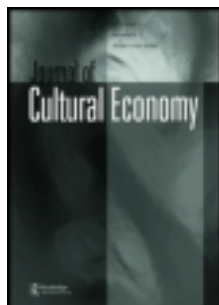


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GIFT-GIVING OR MARKET?

Economists and the performance of organ commerce

Philippe Steiner

Human body parts (HBP) are made available to professionals either through market relations or through gift-giving. Market transactions were made legal in Iran during the 1980s; but this solution did not spread to the rest of the world. Nevertheless, the mere existence of a possible alternative to the current policy in favor of gift-giving opens up a political issue: are market relations legitimate and efficient in the domain of organ procurement? Once so stated, the question becomes: are economists able to perform such commerce as just another form of market relations? After a discussion of Michel Callon's theory of performativity, justifying the use of a restricted definition of performativity, the paper examines Alvin Roth's suggestion that a computerized matching market for non-compatible pairs of donor-recipient be created, and explains why this is a consistent example of performativity of gift-giving.

KEYWORDS: economic knowledge; gift-giving; organ transplantation; performativity

Organ transplantation is a form of commerce between human beings. I use the word commerce here in its older meaning, a meaning common during the eighteenth century in both the French and English languages,¹ denoting social relations. The commerce between men and women, intellectual commerce, the commerce of the world: these terms designated gendered social relations, whether sexual or not; social relations among learned people in Salons; or relations that a country entertained with the rest of the world. Commerce also meant market commerce, that is, market social relations and, in certain cases, this latter relation might have an explicit self-interested component. I have no particular enthusiasm for ambiguity – which is in any case alien to the scientific ethos – but the ambiguity conveyed by this archaic usage usefully captures the intricacies lying at the core of transplantation understood as a form of commerce. This ambiguity arises from the fact that human body parts (HBP) are made available to professionals either through market relations or through gift-giving. Market transactions were made legal in Iran during the 1980s; but this solution did not spread to the rest of the world. Illegal market transactions flourish in various countries, such as Pakistan, India, Turkey, and the Philippines, to mention some of the countries regularly targeted for their lack of effort to abolish such commerce. Nevertheless, the mere existence of a possible alternative to the current policy in favor of gift-giving opens up a political issue: are market relations legitimate and efficient in the domain of organ procurement? Once so stated, the question becomes: are economists able to perform such commerce as just another form of market relations?

In order to answer this question the paper starts with a discussion of Michel Callon's theory of performativity, so that I might justify the use of a restricted definition of performativity. In the first part of the paper I want to show that Callon's approach opens up a view of the sociology of economic knowledge different from that provided by Joseph Schumpeter's massive and still unsurpassed *History of Economic Analysis* (1954). However, by making a distinction between teaching and the embodiment of economic knowledge in a material device, performativity proper is here associated with a situation in which actors *do not need to know the theory they implement*. The second part of the paper provides a general overview of the issue of the biomarket in kidneys, the most wanted HBP, and the reactions to proposals to create such a biomarket. The third part examines Alvin Roth's suggestion that a computerized matching market for non-compatible pairs of donor-recipient be created, and explains why this is a consistent example of performativity of gift-giving. Finally, the conclusion focuses on the political dimension of this debate and the particular significance that can be attached to Roth's proposition.

1. Sociology of Economic Knowledge and Performativity

1.1. *The Sociology of Economic Knowledge*

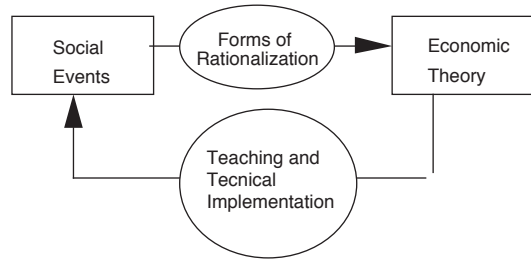
The classical or Schumpeterian view of the sociology of economic knowledge can be summarized in three propositions.

- a. Following Weber's thesis on the various directions taken by the rationalization process, there are *different forms of the rationalization* of economic knowledge, and these forms should be the subject matter of a sociological approach to economic knowledge.
- b. Contemporary sociology of economic knowledge concerns the way in which social dimensions may explain the formation of a given set of scientific knowledge, but it is also about the way this body of knowledge is instrumental when it comes to modifying the political, social and ideological situation. Accordingly, the formulation of an economic policy certainly belongs to the domain of the sociology of economic knowledge.
- c. More generally, the sociology of knowledge also considers how economic knowledge becomes an institution (indeed a 'cognitive' institution) that changes understanding of the functioning of social life and the behavior of people in a given society.

Relations between the world as given and economic theory are twofold. On the one hand, there are various rationalization processes at work among those involved in the production of economic knowledge, a production process not limited to professionals in the academic world, nor to their standards.² On the other hand, the social dimension of economic knowledge derives from the fact that, as a *tooled* knowledge (Schumpeter 1954), economics may become a tool for cognition and action, that is a cognitive institution which can also be studied by economic sociology.

A Weberian approach to economic knowledge is useful in distinguishing various forms of economic knowledge, two of them being rational in a precise sense.³ This means that there are *various forms of rationalization*, that is to say, *different forms of 'tooled knowledge'*.

Economic theory is primarily the normative study of the economic behavior of rational actors and their consequences in a system of interrelated markets. The theory is thus intended as an explanation of what the outcome of a market system in which actors



SCHEMA 1
Sociology of economic knowledge.

consistently followed a given set of efficiency rules might be. Rational economic knowledge endeavors to reach a coherent, simple and comprehensive picture of the working of a system of interrelated markets, whereas non-rational knowledge limits itself to a limited, piecemeal understanding of a particular economic context. In non-rational knowledge, values are used as a yardstick to gauge economic behavior, or they are a (moral) impulse to action for those who rebel against the economic behavior of traders and businessmen. Within rational economic knowledge, the value dimension introduces a salient difference between forms of economic theory: mainstream economists rule out values which they consider foreign to their inquiries, whereas values are taken into account by materially-rational theoreticians. Two reasons explain this difference. Firstly, from the eighteenth century onwards many economists reacted negatively to the rise of formally rational economic knowledge, where human beings and social intercourse are treated as pure magnitudes or abstract phenomena arising from the pure logic of choice. With materially-rational economic knowledge values warrant, and are given, a greater weight within economic theory – for ethical, religious or political values are important elements to consider when any implementation of economic theory through economic policy is at stake.

Furthermore, there is then an important connection between materially rational economic knowledge and popular economic representations. As mentioned above, values provide an extensive set of motives for action, including economic actions and actions having an impact on economic events; and they are also instrumental in providing subjective meaning to actors. Consequently, values may be incorporated within economic theory by economists opposing formally rational economic knowledge, so that they might produce a theory suited to the context. There is consequently space for materially rational economic knowledge engaged in studying what rationally value-driven economic actions are, and what the aggregated outcome is. Obviously, for formal economists materially-rational economic knowledge reeks of irrationality, since the pure logic of choice is not pushed to its limits, and is instead modified by what are thought to be *ad hoc* premises.⁴

In fact until recently those working in public sector administrations were not trained in economic theory and were not directly engaged with economic activity; but this changed after World War II. The economic aspects of the war were decisive in many areas, and after the war the Keynesian revolution in the academic world and in public administration introduced a new standard for economic policy, displacing the liberal financial standards that had prevailed during the early decades of the century. Economic administration is characterized by its political orientation or, to put it in another way, by

politically oriented action in which economic affairs are a part of political struggle. In this respect, economic knowledge is both a tool for understanding an important part of the political reality facing any government, and a weapon in rhetorical conflict between various administrative groups. Traders and entrepreneurs are of course familiar with economic activity, but they do not think in terms of the working of a *system* of markets. Their economic knowledge is grounded upon their market interest, their *pragmatically elaborated representations* arising from the connections they have with the limited number of markets with which they are involved. Laymen, or people generally unfamiliar with the subtleties of economic theory, might be misled out of ignorance or insufficient understanding of economic theory; but they nevertheless use some kind of local knowledge according to which, in a given context and with given cognitive capabilities, their actions make sense.

Propositions (b) and (c) mean that economic science is a cognitive institution, able to modify economic behaviors. This is neither surprising nor mysterious. Economic knowledge is learned at different stages of the educational system and is implemented in specific social contexts (financial markets, commercial law and arbitration); it may thereby modify the way people understand the economic world which surrounds them, and the way they act upon or react to this economic world. In this respect, the feedback loop in the lower part of Schema I takes into account the role played by economists as teachers and engineers. Nevertheless, these two roles must be considered to be radically different, since they rest on different social mechanisms, and because they bring about very different outcomes.

The institutional dimension of the contemporary sociology of economic knowledge can be further opened out through two mechanisms at work in the cases mentioned above. Primarily we should note that there are two different mechanisms which transform economic knowledge into a cognitive institution. The first mechanism is related to the teaching of political economy, while the second works through the materialization of economic analysis – that is to say, its transformation into effective tools used by economic agents during their daily business. In both cases, economic knowledge becomes a non-trivial element in the functioning of the market system. There are thus many *effets de théorie* (Bourdieu 2000) or performativity situations (Callon 1998; MacKenzie & Millo 2003; MacKenzie 2006) within the market system.

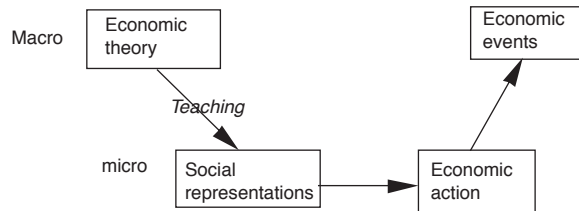
1.2. Teaching and Machines: The Spread of Economic Knowledge in Contemporary Market Society

The sociology of economic knowledge, particularly after World War II, takes the teaching of political economy very seriously. The reason is plain: the functioning of the market system is likely to be modified once there are people schooled in political economy placed in the various departments of economic life, and when the economic point of view is considered as a legitimate, or even *the* legitimate point of view in considering social policy. Contemporary research in the so-called New Economic Sociology actively studies how systematic training in political economy (rather than in law) became a valuable resource in political conflict, and how it came about that a new elite⁵ emerged. This elite is characterized by its capacity to base its view on economic knowledge, knowledge which can be of paramount importance when a given country has to comply with the demands of foreign lenders, as was the case with France in the 1950s (Fourquet 1981), or South

American or Asian countries in the final decades of the twentieth century (Babb 2001; Dezalay & Garth 2002, 2006). This is linked to some important studies of the diffusion of economic knowledge on a larger scale, with the creation of educational programs in pre-college teaching and the creation of a growing number of newspapers and weekly or monthly journals devoted to the economy (Duval 2004). This strand of research is now very active, considering how the economic viewpoint is instrumental for the adoption of neo-liberal policies during the latter decades of the twentieth century (Blyth 2002); and how this economic viewpoint diffuses from core countries (North America and, to a lesser extent, Western Europe) to countries in South America, Asia and Eastern Europe (Dezalay & Garth 2002, 2006; Fourcade-Gourinchas & Babb 2002; Fourcade 2006, 2009). In all these cases, political economy seems to have played a major part in the global extension of the market system. This process is reinforced by powerful financial institutions active at the level of the economic international order, notably the International Monetary Fund. Thanks to studies of this kind we can better understand how belief in the economic point of view operates at a macro level through the determination of financial constraints and adjustment policies, and how this belief spreads among a wider population, so that the economic point of view becomes 'common sense' – two levels of analysis similar to Karl Polanyi's interest in the role of the Gold Standard and the 'liberal credo' (Polanyi 2001[1944]).

Let us consider the first mechanism, with the help of the classical micro-macro approach – or the so-called Coleman's boat (Coleman 1990) – given in Schema II.

In Schema II we can follow the path through which economic knowledge results in a modification of social representations central to an understanding of economic reality, and of economic action on the part of individual actors and organizational actors. It should be stressed that this schema can be deployed in different social contexts and applied to different groups of people. It can be used to understand changes in economic representations either at the level of experts, managers, administrative and political elites, or alternatively at the level of the general population, notably through the role played by the media. Administrative and political elites call for specific comment. Institutions may be strongly connected to a specific organizational setting and to a normative stance, since people *believe in* their economic policies and in their economic expertise. This is most likely the case with the formal institutions (contract, property, inheritance, etc.). Consequently actual functioning, or any change in the rules of the institution, are related to collective action occurring in given organizations. This implies an important role for normative self-belief on the part of a small group at the head of a strategic institution: a central bank, a finance or budgetary ministry together with similar institutions, as



SCHEMA 2

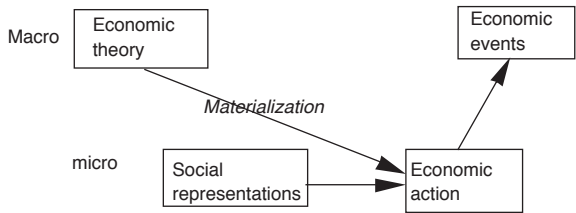
Economic teaching and transformation of economic representations.

illustrated by the Mexican shift from a populist economic policy to one based on a free market (Babb 2001, chap. 7).

The sociology of economic knowledge pays attention to the embodiment of economic knowledge in specific tools and *dispositifs* (in the Foucauldian meaning of this term: a network of actors, texts, laws, norms, rules, buildings, architecture, machines, etc.). Michel Callon’s conception of the economic embeddedness of economic activity (Callon 1998) is that many *dispositifs* exist in which economic knowledge, formally-rational economics included, is embodied in such a way that economic action implements what economic theory predicts will occur, even where there is complete ignorance on the part of the agent of such economic theory. Contemporary financial markets are the classical locus of such circumstances, since the ongoing transformation of markets is strongly related to the presence of software that implements economic theory (Merton, Black and Scholes formulae) in the pricing of derivatives and the decisions of the traders (MacKenzie & Millo 2003; MacKenzie 2006), or in the matching of supply and demand according to a Walrasian view of what constitutes a perfect market (Muniesa 2003). This approach has been extended (Callon & Muniesa 2003) to cover a wide range of situations (from consumer to financial markets) in which marketplaces are treated as collective devices for making calculation, broadly defined,⁶ possible. This extension is of particular importance to the present inquiry, since it implies that economic theory plays an instrumental role as a cognitive institution within the market, including the market design of matching markets (Roth 2002).

There is thus a second mechanism (Schema III) also at work in highly specific and important parts of the contemporary economic world.

As noted above, in this case economic theory is a tool implemented by social actors who may be ignorant of the very theory embodied in the tool (a sheet of paper upon which are written the values of a derivative according to Sharpe’s theory, or computer software for pricing derivatives). We are thus confronted with a new mechanism, since a cognitive institution encroaches on action. Nevertheless, experts charged with creating the tool – often called market design – are following the path described in the previous schema, since they are consciously implementing the results of the cognitive institution, which becomes both a set of ideas and a material fact. So far, our presentation is in line with Callon’s recent overview of the work done under the banner of performativity, notably when he stresses the difference arising from the non-human dimension of the performative mechanism, and hence the distribution of agency between human minds and material devices, together with an alleged self-fulfilling prophecy: ‘Whereas the notion of self-fulfilling prophecy explains success or failure in terms of beliefs only, that of performativity goes beyond human minds and deploys all the materialities comprising the



SCHEMA 3

Materialization of economic analysis and the performance of economic theory.

socio-technical *agencements* that constitute the world in which these agents are plunged: performativity leaves open the possibility of events that might refute, or even happen independently of, what humans believe or think' (Callon 2007, p. 323). However, I depart from the extended meaning of performativity to which Callon adheres when he claims that the first mechanism also belongs to the performativity thesis. The teaching mechanism is by its very nature *transformative*, in the sense that its purpose is to transform the actor and change his behavior, thanks to a change in the cognitive resources at his disposition. The materialization mechanism is by contrast *performative* in the sense that such a change is not required to produce the expected change in the behavior, Callon and Muniesa aptly defining the (restricted) meaning of performativity in a recent contribution: 'In economic sociology, the idea of performativity of economics is implemented, for example, on markets which construction and functioning entail expert knowledge or technical arrangements coming, directly or indirectly, from economics' (Callon & Muniesa 2009, p. 289). In other words, the specificity of the performativity thesis lies in the fact that the implementation of economic theory no longer requires a transformation of the economic representations and beliefs of participants in the market. This distinction is useful for understanding what is going on when surgeons, ethicists, lawyers and politicians are debating the pros and cons of biomarkets.

2. Transplant Surgery, Gift-Giving and Biomarkets

Gift-giving and biomarkets are two forms of commerce that entail specific forms of transfer of resource since, fundamentally, transplant surgery supposes that an organ is transferred from one body to another. This transfer may occur either from a dead body to a living one (*post mortem* transplantation) or between living bodies (*inter vivos* transplantation). Before the legal decision which made brain death the current definition of death, i.e. before the end of the 1960s, transplantation was mainly an *inter vivos* affair because it gave better results, and because it was extremely difficult to procure organs from people who were not legally dead. This occurred even where surgeons were most reluctant to violate the old watchword – *First do no harm* – especially because overall results were still relatively poor. After the legalization of the new definition of death there was in the following decade a broad move towards the *post mortem* type of transplantation.

However, in the mid-1980s the issue of the number of HBP became critical, with kidney transplantation becoming very successful following the availability and manageability of cyclosporine, a new and powerful immunosuppressive drug. As national organizations were unable to obtain sufficient HBP from dead donors, transplant teams came back to the former *inter vivos* procurement process in some countries, such as the United States, Australia, New Zealand, and to a lesser extent, the United Kingdom and the Netherlands. This revived some difficult moral issues, notably those related to the nature of the commerce between the donor and the recipient. Is the donation a gift or market commerce? Is the donor moved by altruism or are the 'donor' and the recipient cheating surgeons and the ethics committees of transplant hospitals? This issue became of paramount importance once non-related *inter vivos* donation – the so-called 'Good Samaritan gift' – was allowed or encouraged, as is now the case in the United States. When such a transfer of resource is possible or rather, when political and medical organizations are exhorting the population to consider positively the idea of living donation, then the marketization of the transplant process became a real issue.

The shortage in HBP and the changes in legislation resulted in the first move towards an official market commerce in kidneys when, in 1981, Dr Harvey Jacobs created a company (the International Kidney Exchange Limited) whose aim was to have been to trade in kidneys. The overall reaction to this move towards pure market relations, that is to say a relationship in which one person sells his organ to a buyer, to the patient himself or an agent of the patient, was negative. Consequently, a federal law (the National Organ Transplant Act, 1984) ruled out the marketization of organs. In the following years, there was an almost global ban on market commerce in transplantation, and a fear of biomarkets led to the current policies for producing HBP.

Up to that point, economists were not a significant part of the debate, which was still conducted among politicians and surgeons. However, with the enduring shortage in HBP, lawyers and economists stepped in with a ready-made solution: a market in HBP. We do need however to consider two dimensions of this new phase of the debate on biomarkets. Firstly, proposals went no further than papers published in academic journals, and limited themselves to general statements regarding the precise forms of biomarket at issue.⁷ Apart from repeating the efficiency credo associated with monetary incentives, these proposals limited themselves to applying a mechanism of supply and demand. Further, there was no agreement among these proposals even concerning the general form of biomarkets: would they be 'spot markets', future delivery markets, or both? Would *post mortem* transfers be included in the market, or would the market be limited to *inter vivos* commerce? Furthermore, there was no agreement on the forms of regulation that would be necessary to the creation of politically and morally acceptable biomarkets. Secondly, during this period an economic line of argument became common among surgeons and politicians. This ran as follows: due to the shortage of organs for transplantation, due to the existence of wealthy people ready to pay for an organ, due to the presence of poor people ready to sell a kidney for making a living whether for them or their family, sooner or later a set of prices will prompt self-interested behavior to initiate illegal commerce between human beings. A high price will be offered by the rich, so that an illegal organization will make a profit on the transplantation while paying a (relatively) low price to the seller who will get, nonetheless, a huge amount of money compared with his customary annual income.⁸ Black markets therefore became an important concern, even if no data was ever collected in support of the argument. Instead, the argument was readily accepted, making general reference to newspaper articles relating what sociologists considered to be urban rumor. A rational account of the possible existence of such black markets was sufficient to make them exist in the minds of politicians and surgeons.⁹

This combination of the limited interest of economists in the actual details of organ commerce, and the impact of a fear that black markets would flourish if nothing were done to contain the shortage in HBP, finally led some surgeons to consider positively the creation of biomarkets. A further reason came from the fact that in 1988 the Iranian parliament moved to create a (lightly) regulated market in kidneys. Taken together, these events changed the debate, since these surgeons were conscious that proposals regarding a biomarket had to be much more precise if they were to be credible; this is certainly the major result of Arthur Matas' campaign in favor of biomarkets (Matas 2004, 2007; Matas & Schnitzler 2003, 2004; Matas *et al.* 2006). After running a series of simulations in order to determine the reservation price for kidneys, that is to say the price at which the socio-financial benefits of a biomarket is nil and at which the benefit accrues only to recipients in

terms of quality of life, Matas proposed a precise form of biomarket regulation, in the absence of which his fellow surgeons would have been unlikely to implement surgery between recipients and vendors. The main elements of this regulation are as follows: (i) the minimum age for being a kidney vendor would be 18; (ii) free entry to the market would be limited to a defined geographic area, preventing vendors from poor countries coming to rich ones to sell their kidney; (iii) vendors would get long-term health care and there would in addition be a long-term follow-up to assess their situation; (iv) payment would be made as a lump sum since US vendors are supposed to be able to manage large sums of money; (v) potential vendor's health status would be verified twice with a minimum of six month interval; and (vi) only a biomarket for kidneys would be made legal, and thus liver and lungs would not be part of this biomarket (Matas 2004, pp. 2013–2014). Finally, Matas acknowledges the fact that some other regulatory elements are still missing, notably the issue of the price-setting mechanism (would it be possible to give the kidney to the highest bidder, or should a fixed price be set?) and the logistics of the biomarket (where would the vendor go to be evaluated? Who would do the evaluation? How would purchased kidneys be allocated to patients?).

This brief overview of leading elements in the most recent phase of the debate on biomarkets raises some interesting questions for the present discussion of performativity. Firstly, this example shows that economists are not necessarily the major proponents of market commerce, and it can happen that professionals in a given social sphere establish such a market by themselves, relying on the economic knowledge that is so widely diffused in modern societies, or on what they have learned. This means that teaching and 'preaching' the economic gospel is still an important element to be considered by the sociology of economic knowledge. Secondly, the economic embeddedness of economic activity is not necessarily based on performativity once a stricter definition of the concept is implemented. These first conclusions must be complemented by a brief consideration of a further novelty in *inter vivos* transplantation.

As an economist does play a major part here, albeit in an unexpected way, this is particularly interesting for the present discussion of performativity.

3. Matching Markets: The Economist's Alternative Approach to Biomarkets

As mentioned above, in the United States there is a positive policy in favor of living donation. This policy appears to be working well, since data provided by the United Network for Organs Sharing make clear that living donation is now more important than *post mortem* donation (6648 *inter vivos* kidneys versus 6326 *post mortem* in 2004). Nonetheless, the number of kidneys available is still insufficient to meet transplant surgeons' needs. This has created an opening for innovation in the medical and academic fields. Among such innovations I would like to direct attention to what is called *Non-Compatible Pairs of Patient-Donor Exchange*.

What does this mean? *Inter vivos* gift giving assumes a patient in a condition of end-stage renal disease (ERSD) who has a sibling or a friend willing to give him a kidney. However, the will to give is not enough, for there are biological constraints to be considered. Among these constraints are blood compatibility (A, B, AB and O groups) and tissues compatibility (HLA histocompatibility, with six main groups). So, it may happen that a patient-donor pair is socially compatible, but biologically incompatible. Confronted

with this situation the American Medical Association suggested a few years ago that there be an exchange between incompatible patient-donors pairs: donor of pair A will give to patient of pair B and donor of pair B will give to patient of pair A. This direct exchange does not work very well, since the chances of an incompatible pair knowing of the existence of a compatibility with another non-compatible pair and hence making two transplantations possible are so small. How might we escape this situation? The innovation was provided by an economist from Harvard, Alvin E. Roth (Roth *et al.* 2004, 2005a, 2005b, 2005c; Saidman *et al.* 2006), who has built software able to match patients and donors in this situation. Roth was not an economist unknown to the medical profession. By the middle of the 1990s he was involved in major work for the National Resident Matching Program, which wished to redesign the software underlying the job market for physicians applying to US hospitals for employment (Roth & Peranson 1999; Roth 2003). The redesign seems to have worked smoothly, and the new software now matches about 20,000 physicians a year.¹⁰

How does the matching of patients and donors work? Is this matching market device, to use Roth's words, an example of performativity? And what can be learned from it? The first step is to create a data base, ideally at the national level, to register all the non-compatible pairs. Then, a 'Kidney Exchange Clearinghouse' will organize exchanges between these pairs of non-compatible patient and donors. Then patients choose the most suitable kidney among those available on the database; or they opt to be given priority on a waiting list for a good match with kidneys coming from the *post mortem* procurement process; or, finally, they can choose to wait for the next matching process if they believe there to be currently no good match. It is further supposed that donors and patients have the same preference. On this basis, the mathematics of pure economics has engendered a software searching for cycles (a closed set of patients-donors exchanging their donors) or w-chains (an open set of patients-donors, since the head of the set will receive a kidney from the waiting list and the tail of the chain will give a kidney to the waiting list). When such cycles and w-chains are revealed, transplants occur and the matching process goes on until there are no more cycles or w-chains. Simulations built on the data provided by UNOS show that this matching process significantly increases the number of transplantations, diminishes pressure on the waiting list (because the patients who before could not swap donors were among the many people queuing on the waiting list) and improves the position of patients with type O blood who suffer from a specific asymmetry: type O donors are universal donors and always compatible with a patient whatever the latter's blood type, but O patients must receive an organ from an O donor. We can now consider more precisely some aspects of the design of this matching market from the perspective of the two dimensions of the sociology of economic knowledge: from economic activity to economic knowledge, and then from the latter to the former.

Economic theory does not offer readymade solutions to design economics. Roth is adamant on this point: when confronted with a specific demand from the medical profession, he has to go beyond the neat theorems modeling simple matching markets because real markets incorporate complementarities (for example between applicants when there are couples) and complications (arising either from the environment, or from the agents who do not necessarily behave in the way that economic theory assumes) omitted by formal theory (Roth & Peranson 1999, p. 750; Roth 2002, pp. 1342, 1374). Roth is also adamant where the utility of the theory is at stake: the pure theory of matching markets provides indispensable guidance for the engineering process, the composition of

the software benefiting greatly from theoretical results (Roth 2002, pp. 1372–1373). What did Roth do here? His response is given in terms of simulation. Simple markets being too simple for the complexities of actual markets, while the latter are too complicated to be formalized by tractable pure mathematics, the solution comes from combining the general guidance provided by the mathematical theory of matching process with computation, so that it can be seen how many exceptions, difficulties and impossibilities appear when the software is fed with actual data from previous years. According to Roth, this strategy fosters a new form of economic practice: ‘... we also describe in this paper the process by which the new clearinghouse algorithm was designed, evaluated, and compared with existing algorithm. At each stage, this process involved computational experiments. This process resembles engineering practice rather than theorem-proving or hypothesis-testing’ (Roth & Peranson 1999, p. 749). Roth is thus driven to make a general distinction between pure economics (i.e. theorem-proving and hypothesis testing) and engineering economics (simulations and algorithm design), since there is a distinction between mathematical physics and engineering, or between biology and medicine (Roth 2002, pp. 1342, 1374).¹¹ The distance between economic theory and economic design induces the economists to take into account the ‘details’ which occupy practitioners. Details can be related to the nature of the applicants (couple versus individuals), and their strategies when providing their list of wishes to the clearinghouse (real agent’s behavior versus agent’s behavior as a pure maximizer). Details can also be related to the political and moral issues underlying the situation in which the design or redesign of the matching market is embedded.¹² In the case of the physician’s job market, Roth and Peranson (1999, pp. 749, 752, 772) were aware that their contract was directly related to a crisis affecting the previous software. This software provided a stable match each year (no applicant was matched to an unwanted hospital and no matched pair existed in which the applicant preferred a hospital which preferred this applicant to his current match), but as there were several possible stable matches, agents were seeking strategic behaviors in which biased preferences would have provided a better match. This is one aspect of the political dimension mentioned earlier in the paper. The moral dimension also requires emphasis, particularly in the case of living organ donation. When considering the ‘details’, Roth has to consider carefully the moral values of the practitioners. In the case of organ transplants, Roth has no trouble in understanding that surgeons, physicians and nurses had strong negative moral feelings about markets, which he later called ‘repugnance for the market’ (Roth 2007).¹³ Simulation and moral values both point to the same consequence: Roth’s engineering economics is a form of material rational economic knowledge. This is not of secondary importance, because Roth (Elias & Roth 2007) was thereby led to oppose formal-rational theoreticians (Becker & Elias 2003) who suggested the introduction of a biomarket (for living and dead vendors) which was the same as any other consumer market, assuming that organs were ordinary goods and assuming that the efficiency of the biomarket would overcome moral reluctance on the part of practitioners.

Does such economic theory and economic engineering constitute a performance of the market? According to the restricted sense that we gave at the beginning of this paper, Roth’s economic design fits well with performativity: actors in these matching markets, whether they be the job market or the donor market for *inter vivos* donation, are in a position to implement abstract economic knowledge (Roth 2005a) without being versed in the intricacies of the theory. The software at the heart of the matching process embodies all that is necessary, and stable allocations are made on the basis of the stated wishes of

real actors. However, there is one difference between this instance of economic performativity and that related to auctions (Guala 2007; Mirowski & Nik-Khah 2007; Callon 2007). In Roth's example, there was no experiment, and thus no need to introduce a learning process so that experimental actors might behave according to the assumptions of the theory, a learning process that Callon and Muniesa suggest might be considered similar to the framing process which underpins experiments in physics (Callon & Muniesa 2007),¹⁴ where actors learn during the experiment to behave according to the expectations of economists in the same way that atoms are placed in a situation in which they will behave as expected by physicists.

Conclusion: Economic Sociology and the Market Mechanism

The present study deals with an unusual situation, since an economist working at the edge of his scientific community with current methods (game theory, experimental economics and simulation) has no need of prices and money for designing and implementing a matching market for kidneys between pairs of non-compatible donor-recipient. Furthermore, this economist abandons the usual economic perspective advocated by some of his colleagues, who consider price, money and the market mechanism to be possible and adequate solutions to the current organ shortage. Arguing that repugnance for the market is an important moral element in the present situation, Roth takes this repugnance into account and seeks alternative forms of commerce that might improve the situation. Contemporary economic theory used to circumvent the market and its price mechanism! Roth's economics of matching markets for kidneys fits perfectly into economic sociology, which argues that markets match supply and demand not simply by the price mechanism alone, but thanks also to other forms of commerce, such as personal relationships and a wide variety of market devices.

Roth's economic engineering does not necessarily deal with market commerce, but it so happens that its object is relevant to gift-giving. Performance is certainly relevant, but it should be clear that gift-giving and not market exchange is performed in this case. Furthermore, contrary to experimental economics, the software is able to do its performative job without involving any training of the actors. Performance occurs not through changing the actors' minds, since their previous representations and their previous willingness to act altruistically toward their relatives remains the underlying motive of this matching device. Performance occurs thanks to the software that provides an opportunity to act altruistically in a generalized system of gift-giving, instead of being trapped in the impossibilities associated with a personal and limited form of gift-giving. Thus the economic theory in the machine still requires interaction, and probably also the support of positive policy to effect social construction of the gift.

Finally, it is important to stress the political dimension to this socio-economic contribution to the performance of organ gift-giving. Roth's work is certainly one of the major recent innovations in the provision of HBP for transplants where the market mechanism is explicitly ruled out, in direct contrast to the views of many working in this field (Steiner 2010, chap. 7). This means that economic *virtuosi* are able to design social devices that run counter to the market where the market arouses strong feelings of repugnance. Hence not only could market commerce or economic activity be said to be embedded in and performed by economic theory, but non-market commerce may also be embedded in and performed by socio-economic theory. This is indeed an unanticipated

conclusion! Last but not least, performance of living donation through a matching market of donors between pairs of non-compatible donor-recipient has promoted a change in the law regulating the procurement process in the United States. In 1984, as a result of the proposal to create a biomarket in kidneys, the National Organ Transplant Act (NOTA) was introduced to ban biomarkets, and thus any market exchange. Roth's implementation of social commerce under the name of matching market therefore brought about amendments to NOTA regulation. This was recently introduced, first in the Senate (February 2007) and then in the House of Representatives (March 2007). Following this, Roth's matching market went through an experimental phase in New Jersey. One can therefore say that this is a perfect example of the kind of socio-economic policies that are needed, according to the synthesis of economic sociology written by Richard Swedberg (1998, pp. 300–304). Moreover, one can see in this example a first step towards the wishes of the late James Coleman (1993) when he urged American sociologists to consider their role to be similar to that of engineers. While the latter are designing bridges and buildings, the former should be busy designing institutions. Is performativity the new Mecca for economic sociologists eager to engage in building purposively the social world?

NOTES

1. See Viviana Zelizer's comments on the English speaking world (Zelizer 2005) and my own study of the meaning of commerce in France during the first part of the eighteenth century (Steiner forthcoming).
2. See my own research on classical political economy (Steiner 1998) and also recent contributions on game theory and experimental economics (Guala 2007; Mirowski & Nik-Khah 2007).
3. See Steiner (1998, chap. 1) for a more general account and Steiner (2001) for an English presentation.
4. Weber argued that 'Value-rational action may thus have various relations to instrumentally rational action. From the latter point of view, however, value-rationality is always irrational. Indeed, the more the value to which action is oriented is elevated to the status of an absolute value, the more "irrational" in this sense the corresponding action is' (Weber 1978[1921], p. 28).
5. See, for example, Marion Fourcade's study of the globalization of the economic profession (Fourcade 2006), Frédéric Lebaron's study of the education received by French administrators (Lebaron 2000), and Marie-Emmanuelle Chessel and Fabienne Pavis's study of the history of management teaching in France (Chessel & Pavis 2001).
6. In their view, calculation does not imply the use of arithmetic or algebra. Calculation is very close to an evaluation procedure such as a classification, a physical move which then produces a given result (a sum, a schedule, an evaluation, a binary alternative) (Callon & Muniesa 2003, pp. 4–5).
7. A general overview of these markets is available in previous papers (Steiner 2004, 2008).
8. A report from the Council of Europe mentions the following prices: \$10,000 for the seller and between \$100,000 and \$200,000 for the buyer. The difference is large enough for a large profit to be made by an illegal medical organization.
9. Whether or not they really exist is a different issue. It is unlikely that such markets can exist without (passive) acceptance on the part of political administrations. Firstly, transplantation involves complex logistics for sourcing the organ, for making the various

biological tests, and for post-transplantation follow-up for the patient, especially in dealing with possible rejection episodes. In brief, there is an issue of trust: are the foreign specialists sufficiently professional for a patient to risk obtaining a graft from them? Secondly, when the grafted person returns to his country, he still needs the aforementioned follow-up, not to mention the pharmaceutical drugs that he has to take on a daily basis. This last element makes it quite easy to tell who has obtained a graft in a foreign country, and to detect the existence of illegal biomarkets.

10. It is interesting to note that in their description of the new software, Roth and Peranson (1999, pp. 760–761, 767) emphasize that on many occasions the new software does not greatly alter the final results: only 0.1% of the applicants are affected when a simulation is run with the new software on data already run with the former software. This does not prevent the new software from being more efficient in treating the complexities relating to strategic behavior and applications by couples (instead of individuals). Nevertheless, this marked similarity suggests that the new software played an important role in calming a situation characterized by a growing lack of trust. The design of new software, as we shall see below, involves a political dimension, something that should not be overlooked.
11. This is similar to the distinction that François Vatin has rightly and forcefully made between analytical mathematics and engineering mathematics (*la science de l'ingénieur*) in nineteenth-century political economy (Vatin 1993 – see also Weiss 1982 and Grall 2003).
12. '... much can be learned from the history of related markets, and sometimes there is an opportunity and a need to tinker with a new design, based on early experience. Finally, at least some of the work design reflects the fact that the adoption of a design is at least partly a political process' (Roth 2002, p. 1345).
13. It is worth noting that Francis Delmonico is among the co-authors of the paper published in *Transplantation* (Saidman *et al.* 2006). Delmonico is a Boston transplant surgeon involved in the present debates on biomarket, defending the present ban on markets in transplantation.
14. It goes without saying that Roth is perfectly aware of the need for this learning process when he does experimental economics, notably when he carried out experiments on clearinghouses following on from his engineering work (Kagel & Roth 2000, p. 212).

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