kidney.⁵⁴ This indicates a perception on the part of these individuals that this is what a kidney is currently "worth" on the open market. Some commentators have assumed implicitly that similar prices would prevail under alternative (non-altruistic) procurement systems. For reasons that will become clear below, however, we seriously doubt that this is the case.

There is a very disturbing consequence of any system that creates an imbalance between supply and demand. The artificial value created by restricting the price of a valuable commodity to zero, and thereby encouraging an undersupply, invariably gives rise to various forms of black market activity. A relevant example is the well-known incidence of bribery in the adoption of children.⁵⁵ Although documentation is not currently available, it appears that similar, or even more serious, behavior has been exhibited by patients attempting to obtain needed organs. For example, wealthy individuals have reportedly been moved to the top of organ waiting lists after making substantial "donations" to transplant centers.⁵⁶ And abroad, the World Health Organization is

52. For a more extensive treatment of the existing public policy, see Blumstein, *Government's Role in Organ Transplantation Policy*, 14 J. HEALTH POL., POL'Y & LAW 5 (1989).

53. Chapman, *supra* note 25, at 114. In addition, an Australian woman offered to sell one of her kidneys for \$20,000. *Kidney Sales Spur Attempt in Britain to Ban the Practice*, Wall St. J., July 10, 1989, at A5, col. 2.

54. *Kidneys for Sale: The Issue is Tissue*, NEWSWEEK, Dec. 5, 1988, at 38.

55. See generally, Landes & Posner, *The Economics of the Baby Shortage*, 7 J. LEGAL STUD. 323 (1977).

56. This is but one of the abuses reported in a six-part series on kidney transplantation in the Pittsburgh Press, Nov. 3-10, 1985. See also Manga, *A Commercial Market For Organs? Why Not?*, 1 BIOETHICS 321 (1987).

encouraging member countries to outlaw organ sales. This action was taken, in part, in response to undocumented reports that children from Brazil and Honduras were being sold to organ and tissue traders in other countries who were converting them into "organ farms."⁵⁷ Thus, the current policy which prohibits white market trade at positive prices creates strong economic incentives for black market trade at artificially inflated prices.⁵⁸

C. *Why the Current System Has Endured*

Despite the fact that the current system has consistently failed to produce a sufficient supply of cadaveric organs, it has endured for well over 20 years now.⁵⁹ To what may we attribute this policy's longevity? While we cannot answer this question completely, we can offer several partial explanations.

Like any public policy, the current altruistic system of cadaveric organ procurement, regardless of its overall performance, yields direct benefits to certain groups. In the case of kidney procurement, three such groups readily come to mind. First, those parties involved in the treatment of end stage renal disease by either dialysis or transplantation stand to profit from the restricted quantity of organs supplied under the current altruistic system. For owners of dialysis clinics, many of whom are physicians, the organ shortage that is created by forcing price to remain at zero causes a higher level of demand than would exist under a system of procurement that produced a sufficient number of kidneys. That higher demand, in turn, increases the profitability of dialysis treatment centers.

Furthermore, the high rate of entry by for-profit dialysis centers suggests that these profits are quite large. The number of for-profit providers of dialysis has increased by more than 150% since 1980 (Table 1 provides more detailed renal provider statistics). Since firms will not generally enter an industry unless that industry is earning above-normal profits, these entry data strongly suggest that the dialysis business has been relatively profitable over the decade of the 1980's. Such profitability is at least partially due to the rising demand for dialysis which, in turn, is at least partially due to the shortage of transplanted kidneys.

57. See Chengappa, *The Organs Bazaar*, INDIA TODAY, July 31, 1990, at 33. Of course, the idea that one can reduce or eliminate black market activities by proscribing white market sales is disingenuous at best.

58. Excess demand also permits various sorts of discriminatory behavior. For instance, some commentators allege that blacks must wait longer for a kidney transplant than whites. *Blacks On List Longer For Kidney Transplants*, Gainesville Sun, Aug. 23, 1990, at 5A, col. 1.

59. See Chapman, *supra* note 7, at 399.

Table 1

MEDICARE RENAL PROVIDER STATISTICS
(by Calendar Year)

| Calendar Year | Total Providers | Total Hospital Based Providers | Hospital Dialysis Providers | Independent Providers | Transplant Providers | For-Profit Providers | Approved Outpatient Stations |
|------------------|--------------------|---|-----------------------------------|--------------------------|-------------------------|-------------------------|------------------------------------|
| 12/80 | 1,054 | 649 | 636 | 405 | 151 | 343 | 12,329 |
| 12/81 | 1,162 | 676 | 657 | 486 | 157 | 408 | 13,784 |
| 12/82 | 1,218 | 690 | 642 | 528 | 159 | 437 | 14,438 |
| 12/83 | 1,308 | 682 | 629 | 627 | 159 | 504 | 15,506 |
| 12/84 | 1,368 | 700 | 622 | 668 | 170 | 544 | 16,594 |
| 12/85 | 1,463 | 715 | 632 | 748 | 178 | 616 | 17,845 |
| 12/86 | 1,578 | 717 | 639 | 861 | 184 | 715 | 19,383 |
| 12/87 | 1,701 | 741 | 660 | 960 | 199 | 805 | 21,246 |
| 12/88 | 1,819 | 753 | 668 | 1,066 | 202 | 907 | 22,605 |

The potential benefit of restricting organ supply is perhaps less obvious for transplant centers. Nonetheless, it is relatively easy to show that by restricting the supply of an essential input, the quantity of output is similarly restricted, and the potential profits of the industry are thereby increased.⁶⁰ Transplant surgeons and hospitals could increase profits by restricting total industry output below the competitive level. In order to hold supply to this level, however, it would be necessary for them to form a cartel that would set price at or near the monopoly level and establish quotas on the number of operations each center could perform so that the total industry output would be held below the competitive level. Such a cartel, however, would face the perennial problems

60. For a graphic proof of this statement, see Kaserman & Barnett, *An Economic Analysis of Transplant Organs: A Comment and Extension*, ATLANTIC ECON. J. (forthcoming 1991).

encountered by all such arrangements - entry and cheating.⁶¹ The excess profits that exist at the restricted cartel output attract new producers into the industry and create strong incentives for individual cartel members (transplant centers) to expand production beyond the authorized amount.

Such output-expanding activities are effectively prevented by restricting the number of transplantable organs available. By forcing a zero price on organs, the quantity of organs supplied is artificially restricted to Q_1 in Figure 1, thereby restricting the number of transplant operations. Thus it appears that adopting an organ procurement policy that relies upon altruism for supply holds output below the competitive level, thereby providing an effective cartel enforcement mechanism, which in turn increases profits above the competitive level.

To evaluate the success of this policy in maintaining profits at above-normal levels at the transplant stage of production, we again examine entry information. Table 1 indicates a 34 percent increase in the number of transplant providers over the 1980-88 period. More recently, an article in the *Wall Street Journal* reported that "[h]ealth-care experts fear an explosion in the number of transplant facilities."⁶² This article went on to describe the increase in the number of hospitals doing heart transplants from less than 20 in 1983 to 141 in 1988 (over a 600 percent increase in six years). Again, such entry would not occur unless the transplant business were quite profitable.⁶³

Given this situation, we conclude that physician and hospital support for the current altruistic system of organ procurement may be due, at least in part, to the enhanced profitability created by this policy. Furthermore, there is an additional incentive for physicians and hospitals to continue to defend the current system, one which is more political in nature. Specifically, these health care professionals may not want third parties, such as private organ procurement firms, inserting themselves between physicians and patients (or patients' families) in the organ acquisition process. In other words, their support for the current system could simply represent a desire to protect their "turf." Such a political motive would, of course, buttress the economic incentives described above.

Health insurance companies that cover transplant operations comprise a second group that stands to benefit from the current organ shortage (and that

61. In addition, of course, such cartel agreements are illegal in the United States. See Blair & Kaserman, *supra* note 48, at 153-77.

62. See Winslow, *Hospitals Rush to Transplant Organs*, *Wall St. J.*, Aug. 29, 1989, at B1, Col. 3.

63. See *id.* (pointing out that this rapid entry into the transplant business is creating an inefficient industry structure as a relatively fixed number of organs are spread over an increasing number of transplant centers). The result is a large number of centers doing a very small number of transplants each year. For example, thirty-seven percent of all kidney transplant centers performed fewer than fifteen operations in 1988. *Id.* If the production of transplant operations is subject to any economies of scale, entry in the face of a relatively fixed number of organs will increase industry costs.

could therefore be expected to defend the altruistic system of supply).⁶⁴ Restricting the supply of organs constrains the number of transplant operations, thereby reducing the claims experienced by these firms.

Third, parties such as existing organ procurement agencies, organ procurement officers, and those employed in quasi-governmental organizations involved in allocating the limited supply of organs among desperately waiting patients (e.g., the United Network for Organ Sharing (UNOS)), also benefit from the existing system as many of their jobs are directly dependent upon the shortage situation created by this system.

Finally, an additional reason for the longevity of the existing policy involves the severity of the shortage it has created. While analysts have been deploring this shortage for over twenty years,⁶⁵ it is only within the past several years that the number of deaths due to organ unavailability has increased substantially,⁶⁶ and expected waiting times have begun to be measured in years instead of months. It is also only within the past five or six years that insurance companies and the Health Care Financing Administration have begun to cover some non-renal (e.g., heart and liver) transplants.⁶⁷ As a result, the magnitude of the excess demand for transplantable organs has only recently increased to the present level.⁶⁸

Precisely for this reason, it has become imperative that all parties, including those who benefit from the current shortage, reconsider their stand on organ procurement policy. It is time to take the alternatives seriously.

III. A Market Alternative to Altruism

Advocating a market solution to the existence of excess demand is commonplace among economists and non-economists alike when the commodity in question is a standard product normally traded on the market. When the scarce resource in question is a human organ, however, this suggestion is much less readily received.⁶⁹ But before categorically opposing a market for organs, one

64. See Somerville, "Procurement" vs. "Donation"--Access to Tissues and Organs for Transplantation: Should "Contracting Out" Legislation Be Adopted? 17 TRANSPLANT. PROC. 53, 56 (Supp. IV 1985).

65. See Chapman, *supra* note 7, at 399.

66. Cohen, *supra* note 7, at 29; Peters, *supra* note 8, at 1302.

67. See Lutz, *Organ Transplant Programs Multiply*, MOD. HEALTHCARE, Mar. 4, 1988 at 30; Hayes, *When a Loved One Needs a Transplant*, PARADE, Oct. 30, 1988.

68. In the past, the vast majority of organ transplants were kidneys, and due to the availability of dialysis treatment, patients did not actually die from lack of a suitable organ. Today, however, with the increasing viability of heart and liver transplants, it is possible to attribute deaths directly to the unavailability of donor organs. See generally Peters, *supra* note 8.

69. Margaret Thatcher was quoted in *Take My Kidney Please*, TIME, Mar. 13, 1989, at 88, as expressing the view that "the sale of kidneys or any organs of the body is utterly repugnant." British Health Minister Roger Freeman apparently agrees: "The concept of organs being bought and sold for money is entirely unacceptable in a civilized society." *Kidney Sales Spur Attempt in Britain To Ban the Practice*, WALL ST. J., July 10, 1989, at A5, col. 2.

should at least examine the likely outcome of the market process.⁷⁰ In this section, we evaluate a market for organs from the economist's perspective of maximizing social welfare. This analysis demonstrates the clear superiority, in terms of the number of organs collected and of overall social welfare, of the market over altruism.

Because the issue of organ markets is so emotionally charged and often misunderstood, let us be clear about what is not being proposed. We do not propose barkers hawking human organs on street corners. We do not envision transplant patients, or their agents, dickering for a heart or liver with families of the recently deceased. We do not advocate an auction in which desperate recipients bid against each other for life-sustaining organs. Finally, we do not advocate a market for organs from living donors.⁷¹

While we might adopt any number of specific arrangements that rely upon market processes to equilibrate demand and supply of cadaveric organs, the following seems a likely scenario.⁷² Potential organ suppliers could be offered some fixed payment (either in cash or in the form of a tax credit) in exchange for entering a binding contract that authorizes removal of one or more of their organs at death.⁷³ For example, a specified sum could be paid to all individuals who sign the donor form on the back of their drivers' license. Such an arrangement would correspond to a forward market for organs in that payment would occur well in advance of expected delivery.

The size of the payment involved could be adjusted in order to yield an adequate supply of organs for transplantation. That is, under shortage conditions, the price could be increased to bring forth an additional quantity of organs; and if an undesirably large excess supply should occur, this price could be reduced.⁷⁴ This process of adjustment would necessarily involve forecasts of demand and actuarial estimates of supply based upon the expected incidence of renal failure and the current stock of outstanding supply contracts.⁷⁵ As in

70. Those who have analyzed a market for organs include Annas, *Life, Liberty and the Pursuit of Organ Sales*, 14 HASTINGS CTR. REP. 22 (1984); Brams, *supra* note 9; Cohen, *supra* note 7; Dukeminier, *supra* note 7; Frier, *supra* note 9; Hansmann, *supra* note 9; Movrodes, *supra* note 9; Schwindt & Vining, *supra* note 9; Note, *Retailing Human Organs Under the Uniform Commercial Code*, 16 J. MARSHALL L. REV. 393 (1983); Note, *The Sale of Human Body Parts*, 72 MICH. L. REV. 1182 (1974).

71. In fact, an institutionalized market for cadaveric organs would, in all likelihood, drive out a market for organs from living donors, because for the majority of the population the opportunity cost of organs obtained from cadavers is substantially less than the opportunity cost of organs obtained from living donors.

72. See, e.g., Hansmann, *supra* note 9, at 61-63 (examining feasible designs for an organ market); see also Cohen, *supra* note 7 (same).

73. One advantage of this type of forward contract is that it eliminates the need for negotiation at the time of death. See generally Cohen, *supra* note 7.

74. This adjustment process will occur naturally in response to any imbalance between supply and demand. If a government controlled monopoly were purchasing the organs, it would have to adjust the price offered to bring supply and demand into balance. If there are private procurement firms, they would bid prices up in response to a shortage, thereby inducing an increase in the quantity supplied.

75. To be perfectly candid, this adjustment process is not apt to work perfectly. The time lags in fatalities are quite long relative to predictable changes in demand and elaborate attempts to fine tune the quantities are therefore unlikely to be very successful. Nevertheless, some adjustments are indeed possible.

other markets where either demand or supply is uncertain (e.g., electricity and agriculture), a margin of safety could be built into these estimates. In other words, one could avoid shortages by consistently overestimating demand and/or underestimating supply.

A. *Supply of Kidneys*

In the last section, we examined the demand for kidneys; now we turn our attention to the supply. In Figure 3, we have reproduced the demand curve of Figure 1, and have added a supply curve. We know that the supply curve coincides with the quantity axis at Q_1 , because this is the observed quantity supplied at a price of zero, but beyond that we cannot be sure of its shape. Since we have never implemented a system in which individuals are compensated for supplying organs at death,⁷⁶ the price elasticity of supply of cadaveric kidneys at prices above zero is uncharted water. This fact has been noted by others who have written on this subject.⁷⁷ And, as we shall see later, this issue of the price elasticity of supply is extremely important to the formulation of rational public policy in this area.

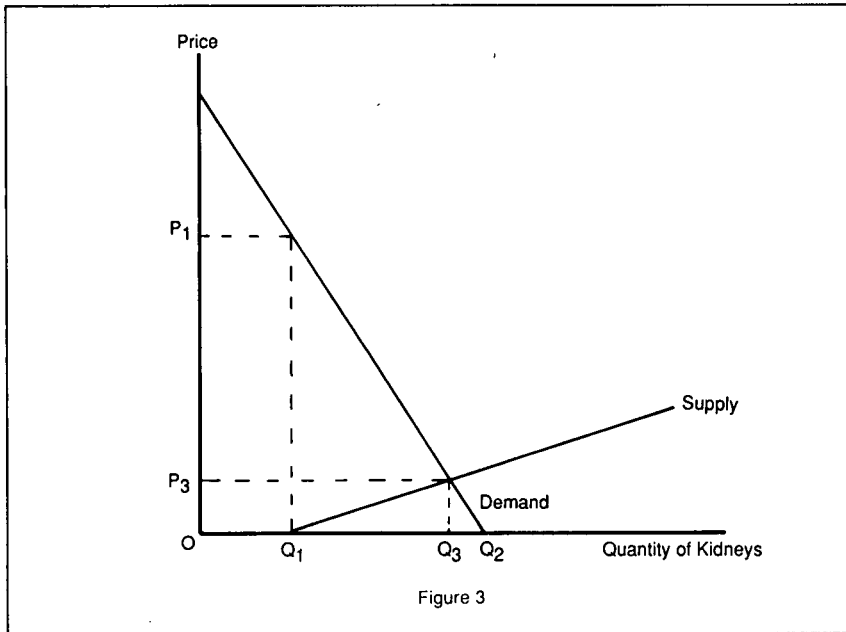
Two considerations suggest that the price elasticity of supply of cadaveric organs may be relatively large (i.e., the supply curve may be relatively flat). First, the low percentage of potential donors that currently supply their organs at death indicates that a substantial increase in the quantity supplied is feasible. Economically, the current situation is somewhat analogous to an industry with excess productive capacity in that additional output may be obtained without new investment. A price increase in such an industry generally leads to a substantial increase in output. Second, survey evidence indicates that families of deceased individuals generally are not strongly opposed to organ removal at death.⁷⁸ Thus, the current low rate of donorship stems from either a failure

Moreover, to guard against shortages, safety margins can be incorporated into the forecasts.

76. Compensation to suppliers under a market system could occur at the time of delivery (a spot market), in which case the survivors of the person supplying the organ or organs would receive the payment; or compensation could occur many years prior to delivery (a forward market), in which case the person supplying the organ or organs would receive the payment. The latter system would correspond to what Schwindt & Vining, *supra* note 7, refer to as a future delivery market. In practice, of course, both types of markets could function simultaneously.

77. Schwindt & Vining, *supra* note 9, at 495 ("What remains unknown, because no such market has functioned, is the potential supply of forward contracts."); Denise, *supra* note 4, at 1032 ("A frequently cited virtue of a commercial organ market is its potential to save thousands of lives by generating a sufficient supply of organs. The effect, however, of an organ market on the supply of available organs is uncertain.").

78. See Prottas, *Structure and Effectiveness*, *supra* note 14, at 375 (reporting an average permission rate of families who were asked to allow organ removal of 75.1 percent); Steinbrook, *supra* note 9, at 513 (describing evidence of similar permission rates).



to request permission to remove organs at death⁷⁹ or a lack of incentive to supply such permission.⁸⁰ This implies that it is probably not due to strongly and widely held beliefs about the need for one's organs after death.⁸¹ It therefore appears likely that even a small monetary incentive would lead to a substantial increase in procurement rates; in other words, the price elasticity of supply of cadaveric organs is relatively large.

Increases in supply under the current system historically have come about through educational and promotional efforts that effectively increase Q_1 in Figure 3, shifting the entire supply curve to the right. By making individuals aware of the need for transplantable organs and by encouraging hospital staff to identify potential donors, the number of cadaveric kidneys harvested has

79. Some states are making an effort to increase the number of donors. For example, Colorado currently requires drivers' license applicants to indicate whether they are willing to allow their organs to be harvested at death. Cohen, *supra* note 7, at 7 n.19. As this Article goes to press, these efforts have not resolved the shortage.

80. Also, the current system requires that negotiations occur at the time of death, which is obviously not the ideal time for negotiation with either the individual or her grieving family. A future delivery market in conjunction with well-defined property rights would obviate the need to conduct any negotiations at death.

81. It is possible that part of the blame for the current system's failure is due to an inability to specify how the donated organs would be used. Some individuals may be very willing to donate an organ to friends and relatives, but unwilling to donate their organs to an anonymous recipient.

increased from 3,834 in 1980 to 4,929 in 1983 and almost 6,000 in 1987.⁸² As noted in Section I.B. above, however, this upward trend in supply has persistently failed to keep pace with demand growth and has recently reversed. Moreover, while the price paid to organ donors has remained at zero, the increase in the number of organs harvested has certainly not been achieved at zero cost. Organ procurement expenditures currently exceed \$7,000 per kidney harvested. Despite these expenditures, however, and despite the increases in donorship that have been achieved, the distance between Q_1 and Q_2 has continued to grow larger each year, and the social costs associated with this shortage have grown correspondingly.

B. The Market Solution

The relevant economic comparison between the current altruistic system and a market system is shown in Figure 3. The current altruistic system, in which price is held fixed at zero, yields a solution at a quantity equal to Q_1 with a resulting excess demand of $Q_2 - Q_1$ and a market value of organs of P_1 . Under a market system, the price is allowed to rise to its equilibrium⁸³ level of P_3 and supply and demand are equilibrated at a quantity of Q_3 . The result is a simultaneous increase in the quantity of cadaveric organs supplied of $Q_3 - Q_1$ and a decrease in the quantity demanded of $Q_2 - Q_3$. Thus, movement to a market-based system of procurement involves an increase in both price and quantity relative to the current system.

While the actual magnitudes of these increases cannot be precisely calculated at this time, it appears likely (based upon our expectations regarding demand and supply elasticities) that the price increase would be relatively small and the quantity increase would be relatively large. That is, with a relatively flat supply curve and a relatively steep demand curve, the bulk of the adjustment in moving to a market system of cadaveric organ procurement will be in the quantity supplied.⁸⁴ Equilibrium price is likely to be relatively low, and the reduction in the number of kidneys demanded is likely to be quite small

82. See Prottas, *Structure and Effectiveness*, *supra* note 14, at 365; *Interchangeable Parts*, *supra* note 24, at 63. The so-called "required request" laws passed by the federal government and a number of states are designed to facilitate this process. These laws require physicians, hospital staff, or organ procurement representatives to request from each potential donor's family permission to remove organs at death. It is not clear how much effect such laws will have, however, since they impose no specific penalties on violators.

83. "Equilibrium" in a free market refers to the state in which supply and demand are equal; there are therefore no forces tending to increase or reduce quantity. In a disequilibrium, supply and demand will be out of balance. If, for example, there is excess demand in a free market, the price is too low. Disappointed buyers will bid up the price, which will cause an increase in the quantity supplied and a decrease in the quantity demanded. This process will continue until the equilibrium price-quantity combination is reached. See generally R. Lipsey & P. Steiner, *supra* note 20.

84. Although the magnitudes will be affected by the shapes of the supply and demand curves, as long as the supply curve is positively sloped, social welfare will be improved by resort to the market mechanism.

(perhaps zero). Thus, the primary difference between the market solution and the current system is that many more kidneys would become available under the former policy.

C. Social Welfare and the Market Solution

Figure 4, which reproduces the supply and demand curves of Figure 3, may be used to explore the gains and losses to donors and recipients in moving from the current system to a market system. To do this, the demand and supply curves must be more precisely understood. The demand curve reveals the marginal valuation⁸⁵ that organ recipients collectively place on successive organs made available for transplantation. That is, as we move down the demand curve, we are moving successively from individuals willing to pay higher prices for a transplantable organ to individuals willing to pay lower prices.⁸⁶ Similarly, the supply curve reveals the marginal valuation placed by their current owners on organs to be supplied at death. In other words, individuals who place an extremely high value on burying the body intact (for religious or any other reasons) would be located far up the supply curve to the right, and individuals who place a low value on burying their body with the organs in place would be located down the supply curve to the left.

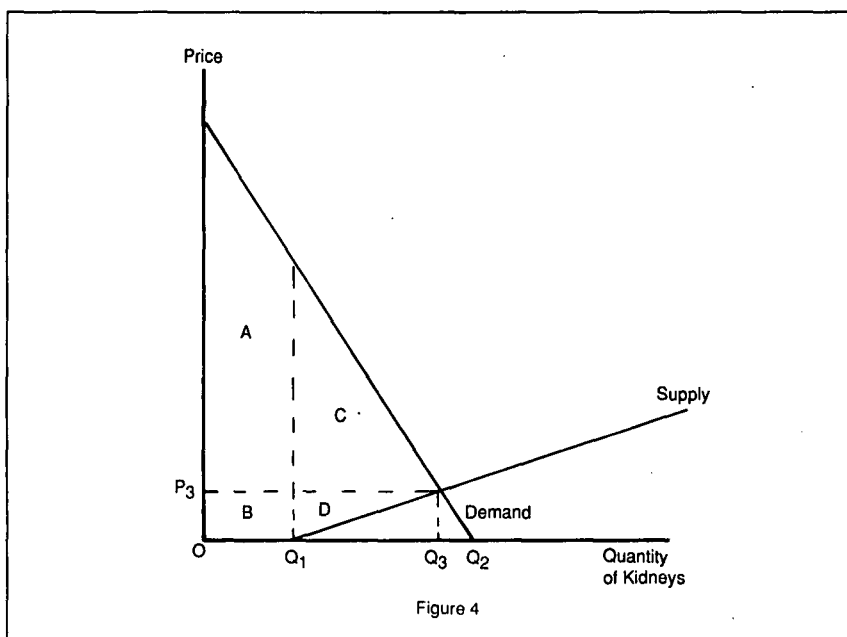
Given these straightforward interpretations of supply and demand, the economic concepts of consumer and producer surplus can be used to examine gains and losses under the two alternative systems we have described thus far. Consumer surplus is given by the area under the demand curve and above the price.⁸⁷ It is the collective dollar valuation placed on all units purchased by consumers minus the expenditure required to make those purchases.⁸⁸ As such, it shows the total dollar value attached to the units purchased above and beyond what is actually paid for them. For example, at Q_1 in Figure 4, the height of the demand curve measures the value placed on that organ by the recipient just willing to pay that price. If the price that she must pay is P_3 , then the difference

85. At a point on the demand curve, the price represents the value placed on the resource in question by the consumer who was just willing to buy it; everyone else purchasing the product valued it more than that. One may thus view the price as the marginal valuation consumers placed on the last unit purchased at any particular quantity. See, e.g., J. HICKS, A REVISION OF DEMAND THEORY 86 (1956).

86. The demand function reflects *inter alia* the existing income distribution, which some may find unacceptable. These distributional issues can however be resolved with other policy tools, such as taxes and transfers.

87. This concept is not without ambiguity; see, e.g., J. HICKS, *supra* note 85, at 95-106; J. QUIRK & R. SAPOSNIK, INTRODUCTION TO GENERAL EQUILIBRIUM THEORY AND WELFARE ECONOMICS (1968). But see Willig, *Consumer's Surplus Without Apology*, 66 AM. ECON. REV. 589 (1976) (clearing up much of the ambiguity by showing that this concept is a very good approximation of an unambiguous - but unmeasurable - welfare concept). See generally H. VARIAN, INTERMEDIATE MICROECONOMICS: A MODERN APPROACH 242-55 (1987).

88. Since the vertical axis of the graph is price, denominated in dollars per unit, and the horizontal axis is units, areas on the graph are denominated in dollars.



between what she is willing to pay and what she must pay represents surplus value, which we refer to as consumer surplus. If all potential recipients were arrayed along the demand curve according to their willingness to pay, then the area under the demand curve and above the price would represent the consumer surplus for all organ recipients.

The supply curve shows the price at which potential donors will supply a given quantity. As such, it represents the value that each potential donor places on her organs. For example, at Q_1 the price that must be paid to get that quantity is zero, while at Q_3 the necessary price is P_3 . Producer surplus is given by the area below the price and above supply. It shows the excess value received by suppliers above the value placed upon the resource given up. If we sum these two surpluses, we obtain overall social welfare, which is the excess value received by both suppliers and consumers as a result of market exchange. As the sum of consumer and producer surplus, it represents the net value that society receives from allowing mutually agreeable and voluntary exchange to take place.

Economists generally regard the objective of maximizing overall social welfare to be the overriding criterion for selecting between alternative public policies.⁸⁹ That is, policy makers should attempt to select alternatives that

89. See generally L. FRIEDMAN, MICROECONOMIC POLICY ANALYSIS (1984); R. JUST, D. HUETH & A. SCHMITZ, APPLIED WELFARE ECONOMICS AND PUBLIC POLICY 1-13 (1982).

yield the greatest sum of producer and consumer surplus.⁹⁰ Many economists prefer this criterion because, through the compensation principle,⁹¹ it offers the greatest potential gain to all affected parties. Suppose, for example, we have two alternative policies, A and B. Policy A increases producer surplus but decreases consumer surplus. Policy B increases both producer surplus and consumer surplus. Suppose, however, that policy A offers the greater overall social welfare. It should then be possible for producers to compensate consumers under this policy so that both groups benefit more than they would under policy B. The crucial insight here is that the issue of selecting a policy that maximizes total net benefits can be addressed separately from the issue of distributing those net benefits among the members of society.⁹² For these reasons, we take overall social welfare to be an appropriate criterion for selecting among the available policy options.

Under the current altruistic system with Q_1 units exchanged, the maximum possible consumer surplus is given by the area below the demand curve between zero and Q_1 kidneys. This is the sum of the areas marked as A and B. The actual consumer surplus received under this system will fall short of this area (perhaps by a very wide margin) because the organs that are made available are not necessarily given to those potential recipients who place on them the highest value, as measured by willingness to pay.⁹³ Thus, A + B constitutes an upper bound on the consumer surplus realized under the current system. Producer surplus under this system is zero as both the supply curve and the price fall on the horizontal axis between the origin and Q_1 . Therefore, A + B gives the maximum possible social welfare achieved under the current altruistic system of procurement.

When we move to a market system, the price rises from zero to P_3 and quantity rises to Q_3 . As a result, consumers lose area B but gain area C. The loss experienced is simply a reduction in excess value that results from the price increase to those patients who are fortunate enough to receive an organ under the current system. The gain is the consumer surplus realized by those additional patients who, due to the increase in the number of organs available, would be able to receive a transplant under the market system. Again, given

90. If total surplus, producer plus consumer, is maximized, society has the largest pie to split. Once the size of the pie has been maximized, issues of optimal distribution of that pie can be considered and policy tools can be brought to bear on the problem.

91. The compensation principle can be traced to Kaldor, *Welfare Propositions of Economics and Interpersonal Comparisons of Utility*, 49 *ECON. J.* 549 (1939), and Hicks, *The Foundations of Welfare Economics*, 49 *ECON. J.* 696 (1939). This principle is simple: state of the world A is preferable to state of the world B if everyone could be made better off through some feasible redistribution, i.e., if it is possible for the gainers to compensate the losers. Note, however, that actual compensation need not be paid.

92. See, e.g., A. ATKINSON & J. STIGLITZ, *LECTURES ON PUBLIC ECONOMICS* 343 (1980). This requires that the redistribution be feasible. If so, the Kaldor-Hicks compensation principle is satisfied.

93. Suppose, for example, that a recipient values the kidney received at \$6,000 while someone who did not receive a kidney valued it at \$10,000. Consumer surplus, which is area A + B, will be reduced by \$4,000 as a result.

the probable sizes of the elasticities involved, it appears likely that area C will exceed area B so that total consumer surplus will probably increase with movement to a market system. That is, the loss that consumers experience from being forced to pay a non-zero price for the organs they currently obtain is more than offset by the benefits associated with the additional organs that become available. At the same time, suppliers gain area B plus area D. Thus, suppliers clearly gain from movement to a market system. We can conclude, therefore, that consumers will probably gain and suppliers will definitely gain by adopting a market-based organ procurement policy.

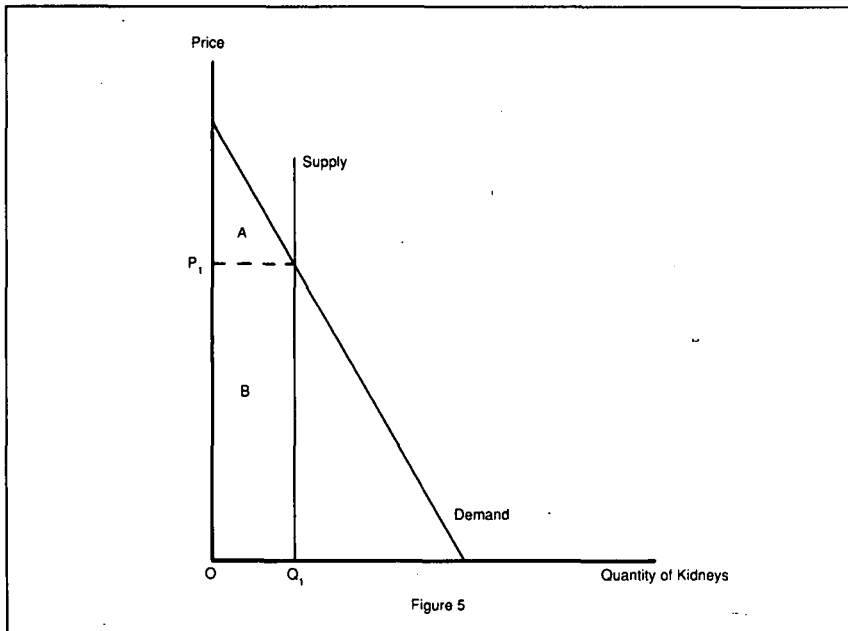
Regardless of whether organ recipients experience a net increase in consumer surplus, however, it is clear from Figure 4 that overall social welfare will definitely rise by moving to a market system. This is true because the surplus lost by consumers as a result of the price increase (area B) is gained by suppliers. The consumers' loss is precisely offset by the producers' gain, and society, as a whole, is unaffected by the transfer. At the same time, however, areas C and D are clear gains realized by consumers and producers, respectively.⁹⁴ Therefore, relative to the present altruistic system, a market system of organ procurement creates an unambiguous net gain in overall social welfare. And if, as we suspect, the demand curve is steep (highly price inelastic) and the supply curve is relatively flat (highly price elastic), this overall net gain (given by area C + D) could be quite substantial.⁹⁵

It might be argued that the overall net gain (C + D) would actually be negative for certain supply-demand curve combinations. But consider the extreme case, shown in Figure 5, in which a supply curve coincides with the quantity axis between zero and Q_1 and then is vertical. Under the altruistic system, the maximum consumer surplus is equal to areas A plus B as price is zero and quantity is Q_1 . Given the peculiar supply curve under consideration, a move to the market system will not increase the quantity. The price will equal P_1 and the total surplus will be split between recipients and donors. The recipients will have consumer surplus equal to area A while the donors will experience producer surplus of B. Thus, total surplus does not appear to increase in this case.

But that is an illusion. If society relies on the market, we know that those who receive the organs value them at P_1 or more and, therefore, consumer

94. The gainers could indeed compensate the losers when society moves to a market system. The necessary transfer may not actually take place, but the Kaldor-Hicks compensation principle does not require actual transfers. See R. JUST, D. HUETH & A. SCHMITZ, *supra* note 89. In practice, any loss in consumer surplus is apt to be small because the price of the organ is not likely to be high. Moreover, the federal End Stage Renal disease program could easily be expanded to cover the cost of the organs. And because of the savings acquired by getting patients off dialysis, this could be done without any increase in the overall budget.

95. The welfare improvement is a somewhat complicated function of the elasticity of demand and the elasticity of supply. A derivation of this function and the comparative statics analysis are available from the authors upon request.



surplus will be equal to area A. Under the altruistic system with non-price rationing, those who receive the organs may place a far lower value on them. In that event, total surplus will fall below the sum of areas A and B. Since there is no reason to suppose that a non-price rationing device will happen to identify those who place the highest value on the organs, one should expect the total surplus to be lower under the present system than it would be with a market system even with the peculiar supply curve assumed here.

D. *Indirect Benefits*

The analysis above demonstrates the unambiguous social welfare gain achieved by a switch from the current altruistic system to a market system. The additional kidneys that would become available under a market system would provide obvious direct benefits to recipients. Patients receiving these kidneys would experience improved health and would be relieved of the tiring process of dialysis. In addition to these direct benefits, however, there are several indirect benefits that would flow from a market regime.

First, an increase in the quantity of cadaveric kidneys supplied should lead to improvements in tissue matching between the transplanted organs and their recipients. In addition, the increased quantity supplied would allow surgeons to be more selective about the overall physical condition of the organs transplanted. Under the current system, the chronic shortage may at times force

surgeons to utilize less-than-ideal matches or low quality kidneys.⁹⁶ This of course results in a reduced rate of success in transplantation. The enhanced supply of organs expected to accompany movements to a market system of procurement, however, would make greater selectivity possible, and thereby improve cadaveric organ transplant success rates.

Second, an expansion in the number of cadaveric kidneys made available for transplantation would permit a reduced reliance upon living related (or unrelated) donors. The current costs to such donors in terms of lost time from work, the pain of major surgery, and the risks that result from loss of a kidney are not reflected in any current dollar figures. Nonetheless, such costs are very real to these donors. With the improvements that have been made in immuno-suppressive therapy over the past decade, such costs are probably no longer warranted by differential success rates between cadaveric and living related donors. Rather, the continued heavy reliance on the living donors is more likely due to the prolonged waiting period and uncertainty associated with the use of cadaveric donors. An increase in the quantity of such organs supplied would largely alleviate these problems.

Third, as noted above, people who have been approached concerning kidney donation also constitute the principal source of hearts and livers for transplantation.⁹⁷ That is, the procurement efforts of the End Stage Renal Disease program not only yield kidneys but other transplantable organs as well. An increased number of kidneys harvested under a market regime will therefore be accompanied by an increased number of hearts, livers, and other organs. Thus, patients in need of these other organs will also benefit from adopting a market system of kidney procurement. In fact, the enhanced supply of other organs may well be a primary source of the social benefits obtainable from such a policy.

Fourth, an increase in the quantity of organs supplied is likely to lead to reductions in the costs of performing transplant operations, especially hearts and livers, through learning curve effects.⁹⁸ For example, the cost of a kidney transplant has fallen from about \$100,000 to about \$25,000 over the 1962-1988 period.⁹⁹ Heart, liver, lung, pancreas, and other organ transplantations are now at a relatively early stage of development. A substantial increase in the number of such transplants performed annually could have a dramatic effect on the costs of these types of surgery. As these costs fall, the treatment would become available to an increasing number of individuals in need of such operations.

96. See Denise, *supra* note 4, at 1019.

97. See generally Protas, *Structure and Effectiveness*, *supra* note 14; Protas, *Organization of Procurement*, *supra* note 32.

98. See R. BLAIR AND L. KENNY, MICROECONOMICS WITH BUSINESS APPLICATIONS 295-99 (1987).

99. Hayes, *supra* note 67, at 8.

Finally, as the idea of harvesting cadaveric organs becomes increasingly less novel, the desire on the part of individuals to bury the body intact may wane. That is, community preferences concerning organ supply are likely to be affected by the existing procurement system and the success of that system. The increased rate of procurement under a market system appears likely to accelerate the erosion of whatever aversion to supplying organs at death currently exists. The result would be an outward shift in supply over time with a corresponding reduction in the market-clearing price.

E. Mechanics of a Market for Kidneys

In this Section we describe some of the concrete features a market for kidneys might display. It is first important to note that a fundamental prerequisite for the functioning of this system, or of any other market-based arrangement, is the legal clarification of property rights in this area. Physicians must be entirely confident that they have the legal right, or even obligation, to remove needed organs from the cadaver of a person who has executed a supply contract. That is, the contract should not be subject to renegotiation or unilateral cancellation by the family of the deceased. It should carry the legal force of a will with no right of contestment.¹⁰⁰

The supply contract, however, need not be irreversible. Those entering into such contracts could be allowed to buy back their agreement at any point at some appropriate price (perhaps, the original price paid to them plus interest). In fact, it would be feasible to allow surviving family members to engage in a similar buy-back if desired. Where the price is allowed to adjust to market clearing levels, such buy-back provisions will not lead to any chronic shortages.

In addition to the forward market, a spot market for kidneys and other organs could be instituted as well. Under a spot market arrangement, the organ procurement firm would approach the surviving family members of potential donors in much the same way that current organ procurement officers do. Similar appeals to altruism and the opportunity to salvage something good (helping someone else improve their health, or perhaps, even save their life) out of an otherwise tragic experience (the loss of the relative who is to be the donor) could be made by the organ collection firm's representative. Thus, a spot market for cadaveric organs would function in much the same way as the current system.

There would be two important differences between the market system (whether spot or forward) and the current altruistic system. First, under the market system, either the donor (with a forward market) or the donor's surviving family members (with a spot market) would receive compensation in

100. This provision is necessary because organs are extremely perishable.

exchange for the organs supplied. For example, under the spot market arrangement, the surviving family members would be offered some payment (determined by the market) in exchange for allowing the organs to be removed. Such payment would function like a premium-free, term life insurance policy on the deceased.

The second important difference between these two systems of cadaveric organ procurement is that the market system introduces an additional party with a direct profit incentive to see to it that potential organ donors or their families are informed about the opportunity to donate (or sell) their organs.¹⁰¹ Under the present system, a major reason for the low collection rates we observe is that no one in the system has a direct profit interest in assuring that potential donors are, in fact, asked to donate. Since requesting a donation is an unpleasant task and since no one with responsibility to discuss the issue with surviving family members has any financial stake in performing this task, in most cases it simply does not get done. That is, in all likelihood, the primary cause of the low organ collection rate (or the organ shortage) under the current system is that potential organ donors are never asked to donate.¹⁰² This flaw in the current system would be corrected under a market approach to cadaveric organ procurement.

Since a major cause of the organ shortage may be the failure to ask potential donors to donate, one may reasonably ask why Congress has not simply passed a law requiring physicians to ask patients and their families for organ donations. In fact, many states do have required request laws. These laws place a legal obligation upon the physician or someone on the hospital staff to raise the issue of organ donation.¹⁰³ Most of these statutes, however, provide exemptions that can undermine the effectiveness of the legislation.¹⁰⁴ Moreover, raising this issue during the critical few hours immediately following a death imposes substantial psychological stress on the physician as well as on the grieving family. If the requests for organ donations were made, the kidney shortage might vanish,¹⁰⁵ but since it has not vanished, we infer that they are

101. There is little danger that these private procurement firms will be offensive in dealing with the families of dying or recently deceased people. The market will discipline those firms that are prone to tasteless excesses. In the funeral industry, for example, competition among funeral homes does not result in unseemly bidding for business.

102. This second distinction is extremely important to keep in mind in discussions of alternative organ procurement policies. For example, some parties are currently advocating the compensation of donors by the government under the current system as a solution to the organ shortage. Peters, *supra* note 8. Compensation alone would alleviate the shortage only if the cause of low collection rates is a refusal to donate by surviving family members. If, on the other hand, low collection rates are due to a failure of the current system to provide a sufficient incentive for anyone to request donation from surviving family members, then compensation alone will not solve the organ shortage.

103. See Rodgers, *Legal Framework for Organ Donation and Transplantation*, 24 NURSING CLINICS OF N. AMER. 837, 840 (1989).

104. *Id.*

105. See Silver, *supra* note 7, at 707 (contending that "...an emerging wisdom now attributes inadequate organ supply not to a dearth of consents but to a dearth of requests.").

not being made.¹⁰⁶ Finally, statutes that require individuals to perform disagreeable tasks must be enforced, which in this case is highly problematic.¹⁰⁷ In sum, an important feature of the market is that it offers incentives for participation to all parties.

A number of alternative market structures are possible for implementing a market system of procurement. The two extremes are a government-operated or regulated monopoly and a competitive private market. Under the former, an agency of the federal government such as the Health Care Financing Administration (which funds current procurement efforts) would establish the price and make payments to those individuals entering into supply contracts. The agency could then charge organ recipients (or their insurance companies for those with insurance coverage) the average cost of the organs actually collected and used.¹⁰⁸ Alternatively, it could include these procurement expenses under the current End Stage Renal Disease program and provide the organs to recipients free of charge.

Under a competitive private market system, procurement firms (much like the current organ procurement agencies) would pay individuals to supply organs. These firms then would collect the organs at death and sell them to transplant centers for use in transplantation. Under this system, the transplant centers could incorporate the price paid for organs as a part of the overall bill for the transplant procedure. With free entry into and exit from the organ procurement business, such a market would yield competitive market-clearing prices.¹⁰⁹

As we noted earlier, however, for either of these systems to function effectively, property rights must be clearly defined and enforced.

IV. Reassignment of Property Rights

An alternative to both the current system of procurement and our proposed market system involves a reassignment of property rights in cadaveric organs from the supplier to either the recipient or to the state, acting on behalf of the recipient.¹¹⁰ As Nobel Laureate George Stigler has pointed out, government

106. *Id.* at 708.

107. See Cohen, *supra* note 6, at 21 (pointing out that required request statutes succeed in imposing neither positive nor negative incentives on doctors or hospitals).

108. The average cost of the organs collected under this system would exceed the price paid to individuals for signing supply contracts. This is true because many (or most) of the supply contracts would fail to yield a transplantable organ due to death in unfavorable circumstances (age, illness, and so on).

109. The cost structure of the organ procurement function determines which of the above options would be most effective. If this cost structure is characterized by large economies of scale, then a single collection agency may be optimal. But if economies of scale are exhausted at relatively low levels of collection (as seems more likely), then a competitive private market will yield lower costs and lower prices.

110. See, e.g., Butler, *supra* note 9; Caplan, *supra* note 12; Dukeminier, *supra* note 7; Dukeminier & Sanders, *supra* note 9; Jaffe, 'She's Got Bette Davis's Eyes': Assessing the Nonconsensual Removal of Cadaver Organs under the Takings and Due Process Clauses, 90 COLUM. L. REV. 528 (1990); Matas, Arras,

has a monopoly over legal coercive powers,¹¹¹ which it uses regularly to define and redefine property rights in a wide variety of situations. For example, the pollution laws of the past two decades have significantly circumscribed the rights of firms to make free use of water and air resources as convenient garbage dumps.¹¹² Additional examples abound.¹¹³ The point is that government, through its power to define and redefine property rights, can exert a tremendous influence over the allocation of resources. Cadaveric organs for transplantation are no exception.

Among the many ways in which property rights could be reassigned, we shall examine one. Specifically, we assume that property rights to the organs of deceased individuals are reassigned to potential organ transplant recipients, and the current policy of a zero price is maintained.¹¹⁴

A. Presumed Consent Distinguished

A policy that effectively reassigns property rights should not be confused with the policy of "presumed consent," which has been adopted in at least fourteen European countries.¹¹⁵ Under presumed consent, physicians and organ procurement personnel are presumed to have the individual's and surviving family members' consent to remove needed organs at death unless these potential suppliers expressly make their preferences to the contrary known beforehand. Since organ suppliers can "buy back" their organs at a price of zero simply by stating their unwillingness to donate, however, they effectively retain property rights to their organs under this policy.¹¹⁶ The economic effect of such a policy is to reduce the transaction costs of obtaining a donated organ and to shift these costs from the organ procurement representative to the organ

Muyskens, Tellis, & Veith, *A Proposal for Cadaver Organ Procurement: Routine Removal with Right of Informed Refusal*, 10 J. HEALTH POL., POL'Y & LAW 231 (1985); Silver, *supra* note 9; Stuart, Veith, & Cranford, *supra* note 12.

111. Stigler, *The Theory of Economic Regulation*, 2 BELL J. ECON. & MGMT. SCI. 3 (1971).

112. See, e.g., Clean Air Act, 42 U.S.C. § 7401-7642 (1988), Water Pollution Control Act, 33 U.S.C. § 1251-1376 (1988) and their subsequent amendments.

113. For economic and legal analyses of property rights, see generally ECONOMIC ANALYSIS OF PROPERTY RIGHTS (Y. Barzel ed. 1989); ECONOMIC FOUNDATIONS OF PROPERTY LAW (B. Ackerman ed. 1975); THE ECONOMICS OF LEGAL RELATIONSHIPS (H. Manne ed. 1975); THE ECONOMICS OF PROPERTY RIGHTS (E. Furubotn & S. Pejovich eds. 1974).

114. Alternatively, property rights could be reassigned, and the market price then allowed to rise to its equilibrium level. This approach would yield the same outcome (in terms of both price and the number of organs transplanted) as a market-based system with property rights vested in potential organ suppliers. The only difference that would occur with this reassignment of property rights is that potential organ recipients would receive monetary compensation for those organs that potential suppliers wish to purchase in order to bury. Thus, the flow of payment would be reversed with a reassignment of property rights; but if the market were allowed to function freely, the number of organs obtained for transplantation would be unaffected.

115. Cohen, *supra* note 7, at 15; Caplan, *supra* note 12, at 24.

116. If potential suppliers were required to pay for the right to retain their organs at death, then presumed consent would be equivalent to a reassignment of property rights with buy-back privileges.

supplier. Thus, property rights are not reassigned with presumed consent, but the manner in which they are exercised is altered. As a result, presumed consent is simply another (potentially more effective) method for shifting the supply curve outward at a zero price under the current altruistic system.

Presumed consent is not free of criticism. Most importantly, it does not appear to remove the organ shortage. Stuart, Veith, and Cranford¹¹⁷ report that those countries with presumed consent statutes continue to experience shortages, which they attribute to the absence of appropriate incentives for hospital-based physicians and nurses to participate fully.¹¹⁸ There are, however, other problems with presumed consent. First, it is exploitive in the sense that many people are reluctant to expressly revoke consent, which is however necessary if one does not want the organs harvested.¹¹⁹ To the extent that presumed consent works because people hesitate to object to something that they do not want done, this policy has an unsound foundation. Second, presumed consent may also exploit ignorance or temporary confusion. Most organs are harvested from accident victims. Their families may not take the affirmative step of objecting to organ removal at that critical point when a loved one dies either because they are unaware of the imminent removal of the organs or because they do not think about it in their time of grief.¹²⁰ Third, presumed consent raises some thorny constitutional issues.¹²¹ Jaffe contends that under the Due Process Clause presumed consent will not afford patients and their families adequate notice and an opportunity for objecting.¹²² Furthermore, under the Takings Clause, the state must provide just compensation.¹²³ Ordinarily, just compensation means fair market value.¹²⁴ If that is the case, money is going to change hands anyway and we may as well rely upon market forces.

B. True Reassignment of Property Rights

In contrast to presumed consent, with a true reassignment of property rights, potential suppliers no longer own the cadaveric organs, and consequently, are

117. See Stuart, Veith, & Cranford, *supra* note 12, at 239.

118. See *infra* Section B.

119. Silver, *supra* note 9, at 706.

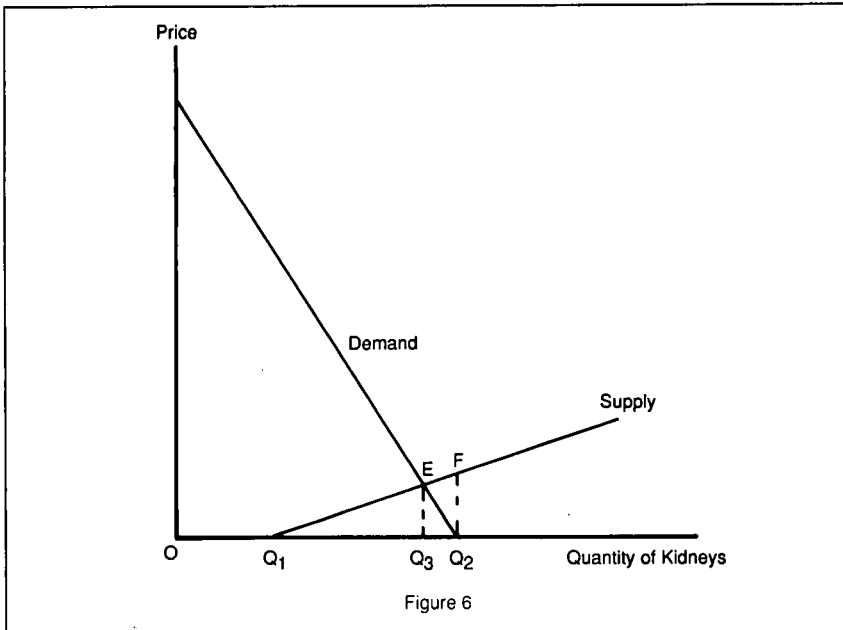
120. See Silver, *id.* (referring to this as "conscriptio in disguise," which seems apt. Silver also points out that families who are aware of the imminent organ removal face the strain of deciding whether to object at a time when one should not have to make difficult decisions).

121. Silver, *id.*, at 708-18; see also Jaffe, *supra* note 110, at 547. Some serious constitutional conflicts could also arise due to religious beliefs. For some thoughts on the religious ramifications of transplants, see May, *Religious Obstacles and Warrants for the Donation of Body Parts*, 20 TRANSPLANT. PROC. 1079 (1988); Sachedina, *Islamic Views on Organ Transplantation*, 20 TRANSPLANT. PROC. 1084 (1988); Weiss, *Organ Transplantation, Medical Ethics, and Jewish Law*, 20 TRANSPLANT. PROC. 1071 (1988).

122. Jaffee, *supra* note 110, at 561-67.

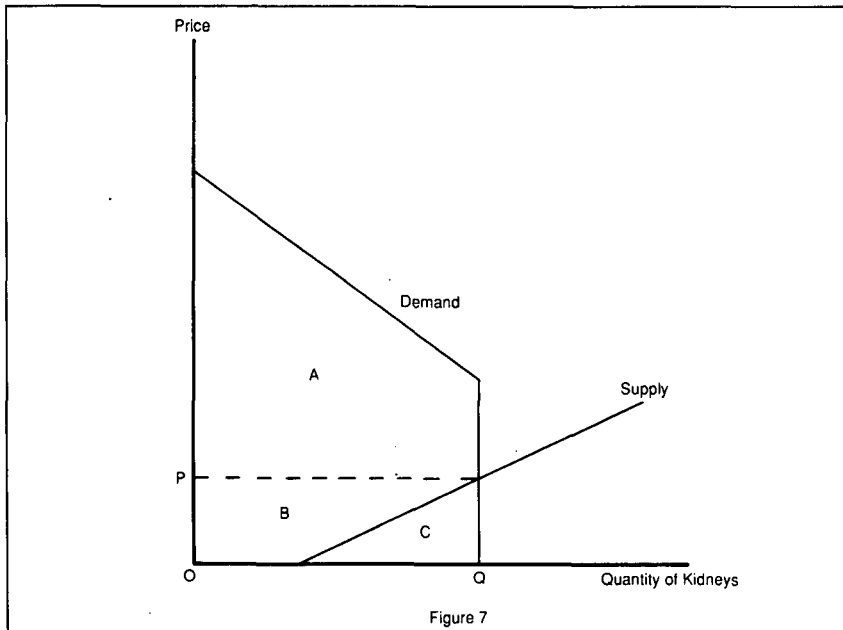
123. *Id.* at 571.

124. See Jaffee, *id.* at 571-72 (examining alternate ways of determining just compensation).



unable to wield any power over their use. The outcome under this policy is the complete elimination of the shortage as shown in Figure 6, which reproduces the supply and demand curves of Figure 4. Given the right to collect desired organs at a price of zero, potential transplant recipients will choose to obtain a total of Q_2 organs from cadavers. Thus, the number of transplants performed under this policy is apt to exceed, by a small amount, the number performed under a market-based system (which, in turn, exceeds, by a large amount, the number performed under the current system). The size of the increase relative to the current system, which is $Q_2 - Q_1$, may be quite substantial. Due to the relatively inelastic demand, however, the size of the increase relative to a market system, which is $Q_2 - Q_3$, is likely to be comparatively small. This latter increase is entirely due to the demand-side effect of the reduction in price from its (relatively low) market equilibrium level to zero. The steeper the demand curve at point E (i.e., the less elastic the demand) the smaller will be the quantity response to any given price change.

In fact, it is conceivable or even likely that the demand for transplantable organs is totally price inelastic (i.e., vertical) at low prices. If that is the case, then the market-based system and the reassignment of property rights will yield exactly the same number of transplants (i.e., Q_2 and Q_3 will converge). A major difference between these two policy options in that case would be the distribution of the benefits of exchange. Under the market system, these benefits are shared between organ suppliers and recipients; but under the reassignment of property rights, organ recipients receive all of the benefits of exchange and



organ suppliers receive none. These distributional effects result from the difference in price under these two alternative regimes—a positive price with market exchange and a zero price with a redefinition of property rights.

This result is displayed in Figure 7, which reproduces the supply curve of our earlier figures but represents demand as vertical or perfectly inelastic at low prices and negatively sloped at higher prices. Under a market system, the intersection of demand and supply will yield the socially optimal quantity equal to Q and the socially optimal price of P . Consumer surplus is represented by area A while producer surplus is represented by area B . The total social surplus is the sum of areas A and B . In contrast, the reassignment of property rights will result in the same quantity but a price of zero. Consumers surplus is equal to areas A plus B plus C . Producer surplus is negative and equal to at least area C . In this case, consumers (recipients) get all of the benefit while producers (donors) suffer a net loss.

Since any redistribution of benefits within a society is a pure transfer between the affected groups, overall social welfare would appear, at first blush, to be the same under either policy when demand is perfectly inelastic. This initial impression, however, is incorrect. Since price is not allowed to perform its rationing function under a redefinition of property rights, kidneys will not be taken first from those donors who place a relatively low value on them. Instead, the Q kidneys that are collected will be drawn at random from the population of potential donors. Unlike the market system, a redefinition of property rights does not differentiate between donors who place a relatively low

value and donors who place a relatively high value on burying the body with the organs intact. As a result, even though the number of organs transplanted will be the same under these two policies where organ demand is perfectly inelastic, social welfare will be unambiguously higher under the market-based procurement system.

When the demand curve is not perfectly inelastic at low prices, both the number of transplants performed and social welfare will differ under these two alternative policies. In this case, as before, overall social welfare will be unambiguously lower under the reassignment of property rights approach. To see this, we make use of our earlier interpretation of overall social welfare.¹²⁵ As we move from point Q_3 to point Q_2 in Figure 6, there is a gain in consumer surplus equal to the triangle EQ_3Q_2 . This area represents the additional benefits received by organ recipients as a result of lowering the price to zero. At the same time, however, there is negative producer surplus created that is at least as large as the quadrangle EQ_3Q_2F . This area represents the minimum value to suppliers of the additional organs given up for which no compensation is received. The difference between the sum of the consumer and producer surplus under these two alternative systems is represented by triangle EQ_2F . This is the minimum decrease in social welfare caused by the reassignment in property rights, which forces people who value their organs to surrender them at a zero price.

The actual loss in value to organ suppliers may in fact be even greater. As we discussed above, given a price of zero, the Q_2 organs harvested will be drawn from potential suppliers at random instead of taking them in ascending order of the value placed on them by their owners. That is, some of the organs transferred from donors to recipients may have a value to their current owners far above point F on the supply curve. As a result, the area given by EQ_3Q_2F provides a lower bound on the negative producer surplus created by the reassignment of property rights. It is apparent that the loss in producer surplus swamps the gain in consumer surplus, and that social welfare therefore declines as a result of moving from a market system to a reassignment of property rights.¹²⁶

In addition to its economic shortcomings, a reassignment of property rights appears to be inferior to a market system of cadaveric organ procurement on ethical grounds as well. Under the latter policy, organ suppliers willingly exchange the organs of the deceased for some form of payment; while under the former policy, the organs are simply taken regardless of the religious or moral beliefs of the donor or the donor's family and regardless of the monetary

125. See *supra* Figure 4 and accompanying text.

126. The precise magnitude of the superiority of the market system over a reassignment of property rights depends upon the elasticities of supply and demand. A derivation is available from the authors upon request.

value these individuals place on being able to bury the body intact. That is, the reassignment of property rights makes no distinction whatsoever among individuals who may place vastly divergent values on burying the organs of the deceased. Consequently, this policy eliminates these individuals' rights to decide how the remains are to be buried. As a result, it is unlikely to enjoy widespread support in a society that places a high value on individual liberties.

In comparing the market system to this reassignment of property rights, we conclude that there may be somewhat fewer transplants with the market system, but that social welfare will be unambiguously higher. Thus, the market system is superior and should be the socially preferred policy. Given the presumed relative elasticity of supply, however, the current altruistic system is inferior to either of these alternatives in terms of the number of transplants performed. Moreover, the altruistic system is clearly inferior to the market system in terms of the social welfare criterion.¹²⁷ And, given a price elastic supply and a price inelastic demand, it is likely that the altruistic procurement policy is also inferior to the reassignment of property rights on social welfare grounds. Thus, the present policy appears to represent the worst of all worlds in terms of both the number of transplants performed and the social welfare achieved.

V. Economic Objections to a Market for Kidneys

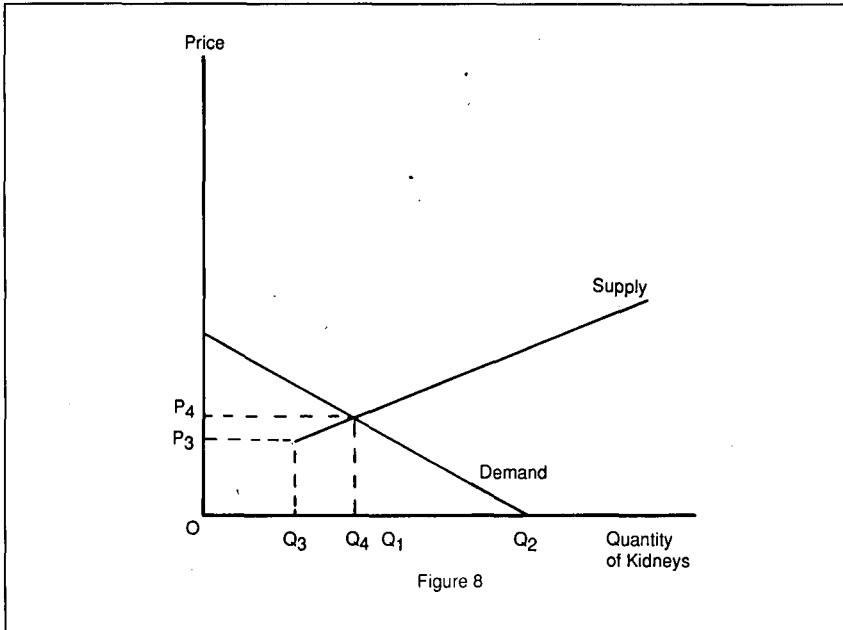
In spite of the persuasive case for reliance upon the forces of supply and demand to alleviate the organ shortage, there have been two economic arguments made against using the market system.¹²⁸ First, it is argued that the market environment may cause some former altruists to refuse to supply their organs at death. Second, opponents of a market system claim that such a system may cause the quality of the organs supplied to be lower. We examine these economic objections here and defer treatment of the ethical concerns to a later section.

A. *Discontinuous Organ Supply*

The first economic argument against a market system involves the possibility of a discontinuous organ supply curve at prices above zero. Several commentators have argued that implementing a positive price (compensating the donor or the donor's family) would reduce the desire of some individuals to donate

127. See *supra* Figures 4 and 5 and accompanying text.

128. Those who prefer the altruistic system rarely offer any persuasive economic objections to a market system. More typical is some conclusory statement without much support. See, e.g., Note, *Regulating the 'Gift of Life': the 1987 Uniform Anatomical Gift Act*, 65 WASH. L. REV. 171, 181 (1990) (asserting that "[t]he present altruistic system offers social benefits that outweigh the speculative increase in organ supply promised by adding financial incentives.").



their organs.¹²⁹ In other words, while some people who will not donate at a price of zero might be encouraged to supply organs at a positive price, others who are willing to donate their organs freely would refuse to supply their organs at all if compensation were offered.¹³⁰ If the number discouraged from donating exceeds the number encouraged to sell, then the actual quantity of kidneys made available for transplantation could fall with an increase in price above zero. That is, the supply curve could exhibit an acute discontinuity near the horizontal axis. It would then appear as in Figure 8 where supply jumps

129. There is some weak evidence that such a discontinuity may exist. The impact on supply when blood sales were first allowed in the United States apparently reflected this type of behavior. *See generally* R. TITMUS, *THE GIFT RELATIONSHIP* 64-67 (1970); Denise, *supra* note 4. In addition, survey evidence indicates that the phenomenon may carry over to organ supply as well. *See* Pessemier, Bemmaor, & Hanssens, *Willingness to Supply Human Body Parts: Some Empirical Results*, 4 J. CONSUM. RES. 131 (1977); *see also* Lee, *The Organ Supply Dilemma: Acute Responses to an Acute Shortage*, 20 COLUM. J. L. & SOC. PROB. 363, 398-99 (1986). *But see* Hansmann, *supra* note 9, at 67-68 (pointing out that too much may have been made out of the blood supply experience). First, donation rates of those strongly predisposed to donate blood fell, but those who were not so predisposed were more inclined to donate for a relatively low price. Second, the low price offered may have given a false signal to the donors regarding the value of the blood. Finally, it is not clear that such experiments would carry over to organs that are to be harvested after death.

130. *See* Manga, *supra* note 56, at 328 (explaining the logic of this reaction: "The commercialization of organs ... affects the meaning of the gift to the donor. When unpriced, it is often perceived to be a 'priceless' gift essential to the saving of a life. With its commercialization it has a price, one which merely denotes how much a donor is saving the procurement agency should he decide to donate it rather than sell it." As a result, "the pricing of organs may be said to diminish the value and meaning of the voluntary donation of organs.").

from Q_1 at a zero price to Q_3 at a price of P_3 with the implementation of positive prices.

If such a discontinuity is present, then an important empirical question is the magnitude of the difference between Q_1 and Q_3 . In other words, how much supply restriction is likely to occur with implementation of cadaveric organ sales? In addition, the size of the price elasticity of supply above P_3 becomes an extremely important empirical issue in the event such a discontinuity is present. If supply is relatively flat above this point, then any reduction in the quantity supplied in moving from Q_1 to Q_3 may be more than compensated for by increasing price above P_3 .

It is important to know whether a discontinuity exists because the presence of a supply discontinuity could influence the optimal method of reimbursement under a market-based system of organ procurement. A bifurcated payment scheme similar to the current method used to obtain blood may permit policy makers to simultaneously move along both segments of the supply curve.¹³¹

Thus, individuals interested in selling their organs at death could be offered direct compensation while those more prone to donate could be offered an indirect incentive such as guaranteed free access to needed organs in the event they should require a transplant themselves. For higher income individuals, this sort of payment in kind may be worth more than direct monetary compensation because of the taxes that are thereby avoided. Obviously, other possible methods exist for discriminating between individuals who are willing to donate and those who must be paid.

Impact on Number of Transplants If there were a significant discontinuity in the kidney supply function, it is theoretically possible that movement to a market-based system of procurement could result in fewer transplant operations being performed. Such a possibility is depicted in Figure 7; where the market equilibrium occurs at a price and quantity of P_4 and Q_4 , respectively. Altruistic supply, however, yields Q_1 kidneys for transplantation at a price of zero. Thus, movement from the current altruistic policy to a market regime apparently leads to a net reduction of $Q_1 - Q_4$ transplantable kidneys. By this logic, adoption of a market based procurement policy does not guarantee an increase, and could even lead to a reduction, in the number of cadaveric kidneys made available for transplantation.

This hypothetical, however, deserves considerable skepticism. Two observations indicate that a market system of procurement would not be likely to create a reduction in the number of transplants. Rather, it appears to assure a substantial increase. First, kidney demand is, in all likelihood, highly price inelastic, meaning that the quantity demanded will not fall much in response to an

131. But see Note, *Regulating the 'Gift of Life'*, *supra* note 125, at 178-80 (recognizing this possibility, but deferring to the current system apparently due to the current federal law).

increase in price. And second, the current system yields substantial excess demand. In terms of Figure 8, this means that (a) the distance between Q_1 and Q_2 is large, and (b) the demand curve is steep above Q_2 . Given these observations, then, it is highly unlikely that supply and demand will intersect at a quantity smaller than Q_1 . For example, in Figure 8, it was necessary to draw the demand curve as being highly elastic in order to yield a reduction in the number of organs collected. This is simply not the case for transplantable organs. Demands for these organs are steep (or highly inelastic). Thus, it seems extremely farfetched to claim that adopting a market-based system of organ procurement would lead to a net reduction in the number of organs made available for transplantation as a result of discontinuous supply. The situation depicted in Figure 4 is far more plausible. We conclude, therefore, that a market-based procurement policy will yield more (and, in all likelihood, substantially more) kidneys than the current altruistic system.

B. *Deterioration of Organ Quality*

The second economic argument regarding the use of a market system of procurement involves the potential effect on the average quality of the organs harvested.¹³² Substituting payments for altruism is likely to reduce the relative, although not necessarily the absolute, number of organs obtained from comparatively higher income individuals. To the extent that there is a positive correlation between health and income, adopting a market system may decrease the average quality of the organs obtained for transplantation. Thus, some argue for preserving the current altruistic system in order to maintain organ quality.¹³³ By selecting the current system over a market system, we are seen to be trading quantity for quality. And since organ quality is an important factor influencing the success of the transplant operation, such a tradeoff appears, at first blush, to be potentially justifiable.¹³⁴

Two considerations, however, indicate that the organ quality argument is greatly overstated. First, it is not at all clear that the presumed drop in average quality will materialize. While the forces described above may operate in that direction, other (perhaps, more powerful) forces operate in the opposite direction. As we pointed out earlier, under the current shortage conditions, surgeons

132. See Rose-Ackerman, *Inalienability and the Theory of Property Rights*, 85 COLUM. L. REV. 931 (1985) (pointing to quality control as a possible justification for modified inalienability, which permits donations, but does not permit sales).

133. Rose-Ackerman, *id.* at 947 (pointing out that "the quality control benefits of gift giving operate only on the supply side of the market."). There is no quality control argument against selling the organs to the patients.

134. Rose-Ackerman, *id.*, (also recognizes that "undersupply may continue to be a serious problem.").

may be tempted, or even forced, to make use of substandard organs.¹³⁵ The increased number of organs that would become available under a market system of procurement, however, would enable physicians to exercise greater selectivity in screening acceptable organs for transplantation. Organ quantity and organ quality are not independent variables. Through enhanced screening procedures, an increase in quantity can lead to a corresponding increase in quality.

Second, transplant centers or collection agencies, either the government or private firms, are able to distinguish organ quality *ex ante* (prior to the transplant operation). The organs for transplant come from cadavers. The organs cannot be compared to blood collected from living donors who might be infected. For organs, the donor pool is the set of accident victims. Paying for organs will not increase the supply of dead people. Hospitals can and routinely do conduct tests to detect the presence of disease or drug use. Consequently, a potential decrement in the average quality of organs collected need not lead to a decrement in the average quality of organs transplanted. Surgeons performing transplant operations can establish minimum quality standards, and the market price can adjust to yield an adequate supply of organs that meet these standards. We conclude, therefore, that the quality of organs transplanted is likely to improve rather than deteriorate with the adoption of a market system of procurement.

VI. Ethical Arguments Against a Market System

Despite the clear superiority of a market-based system of procurement on social welfare grounds, and despite the glaring inferiority of the current altruistic system relative to both of the alternative policies analyzed above, dependence upon altruism has persisted in the United States for at least the past twenty years. Advocates of the altruistic system of procurement argue that it is superior to a market system on moral or ethical grounds.¹³⁶ Both the American Medical Association and the American Hospital Association have expressed their support of the current system and their ethical opposition to a market-based approach.¹³⁷ Moreover, three separate transplant associations have recently passed resolutions that allow for expulsion of any member who

135. See *supra* note 96 and accompanying text.

136. See, e.g., R. TITMUS, *supra* note 129, at 73 (arguing that "[t]he social relations set up by gift exchange are among the most powerful forces which bind a social group together."). See also Task Force On Organ Transplantation, ORGAN TRANSPLANTATION: ISSUES AND RECOMMENDATIONS 28 (1986) (Altruism "...promot[es] a sense of community through acts of generosity."). But see Hansmann, *supra* note 9, (examining some of the ethical issues raised by having a market for organs. His analysis shows that many of these concerns have been asserted without much, if any, analysis).

137. See Schwindt & Vining, *supra* note 9, at 485.

takes part in organ purchases and sales.¹³⁸ One such resolution characterizes a market system as "abhorrent" and "completely morally and ethically irresponsible."¹³⁹ This strong opposition to a market-based approach to organ procurement is ostensibly grounded on ethical concerns.¹⁴⁰ Since the implementation of virtually any change in procurement practices will require the cooperation of these professionals, it is essential to fully explore the logical basis for their policy position.

Although ethical concerns with a market system are often poorly articulated,¹⁴¹ three major issues appear to dominate discussions in this area. The first concern is that the poor may be economically coerced into supplying organs.¹⁴² The second concern is that if kidneys must be purchased, relatively low income individuals may not be able to afford a transplant.¹⁴³ Third, some concern has been expressed about the potential effects on the incentive to maintain adequate care for critically ill patients.¹⁴⁴ We evaluate each of these points in turn.

A. Economic Coercion of the Poor

Voluntary exchange between a willing buyer and a willing seller usually cannot make either party worse off and typically makes both parties better off. However, commentators argue that a market for organs may induce the poor to sell their organs out of need; this phenomenon, they argue, constitutes coercion. The absence of a market in organs, by this logic, actually protects them from doing something that they do not want to do. This reasoning, however, is seriously flawed and completely misconstrues the nature of coercion and voluntary exchange.

138. See Denise, *supra* note 4, at 1035. See also Cohen, *supra* note 7, at 24 n.8 (noting that these associations are the American Society of Transplant Surgeons, the American Society of Transplant Physicians, and the International Transplantation Society).

139. Denise, *supra* note 4, at 1035.

140. Not all physicians share this view. For example, one transplant surgeon, who is chairman of the United Network for Organ Sharing donations Committee, has said that "... the public has to make a decision as to whether they would rather see people die on dialysis while leading a fairly unsatisfactory life . . . or allow the buying and selling of human organs." See Bailey, *Should I Be Allowed To Buy Your Kidney?*, 36 BREAKTHROUGHS 41 (1991).

141. See, e.g., Calabresi & Melamed, *Property Rules, Liability Rules, and Inalienability: One View of the Cathedral*, 85 HARV. L. REV. 1089, 1112 (1972) (referring to nonmonetizable external costs suffered by those opposed to the sale of organs as moralisms that result in rules of inalienability). The difficulty with such a rule is that the benefits to the participants in a market transaction can be outweighed in the political process by some nonmonetizable distress experienced by a large group of nonparticipants. Nearly any tyranny of the majority can be justified on this basis.

142. See, e.g., Manga, *supra* note 56, at 325-26; Note, *Regulating the 'Gift of Life,' supra* note 128, at 178; See also Forum: *Sacred Or For Sale?*, 281 HARPER'S 47 (1990) (William May, a medical ethicist, predicts that "[t]he rich would buy and the poor would sell.").

143. See, e.g., Manga, *supra* note 56, at 324 (claiming that "[t]he allocation of organs on the basis of ability to pay obviously violates the egalitarian ethic of distributive justice....").

144. See, e.g., Cohen, *supra* note 7, at 9.

The essence of coercion is to induce an action through force or threat. As Fried points out, "a threat worsens the recipient's situation."¹⁴⁵ For example, it is obvious that the mugger's challenge - "Your money or your life" - is fundamentally different from entering into a voluntary exchange. The mugger's challenge is coercive because she offers a choice between two alternatives, both of which make the recipient worse off. In contrast, it cannot be coercive merely to solicit the sale of a valuable asset.

We must be very careful to distinguish allocative matters involving the market from inequities inherent in the distribution of society's wealth. This confusion can be exemplified in William May's concern for distributional equity. As he points out, "A poor mother who sells her organs in order to save her child is acting nobly. But that noble act does not redeem the tawdriness of a social system that would force a poor parent to help her child that way."¹⁴⁶ No one applauds an income distribution that offers no better way to save a poor child. Nonetheless, foreclosing the only option available to the poor mother does not cure the social malady.

Several medical ethicists have expressed opposition to the use of market forces (compensation) to increase cadaveric organ supply on the grounds that families of deceased individuals may be "economically coerced" into agreeing to organ sales that violate their fundamental religious or moral beliefs.¹⁴⁷ There are at least four major problems with the economic coercion argument. First, it is paternalistic in nature. In effect, the ethicist substitutes his or her own values for those of the individuals involved in the transaction. For example, May argues that "[t]he human body is . . . an organism with organs. I not only have a body; I am my body. It is my means of self-presentation to the world, and if, in response to some need, I act to contribute part of it, the appropriate form should be giving, not selling."¹⁴⁸ Every scholar argues that their view should be accepted by others. If one accepts the basic concept of individual liberty, then one must also adhere to the view that individuals should generally be free to make and be held responsible for their own decisions.¹⁴⁹ Given this view, a voluntary exchange by two parties cannot involve coercion of any kind, economic or otherwise.¹⁵⁰

145. Harper's Forum, *supra* note 142, at 51.

146. *Id.*

147. One interpretation is that individuals value the ability to commit themselves against actions that *ex ante* they prefer not to do, but *ex post* would find in their self interest. In other words, an individual might gain from a ban on organ sales because *ex post* he will be unable to resist the financial incentives to sell his relative's organ whereas *ex ante* he would prefer that the organs be buried. As the text indicates, we are not persuaded that this preference by some justifies a ban that applies to all.

148. See Harper's Forum, *supra* note 142, at 51.

149. Moreover, to the extent possible, one should be free from the dictates of those who seek to impose their values upon others.

150. But see Eisenberg, *The Bargain Principle and Its Limits*, 95 HARV. L. REV. 741 (1988). Eisenberg might argue that a contract to sell an organ, entered into because of the donor's economic distress, is unconscionable and, therefore, should not be enforced on equitable grounds. But this does not resolve the

We assume that individuals who accept compensation in exchange for the organs of a recently deceased family member have weighed the benefits of such compensation against the "costs", if any, of not burying these organs. If the outcome of that decision process is to sell the organs, then it must be that these individuals are made better off by their voluntary choice.¹⁵¹ Perhaps they may be consoled by the fact that the decision to sell the organs will bring improved health to the ultimate recipients of those organs. In any event, they will receive reimbursement that may help with medical bills, funeral expenses, and the like. Since most organ donors are relatively young accident victims, these expenses are generally unexpected, and many families are unprepared for them. The organ sales may permit the family to afford the sort of burial that they want, allowing them to escape another form of ostensible economic coercion.¹⁵²

A second problem with the economic coercion argument is that it presumes that the market-clearing price of cadaveric organs will be sufficiently high to provide a financial incentive that overrides fundamental religious or moral beliefs. Economic reasoning, however, suggests that the equilibrium price of cadaveric organs is likely to be low in comparison to the prices at which living donors have sold kidneys in other countries.¹⁵³ Although there is no reliable way to predict free market prices in the absence of a free market, one author estimates that cadaveric organs would probably sell for less than \$5,000 each under a market system.¹⁵⁴ Two sets of facts support this claim: First, at present, we collect less than fifteen percent of the cadaveric organs that would be suitable for transplantation.¹⁵⁵ Consequently, a tremendous increase in supply is physically possible. Second, survey evidence suggests that many potential donors fail to donate organs simply because they are never asked.¹⁵⁶ Moreover, this same evidence reveals neither strongly held widespread religious nor moral opposition to the concept of organ donation. Therefore, by providing a profit incentive for someone to request donation and by providing a (albeit small) financial incentive to agree to donation, a market system could produce

issue of whether willing buyers and willing sellers should be precluded from entering such a contract. See also Epstein, *Unconscionability: A Critical Reappraisal*, 18 J. L. & ECON. 293 (1975).

151. See Hansmann, *supra* note 9, at 72-74 (examining protection of the poor and improvident as a rationale for rejecting the market system). Hansmann appears to be unconvinced, as are we.

152. At the risk of introducing some serious complications by considering live donors, one may point to the following circumstance. An Australian woman, who had lost her home to fire and had no insurance, grew tired of the constant economic struggle to support herself and her children. She offered to sell one of her kidneys for \$20,000. *Kidney Sales Spur Attempt in Britain to Ban the Practice*, *supra* note 53, at A5, col. 2. Forbidding this transaction is supposed to make her better off. But how would one explain that to her? We would prefer not to attempt it.

153. We are relying upon our prior reasoning that suggests that the supply curve of organs may be relatively flat.

154. Cohen, *supra* note 7, at 35. If this number were accurate, the total value of all cadaveric organs would amount to some \$30,000 - \$35,000, which would be somewhat more financially attractive. But in any case, for the reasons stated in Section II.B., *supra*, we believe this to be an overestimate.

155. Denise, *supra* note 4, at 1020.

156. See *Interchangeable Parts*, *supra* note 24, at 61.

a large supply of organs available at a relatively low price. This, in turn, means that whatever "economic coercion" may be involved in this transaction will be small, and any strongly held beliefs will simply lead to a refusal to sell.

Third, if we are going to base our selection of policy options on the sole criterion of the degree of coercion involved, then we must look at the market system not in isolation but in comparison to our existing system. A market system would create a mechanism for voluntary exchanges at mutually agreeable prices. Under the current system, a physician, nurse, or organ procurement officer must try to coax the family of the deceased into giving away an asset that is likely worth several thousand dollars for free. Which system involves greater coercion? By favoring the current altruistic system over the market system, the medical ethicist is merely substituting moral or emotional coercion for the alleged "economic coercion" that would accompany a market system.¹⁵⁷

Finally, those commentators who argue that the market system is economically coercive must take responsibility for the high price extracted under the current policy to avoid such coercion. In effect, defenders of the present system are trading lives for a policy that they personally prefer because of its reliance upon altruism.

B. *Transplant Accessibility for the Poor*

It appears that a second major concern preventing the adoption of a market-based system of organ procurement in the United States is access to transplants by the poor.¹⁵⁸ At least one commentator feels that under a market system of procurement only wealthy individuals will be able to afford transplants.¹⁵⁹ This concern is ill-founded. In order to clarify the likely effects of adopting a market-based system of procurement on access to organ transplants by the poor, three aspects of our preceding analysis need to be underscored.

The first point is that the accessibility concern is based largely upon an implicit assumption that transplantable organs will be expensive under a market system. This assumption confuses the current value with the market equilibrium price. For example, in Figure 3, P_1 is confused with P_3 . The high value given to organs under the current system is thought to carry over to the market regime. If, as we have argued, the supply curve of transplantable organs is

157. Moreover, the current system fosters an undesirable atmosphere of emotional coercion within families. For example, living related donors often feel that they can hardly refuse to donate an organ to a close family member, despite their own fears and misgivings.

158. This raises the obvious question of whether the poor have access under the present system. With the exception of kidneys, transplant operations are very expensive and generally unavailable to anyone of average means without medical insurance. *Interchangeable Parts*, *supra* note 24, at 63.

159. Rinehart, *The Market Approach to Organ Shortages*, 8 J. HEALTH CARE MKTG. 72 (1988). *But see* Cohen, *supra* note 7, at 28-29 (criticizing this concern).

relatively elastic, then, the equilibrium market price will fall well below current values.¹⁶⁰ Accordingly, the purchase price of organs will then be within the reach of a much greater portion of the population than current values suggest.¹⁶¹

Second, under a market system, permitting prices to rise to equilibrium levels is likely to result in a substantial increase in the number of cadaveric organs made available for transplantation. The particular funding mechanism utilized will determine whether or not this additional supply of organs becomes available to the poor. Given that more organs are made available for transplantation, adoption of a market system creates at least an opportunity to increase the availability of this treatment to everyone. Thus, it is entirely possible to design a policy that allocates the entire increase in the number of cadaveric organs to the poor.

An analogy would be our public policy concerning access to food by the poor. We do not stipulate that food prices be deemed zero because of the clear disincentives presented to food producers under such a policy. Instead, we allow market forces to establish food prices and then subsidize purchases by low income individuals.¹⁶² While the food stamp program is certainly not without its flaws, it is, nonetheless, superior to a policy of free food for all who could obtain it. Thus, those opposed to a market system on the ground that it would place transplants out of the poor's reach have failed to appreciate the likely effect that such a system would have on the total quantity supplied and the capability of allocating that supply to the group considered to be at risk.

Finally, the accessibility argument ignores the beneficial cost effect that a market-based system would offer the Federal End Stage Renal Disease program. Adopting a market system could substantially reduce the expenditures of that program through two major channels. First, transplantation is a less expensive form of treatment for renal failure than dialysis. Aroesty and Rettig¹⁶³ estimate cost savings to the Health Care Financing Administration of \$47,000 to \$66,000 over a five-year period for each patient shifted from dialysis to trans-

160. Although we are not persuaded that Cohen's estimate of \$5000 is much more than a guess, this sum would amount to a small part of the total cost of a transplant operation, which is \$32,000 for kidneys and \$267,000 for livers. *Interchangeable Parts*, *supra* note 24, at 63.

161. One can argue that the current system restricts access to transplants by the poor more than a market system. The inflated value of transplantable organs, caused by the restricted quantity supplied, gives rise to black market activities and other forms of abuse which only the rich can afford. Moreover, disequilibrium in the market also permits other undesirable consequences such as discrimination. Currently, there is a concern that some racial discrimination in the allocation of available kidneys may exist. *Blacks On List Longer For Kidney Transplants*, Gainesville Sun, Aug. 23, 1990, at 5A, col. 1.

162. This may be one reason that the government is not in favor of a market system. Once positive prices are implemented, the government would be hard pressed to refuse subsidies to those who would die without a transplant. As a result, there may be a fear that the government will have to pay for the bulk of the transplant organs. This, however, ignores the fact that there are many other items essential to the health and welfare of society that continue to carry positive prices: medical care, clothing, shelter, and so on.

163. Aroesty & Rettig, *supra* note 21, at 27.

plantation.¹⁶⁴ Thus, in order to move additional patients from dialysis to transplantation, the federal government may find it cost-effective to subsidize the purchase price of kidneys. In doing so the resulting reduction in expenditures could more than offset the costs of procurement. Kidney patients, taxpayers, and organ suppliers would all benefit under such a policy.

Second, it is likely that the incentives provided by a market system of procurement would reduce some of the current costs of acquiring organs. In 1980, the Health Care Financing Administration incurred expenditures of approximately \$7000 for each cadaveric kidney collected.¹⁶⁵ While much of this cost is associated with the care and treatment required to collect a kidney under any system, it also reflects the advertising and procurement efforts needed to obtain these kidneys at a zero price. This portion of the current acquisition cost may be substantially reduced by adopting a system of sales and purchases. We may be spending an unnecessarily large sum on advertising in order to convince people to give away something that they would have gladly sold at a relatively low price. It would not seem reasonable, for example, to spend \$100 to persuade someone to donate something that they would have been willing to sell for \$50. Thus, the increase in total acquisition costs incurred as a result of fully funding organ purchases under a market system is likely to be less than the purchase price of the kidneys obtained. In fact, it is possible that total acquisition costs would actually fall under a market system of procurement.

Regardless of whether organ acquisition costs rise or fall, the total expenditures of the End Stage Renal Disease program will drop, even if the purchase price of kidneys is included under this program. Thus, subsidization of organ purchases can be cost-effective. As a result, access to transplants by the poor is likely to improve under this system. With kidney purchases subsidized, more kidneys available, and government expenditures reduced, there are no apparent losers under this policy.

C. Premature Termination of Care

The third ethical issue we address pertains to potential incentives for premature termination of care. This problem involves a fear on the part of

164. These cost savings fail to consider the additional benefits of the more active and productive lifestyles of transplant recipients relative to dialysis patients. The former are much more likely to be able to continue full-time employment. See R. EVANS, CASE-MIX, TREATMENT MODALITIES AND PATIENT OUTCOMES: RESULTS OF THE NATIONAL KIDNEY DIALYSIS AND KIDNEY TRANSPLANTATION STUDY (1982).

165. Aroesty & Rettig, *supra* note 21, at 13.

patients that an organ market might result in unwarranted removal of care.¹⁶⁶ For example, if a potential supplier has entered into a contract for delivery of her organs at death, and due to the forces of supply and demand, the current "spot" price of organs is high, then she may be apprehensive about the commitment of the attending physician to sustain her life in the event that such a decision must be made.

Two fundamental problems exist with this line of reasoning. The termination of care concern is founded upon a belief that the equilibrium market price of organs would be relatively high. As we explained above, that is unlikely to be the case. If, as we suspect, the equilibrium price would be low relative to current values, then the incentive to terminate care will be correspondingly low.¹⁶⁷

A second problem with the termination argument is that, under a market system, the attending physician has no motive for profit in obtaining the organs from the patient. Under that system, the property rights to the organs of the deceased would be held by the party that had entered into the contract for delivery. That is, either the private procurement firm, the government procurement agency, or the surviving family members are the only entities that might directly benefit from the death of the contractor. The physician responsible for the patient's care has no incentive to withhold treatment.¹⁶⁸

The issue of premature termination of care, then, is not a sound basis for rejecting a market system of organ procurement. In fact, the problem is likely to be worse under the current policy because of the relatively high value of organs on the black market. The logical basis for the moral superiority of the current system over the market system is far from obvious. The primary difference between these two systems is the price of exchange. In the current system, price is held fixed at zero. In the market system, it is allowed to rise to equilibrium levels. Thus, under a market system, organ suppliers (or their survivors) receive monetary compensation in exchange for forfeiting the right to bury the body intact. Under the altruistic system, they receive no compensation.

166. Those who commit their organs upon death increase the present value to others of their demise. Consequently, life support measures may be used less extensively on an individual who has promised to supply his organs upon death. Forseeing this possibility, some people may be reluctant to will their organs. See Dukeminier, *supra* note 7, at 865.

167. In fact, the incentive to engage in such behavior is greater under the current system of procurement because of the artificial scarcity that is created. Under a system that produces an adequate supply at comparatively low prices, there will be a much lower incentive to engage in this type of unethical behavior.

168. A third party might possibly bribe the physician to terminate care prematurely. This possibility seems remote, however, because the market price is not apt to be very high relative to what the physician stands to lose if he is discovered: loss of reputation, moral opprobrium, loss of income if his license is revoked, criminal prosecution, and the like.

D. Summary

The three ethical arguments that we have examined are not sufficient to undermine the case for adopting a market system of cadaveric organ procurement. On the contrary, our evaluation confirms the superiority of the market system on ethical, as well as economic, grounds. As a result of the chronic undersupply of transplantable organs that results under the altruistic system, an additional and unnecessary loss of lives is caused by this procurement policy option. It is questionable how a system that trades lives in exchange for zero monetary compensation to suppliers can be viewed as superior. That, however, is precisely the tradeoff involved in choosing between these two alternative organ procurement policies.

Conclusion

The question of alternative organ procurement policies is an extremely important public policy issue. The choice that we make, whether by conscious design or by default, will affect the health of tens of thousands of patients who are waiting for kidneys, hearts, and livers. For many, the choice we make will mean the difference between life and death. There is a glaring need for open minds and rational debate on this issue.

At the same time, we recognize that this is an emotional issue.¹⁶⁹ It may not be possible to examine alternative solutions in a completely cold and analytical fashion. But emotional issues do not require illogical solutions. In an effort to advance our understanding of the organ supply problem, we have examined three alternative organ procurement policies: (1) the current altruistic system, (2) a market-based system, and (3) a system based on reassignment of property rights.

The most striking outcome of the altruistic system is that a shortage of organs inevitably results from the straightforward operation of market forces. This shortage appears to be wholly unnecessary. The reassignment of property rights seems to be better, but the best system relies upon the market mechanism. We have shown that the market system is superior to either of the alternatives on overall social welfare grounds.¹⁷⁰ Moreover, the market system was also shown to provide an opportunity for improved access to transplants by the poor. Also, it was shown not to have adverse impact on incentives to provide care to potential organ suppliers. Finally, it exhibits less coercion of

169. See, e.g., Manga, *supra* note 56, at 325 (noting that those who oppose "commodification" of organs believe it to be "intrinsically objectionable," but characterizing this as "an emotionally charged assertion and not a reasoned argument.").

170. See Epstein, *Why Restrain Alienation?*, 85 COLUM. L. REV. 970 (1985) (arguing that alienation should be restrained only to control external harms or resolve common pool problems). Neither circumstance is present when examining organ supply.

organ donors than either of the alternative systems. Therefore, we conclude that the ethical concerns with a market system of procurement are completely ill-founded.¹⁷¹

Several groups benefit from the current policy: physicians, hospitals, health insurance companies, and organ procurement and distribution employees; and two groups lose: potential transplant recipients and organ donors. The former groups are cohesive, well-organized, and politically influential. The latter groups are diffuse, unorganized, and politically silent. The economic theory of regulation predicts that the former groups will tend to dominate in the policy arena, and they have.

We have been students of regulation, antitrust, and related microeconomic policy issues for all of our adult lives. Yet we have never encountered a single policy more at odds with public welfare than the current organ procurement policy in the United States. Until the interested parties (physicians, hospitals, patients, and policy makers) consider alternative organ procurement policies, the existing shortage will persist. In fact, if the current policy is maintained the shortage will continue to grow worse, as will the needless suffering.

171. See, e.g., G. CALABRESI AND P. BOBBIT, *TRAGIC CHOICES* (1978) (examining the agonizing choices that society must make in allocating scarce resources that are a matter of life and death). But of course we should avoid being forced to make such choices if at all possible. In the case of transplantable organs, the market system can eliminate the shortage and reduce or eliminate the need for tragic choices.