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The Behavioral Economics of Organ Donation: How do Cognitive Biases and Default Options Influence Organ Donor Rates?

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ABSTRACT

In light of extreme organ shortages in countries around the globe, several nations have chosen to shift from an opt-in system to an opt-out policy in the hopes of improving donor rates. Using concepts of behavioral economics such as the endowment effect and the status quo bias, I will analyse why this policy change may be an effective way of increasing organ donation rates by narrowing the gap between those willing to donate and those who actually donate. The paper provides a closer analysis of these systems using two case studies: the USA, which adopts an opt-in system, and Spain, which uses a soft opt-out policy. Furthermore, this study also examines the impact of message framing on individual choices involving organ donations. My findings suggest that cognitive biases and default options are in fact capable of influencing decision-making regarding organ donations, resulting in greater donor rates in countries adopting an opt-out system over an opt-in one. Nevertheless, my analysis also concludes that an opt-out system alone is not an effective way to significantly increase donor rates, and should therefore be implemented alongside administrative and campaigning strategies. Finally, the impacts of framing on choices involving organ donation still remain inconclusive, prompting a more detailed analysis in the future.

Keywords: Behavioral economics, Economics, Psychology, Status quo bias, Endowment effect, Health policy

1. Introduction

Organ transplantation is a field of medicine with extremely high stakes, offering patients a final chance at life. All over the world, the demand for organ transplantation continues to increase rapidly as a result of advancements in transplant surgery and increased success in post-transplant outcomes. In most countries, however, a major organ shortage crisis has posed a threat to the

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health and living outcomes of numerous patients, and as demand continues to grow, the availability of adequate organs seems only to decrease.

Organ donations can be divided into two principal categories:

- Living donation: An organ donation that is made available through a living donor, but is generally limited to renal and hepatic donations
- Deceased donation: Organ donation from a non-living donor.

Both living and deceased organ donations experience critical shortages, with over 366,000 patients currently waiting for a lifesaving transplant (2022). Beyond unfavorable patient outcomes, several negative externalities are associated with low organ donor rates. Countries with lower organ donation rates have increased healthcare costs, as patients require ongoing treatment plans such as dialysis or other interventional medical procedures. Another spillover is the loss of productivity, as patients waiting for organ donations are often unable to work and hinder economic growth.

In the US, several media campaigns have been implemented in an effort to increase donor rates: on May 12th 2012, Facebook altered its platform to allow users to specify 'Organ Donor' as part of their profile. Similarly, in 2003, the DHHS launched an "Organ Donation Breakthrough Collaborative" aimed at increasing organ donations in the nation's largest hospitals. Several of these efforts have been funded by the US department of Transplantation, offering a series of grants to replicate successful initiatives nationwide. That being said, despite efforts from governments to raise awareness surrounding organ donations amongst populations, the number of deceased organ donors is still insufficient to allow for transplantation for all patients. Beyond an actual organ shortage, the large difference between the number of patients and organ donors is also a result of the discrepancy between expressed preferences and actual donation behavior. For instance, in 2006, 56% of Europeans expressed willingness to donate their organs after death, but only 12% owned an organ donation card (Eurobarometer, 2007). In the US, this discrepancy is even more conspicuous, with 90% of respondents supporting organ donation, but only 50% signed up as organ donors (Department of Health and Human Services, Health Resources and Services Administration, 2019). These inconsistencies imply that a potential organ donor pool still remains, most notably in countries adopting an opt-in system.

Given that organ supplies usually fall short of demand for them, public policy specialists are constantly looking for mechanisms to boost organ supply. In particular, some countries have implemented legislative strategies aimed at increasing the number of deceased organ donors. In opt-in countries, organ removal is only allowed if the organ donor has explicitly consented to

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organ donation during his lifetime. In opt-out countries, anyone who has not objected can become a donor. Some countries choose to adopt a 'hard' system, where the next of kin is not involved in the decision-making process. Others employ a 'soft' system, where close relatives are consulted on the removal of the organ.

The opt-in versus opt-out donation systems differ in their default option, of either 'donating' or 'not donating.' The impact of this difference is explored in the paper through a behavioral economics lens, addressing cognitive biases such as the endowment effect and the status quo bias to justify why organ donation rates in opt-in countries tend to be lower than for opt-out countries. The discussion relies on data from two major case studies: the United States and Spain. These ultimately show that a shift to an opt-out donation system can significantly increase donor rates, an effect that persists long term.

2. Default Systems in Organ Donation

Nudge theory, a concept in behavioral economics, involves subtly pushing individuals into the direction of a desired outcome via indirect means. Nudges leverage widespread cognitive biases in order to guide decision-making in a more predictable way, without compromising freedom of choice. This non-coercive public policy is often vindicated on the basis of the as-judged-by-themselves principle, which suggests that people are nudged into a choice that they themselves truly want. In organ donation systems, nudge theory applies to the default choice put in place: opt-in systems assume individuals are not organ donors unless they actively choose to be registered as an organ donor by, for example, obtaining a donor registration card. On the other hand, opt-out systems assume that individuals are organ donors unless they explicitly object to donation at some point in their lives. Thaler and Sunstein's seminal book Nudge refers to these systems as a country's adopted choice architecture, which specifies under which conditions choices are made. This can include the way choices are presented, the extent of information provided to decision makers, and whether a particular option is set as a default choice (Beraldo & Karpus, 2021). Thaler and Sustein argued nudge based policy interventions under the idea that people often make imperfect decisions as a result of limited human cognitive abilities. True rational decision-making is only achieved by non-existent *econs* or *homines economici.* If individual decision-making is generally undesirable, it may be advantageous to steer people towards more favorable decision-making. Nudge-based policies, therefore, intend to tap into people's own judgments of what is best for them, or as Thaler put it: "We just want to reduce what people would themselves call errors" (2015, p. 326).

Countries with the highest organ donor rates, such as Spain, Portugal, Austria and Belgium, more commonly adopt an opt-out policy, suggesting that changing people's default choice is an effective way to apply nudge theory in organ donation policies. This, however, does not mean

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that individuals in opt-out systems are more willing to donate than those in opt-in systems. In fact, data from the Special Eurobarometer 333a report (European Commission 2010) suggests no clear difference between individual's willingness to donate organs between countries adopting an opt-out system versus an opt-in system. Most people do not express a decision - whether that means donating or not donating - regardless of the system put in place. By making organ donation the most accessible choice, opt-out systems cater towards those individuals willing to donate in the first place but who might have been easily swayed by the non-donor default.

Similarly, prospect theory also plays a central role in decision-making involving organ donation. Prospect theory (Kahneman & Tversky, 1979) explores how individuals make decisions under uncertainty, particularly discussing the importance of losses and gains. Firstly, the theory suggests that individuals are more sensitive to losses than equivalent gains as a result of loss aversion. Secondly, Kahneman and Tversky identified that decisions are framed relevant to a reference point, which often refers to the status quo. Applying prospect theory to organ donation policies, it is evident that the framing of choices can influence whether donating an organ is perceived as a gain or a loss: in opt-in systems, donations are presented as gains whereas in opt-out systems, not donating is interpreted as a loss. Since losses and gains are perceived asymmetrically, the losses from not donating in opt-out systems loom larger than gains in opt-in systems, so individuals are more hesitant to opt-out. This, in turn, results in greater organ donor rates in countries adopting an opt-out system.

3. Endowment Effect

The endowment effect, (Thaler, 1980) also known as divestiture aversion, is defined as a cognitive bias where individuals assign a higher value to goods they own than goods they don't. Thaler's questioning of the rational economics behavior model led him to conclude that people demand much more to give up an object than they would be willing to pay to acquire it, a bias attributed to loss aversion. Kahneman et al.'s famously quoted experiment of the mug and pen demonstrates the prevalence of the endowment effect: undergraduates at Cornell University were given either a pen or mug of equal value and then offered a chance to trade it for the equally valued alternative. Students in possession of the mug valued it at double the cost of those who did not own the mug, exemplifying first hand how individuals perceive items they own to be of greater value. In organ donation systems, the endowment effect translates to a hesitance to change options even when advisable. Given one's propensity to over-value items they own, leveraging an opt-out system means reversing this balance. In opt-in systems, the default 'ownership status' favours the endowment effect, making individuals instantaneously attached to the non-donor default option.

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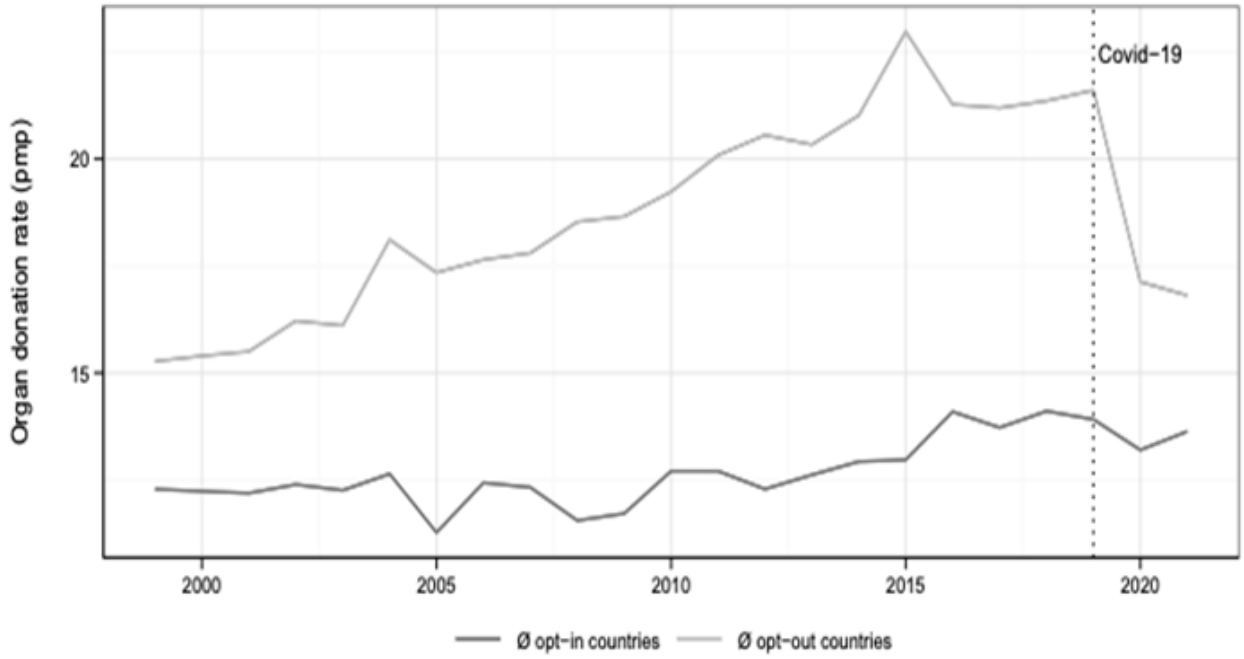
Figure 1 (Spuentrup, 2023) shows organ donations per million population (pmp), suggesting a greater organ donation rate for opt-out countries than opt-in ones. A notable drop in organ donation rates after Covid-19 is likely a result of the increased burden on the health care system and its workers as well as reluctance to transplant organs from deceased patients who could possibly have been infected with Coronavirus. Even so, opt-out countries have sustained a considerable advantage over opt-in countries.

Figure 1. Organ donation rate (pmp) in opt-in versus opt out countries over 20 years



Even though opt-out systems show a clear advantage over opt-in systems, this discrepancy may not be fully attributable to the endowment effect. More specifically, debate has risen as to the impact of this cognitive bias on consumer decision-making when it comes to hedonic versus utilitarian products. Hedonic products are those consumed primarily for pleasure and excitement while utilitarian goods are more practical and functional, serving specific needs to achieve a particular outcome. In a study by Leonie Cramer and Gerrit Antonides, a sample of students from the Netherlands was found to prefer keeping their hedonic good rather than their utilitarian good in endowment, suggesting a stronger endowment effect for hedonic products as compared to utilitarian products (Cramer, 2011). This distinction reveals that ownership does not always increase perceived value in the same way: emotionally charged hedonic goods carry greater psychological attachment, increasing one's reluctance to trade or give them up. A greater sense of ownership will intensify an individual's perceived loss where that good is being taken away,

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thus magnifying the endowment effect. Decision-making involving organs - an utilitarian product - should therefore be less strongly affected by the endowment effect, demonstrating that the gap in donor rates between opt-in and opt-out donation systems cannot be fully explained by divestiture aversion.

4. Status Quo Bias

Behavioral science tells us that key psychological barriers can prevent people from becoming organ donors, most notably what is known as the status quo bias – meaning that individuals tend to stick to the current state of affairs, even when change would better align with their personal goals or beliefs (Robitaille, 2019). According to Columbia Business School, defaults can increase the uptake of a pre-selected decision by 27.24% on average (Columbia Business School, 2019). In the medical field, the status quo bias plays a prominent role in the day-to-day decision-making of physicians, particularly when deciding between several treatment options. Amongst these various paths, the most automatic one is likely to be favored by clinicians. Likewise, in opt-in systems, individuals might not choose to register as organ donors, even if they would like to donate, due to the inertia of not making a decision (Andrade, 2024). The status quo bias makes it much easier for individuals to remain non-donors in opt-in systems and to remain donors in opt-out systems, leading to significantly different organ donor rates across countries adopting varying policies. The perceived effort in opt-in systems can also make it even harder for the status quo bias to be overcome.

Moreover, the default effect refers to an individual's tendency to choose the default option when presented with several choices. In organ donation systems, the status quo and the default option are the same, resulting in the overlap between the status quo bias and the default effect. Beyond behavioral inertia, defaults can also affect decisions by making decision makers perceive the respective default as implicitly recommended by politicians (Johnson and Goldstein, 2004). This idea is further emphasised by the fact that people often make decisions in the way they think others do (Thaler and Sunstein, 2009).

5. Framing Effects

The way information is presented can significantly influence one’s choices, even if the underlying information is the same. In our two modes of thought, the fast and automatic System 1 is more easily manipulated by how choices are framed, allowing for cognitive biases to influence decision-making. Message framing refers to the effect that the presentation of a question or prompt has on the ability to appeal to an individual's cognitive biases, thus swaying their decision towards a desired path. This effect is predominantly associated with gain versus loss framed prompts: a gain frame prompt informs individuals on the statistical gains of their

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decision, while a loss frame specifies the statistical losses (Aneja, 2024). Message framing differs from the framing of events relevant to a reference point that was explored earlier in the paper. While the framing of events relevant to a reference point relies on the status quo or default option, message framing is a response to how information is presented. For instance, emphasising that 'you could save multiple lives' is framing organ donations as a gain, while stating that 'everyday people die waiting for a transplant' is an example of a loss framed message. Loss framed messages are sometimes perceived as coercive, increasing psychological resistance and reducing the likelihood of donation (Miller, 2021).

Nonetheless, the effects of framing on organ donation systems still remain inconclusive, given that several studies have yielded varying results. In a study conducted by the Department of Psychology at the University of Pittsburgh, no correlation was found between message framing and an individual's willingness to donate (Aneja, 2024). One possible explanation for this result is that individuals were more greatly influenced by their values and opinions over the message frame provided, especially considering the high-stakes involved in donating one's organs. Alternatively, the decision to donate one's organs is arguably a product of System 2, not system 1. When faced with complex and important choices - such as whether to donate one's organs - individuals will usually employ System 2 decision-making. This mode of thinking is conscious and effortful and is therefore less subject to the effects of framing.

6. Utility Theory and the Economics of Donor Decision-Making

Utility maximization suggests that individuals will seek to attain the highest level of satisfaction from their economic decisions. In opt-in systems, the perceived cost of registering as an organ donor (paper work, time, registration effort) introduces a disutility, disincentivizing individuals from registering as organ donors. Reducing the perceived cost of donation can increase net utility, thus increasing overall donor rates. In opt-out systems, the utility loss from the effort of donating is avoided, increasing net utility and eliminating the barrier between a non-donor and donor status. Nevertheless, within organ donation systems, psychological utility – the subjective value or perceived usefulness of a decision or outcome – will also uniquely shape the experienced utility of every individual. Some may derive satisfaction from knowing they will be helping others, despite the benefit being distant and abstract. This, in turn, suggests that while the choice between opt-in versus opt-out donation systems has the power to alter net utility, its influence over psychological utility is minimal (only in instances where the default option is seen as the recommended option and might shift one's preferences for donating), since this specifically relies on an individual's personal beliefs and values. Increasing psychological utility can be more effectively achieved through a system of priority allocation for registered organ donors, meaning that those individuals already registered as organ donors will receive higher priority for organ transplants if needed in the future. This may incentivise individuals to register

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as donors by offering a tangible benefit to organ donation: in China, the number of individuals registered as organ donors has significantly increased since the system of priority allocation was introduced in 2011, with approximately 6.3 million people being registered as organ donors in 2023 (Zhang, 2023).

The concept of utility maximization, however, relies on the principle of rational decision-making, an assumption that is generally not applicable to the choices and decision-making of ordinary individuals. Cognitive biases hinder an individual's ability to act rationally, resulting in suboptimal decisions. The present bias, referring to one's tendency to overvalue immediate rewards over future ones, can significantly impact utility maximization. When it comes to organ donation systems, the present bias translates to an overvaluing of short term convenience, such as not registering as an organ donor, over the long term benefits of saving lives. Despite one's willingness to donate, the immediate inconvenience of registering can discourage an individual from enrolling as a donor, resulting in a gap between individuals willing to donate and those who actually donate. Opt-out donation systems narrow down this gap by effectively minimizing the present bias and reducing perceived costs and the inconvenience of registering as an organ donor. Interestingly, since the default option is to donate, the present bias can also work in the opposite direction: the immediate costs of opting out are greater than the distant benefits of not donating, resulting in donations from individuals who never intended to contribute in the first place.

7. Case Studies

7.1 United States

122,625 patients are currently on a waitlist for a life-saving organ transplant in the United States. On average, around 22 patients die each day while waiting for a transplant that has been put on hold due to the extreme organ shortage in the US. Over the last few decades, the demand for organs has increased exponentially due to a variety of factors: obesity, alcohol abuse, diabetes and an aging population have all contributed to an increased need for organ transplants, a rate that organ donor supplies have not kept up with.

The United States currently adopts an opt-in donation system which assumes that everyone does not wish to be an organ donor unless explicit consent for organ donation is given during one's lifetime. This system requires individuals to actively register their consent to be a donor in a legally binding agreement. Some argue that using an opt-out donation system can help increase donor rates in the country. This system, however, goes against the cultural emphasis on individual autonomy, a question that could spark political debate and controversy following the transition to an opt-out organ donation system. Supporters of the implementation of the opt-out

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donation system in the US discuss the potential signaling effect of the policy: the default option is assumed to be a suggestion favoured by the government and society, thus increasing donor rates (Spuentrup, 2023). The opt-out approach would also help normalise organ donation, which alone is beneficial (Ahmad, 2016).

Nonetheless, cultural barriers and a lack of transparency regarding organ donation systems can pose a significant threat to the success of the opt-out policy in the United States. Firstly, varying religious beliefs, values and experiences amongst different communities result in differing attitudes towards death and the afterlife, discouraging organ donation. Secondly, distrust in the healthcare system is notoriously high in the United States, with two thirds of Americans expressing distrust in the health care system (Saad, 2023). While the Health Resources and Services Administration is actively working to ensure greater transparency in the organ donation and transplantation system, gaps between the government's and the public's knowledge still remain a source of information asymmetry, further discouraging organ donations.

Using data from the Organ Procurement and Transplantation Network Standard Transplant Analysis and Research files, a group of researchers at the University of Michigan developed a computer model to simulate how a policy shift to an opt-out organ donation system would impact patients on the waiting list for a heart, kidney, liver, lung or pancreas between 2004 and 2014. A conservative estimate predicted a 3% to 10% reduction in the number of individuals on the waiting list, but under ideal circumstances, the number of patients on the waiting list could have been reduced by up to 52%. While significantly improving organ donor rates, this policy shift is still not enough to meet the increased supply. The implementation of an opt-out donation system in the US is therefore not a silver bullet, but will require continued cultural and political campaigning throughout its enactment.

7.2 Spain

Spain's long-standing international leadership in organ transplantation is both attributable to its strong socio-political support and solid legislative framework ("Organ Donation: Lessons From the Spanish Model," 2024). With the highest organ donation rate globally, Spain reached 52.6 donors per million population in 2024, surpassing its previous record of 48.9 in 2023 (Spain, With Over 6,400 Transplants, Exceeds Forecasts for 2024, 2025). Spain operates an opt-out system, where everyone is an organ donor by default, but families of the deceased will have the final say.

The opt-out organ donation system has been heavily criticised due to ethical and practical concerns. Most notably, a number of authors suggest that opt-out systems fail to secure valid and informed consent to organ donation. This criticism is especially used against the hard opt-out

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system, where an individual's organs will be removed after death if the person has not opted out and the family has no say on the matter. This system leads to the frequent objection that the state is taking over the individual's body after death. Consent must be an active process and cannot be presumed just because no objection has been given by the individual (Rudge, 2018). Spain, however, has adopted a soft opt-out system, where consent is presumed but ultimately the family is the one to decide whether donation is agreed upon or not. Ethically, this system raises much less concern and objections, facilitating the implementation of the opt-out strategy in Spain.

While since the adoption of the system in 1979, organ donor rates have increased in the country, the Spanish authorities have stated repeatedly that their success in organ donation does not stem solely from the law. Dramatic increases in donor rates were only observed after 1989, with the creation of the National Transplant Organization (ONT). With a focus on coordination and infrastructure, this body is focused primarily on establishing medically qualified donor coordinators in every hospital and promoting public awareness. This suggests that the opt-out system alone was not responsible for Spain's increased donor rates, but was only effective when implemented alongside coordination and awareness strategies. Spain's organ donation system serves perhaps as an indication of the limitations of nudges and cognitive biases in shaping decision-making, since they are ultimately unable to greatly influence one's preferences or values. Here, awareness campaigns become vital, helping promote greater public trust in the transplant system and address misconceptions about the organ donation process. Since its initial adoption, the Spanish Model has been successfully introduced in several other countries such as Portugal, Italy, Croatia and continues to serve as a role model for other organ donation systems worldwide.

8. Policy Implications: How to Improve Organ Donation Systems

Ultimately, the effectiveness of an opt-out organ donation policy on donor rates is clear. In opt-out countries, more than 90% of people register to donate their organs, yet in opt-in countries, this number falls to 15% (Scheiber, n.d.). Despite ethical considerations regarding opt-out organ donation systems, the Spanish Model has shown that a soft opt-out strategy can be an effective way to mitigate these concerns, helping ease the implementation of an opt-out system.

Opt-out systems harness the power of cognitive biases in shaping one's decision-making: nudges help frame organ donation as a social norm, pushing individuals towards consent. Likewise, the status quo bias favors the default option, which in opt-out systems, is the consent to organ donation. From a microeconomics perspective, an opt-out strategy is also effective in eliminating transaction costs by removing the need to register as an organ donor. Combining principles in behavioral economics and utility theory can help nudge individuals towards choices that best

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align with both their personal preferences and broader societal benefits, substantially improving organ donor rates.

Along with an opt-out strategy, policy makers should look to adopt educational campaigns designed to shift the narrative of organ donation from a loss (giving up one's organs) to a gain (saving lives), aligning with the principle of loss aversion. From the Spanish Model of organ donation, it is evident that an opt-out system alone is not enough to meet organ needs, and must be met with consistent efforts to improve awareness surrounding organ donation and establish more efficient legislative and legal frameworks. Individuals will be more willing to commit if they perceive the system as fair and considerate of their wishes, emphasising the need for transparency and trust between the population and the government.

9. Conclusion

Organ donation systems are shaped by a complex interplay of behavioral and microeconomic forces. When considering utility maximization theory, individuals may gravitate towards a choice that reduces perceived costs such as time, effort or emotional discomfort and optimizes benefits. Similarly, cognitive biases such as the endowment effect, framing effect and the status quo bias can influence one's reluctance to donate organs, revealing tensions between one's individual preferences and collective welfare. While the enhancement of social welfare may be taken into account, a decision as personal as donating one's organs relies on unique preferences that may take precedence over maximizing social utility. Understanding decision making behind organ donation systems, therefore, requires a combination of classical and behavioral economics concepts, accounting for individual self-interest and psychological biases. These critical aspects of individual choice make utility maximization theory an insufficient model when holistically evaluating real-world choices in organ donation systems.

When it comes to the effectiveness of opt-out organ donation strategies versus opt-in, the former holds a clear advantage. Comparing the systems adopted in the USA and Spain, the Spanish Model has shown consistently better results in terms of total organ donors per million people, a difference that is partly attributable to its opt-out system. Significant increases in donor rates were most frequently observed when an opt-out system was implemented alongside campaigning strategies, promoting greater public trust surrounding the organ donation system while also addressing moral concerns that may arise from the adoption of a presumed consent policy. Future policy development should continue to integrate these behavioral insights in order to design systems that favor the overall welfare of society, reducing healthcare costs and promoting transparency between policymakers and the public. Navigating policy reevaluations will likely require further research and investigation, but in the long-run, can prove to be an effective way of promoting individual well-being and increasing the overall productivity of workers.

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Nonetheless, ethical concerns regarding the use of opt-out systems still remain: some suggest that such policies have moved from persuasion to manipulation, functioning as a tool for coercion and limiting individual autonomy. That being said, while behavioral insights are powerful tools that can help reduce organ shortages around the globe, their implementation should be coupled with greater government transparency and respect for individual consent, helping educate the public rather than limit freedom of choice.

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