Opt In? Opt Out?

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Abstract

Thousands of people die each year waiting for a life-saving organ transplantation. Cadaveric organ donations from the deceased provide the majority of transplanted organs in the U.S. and many other countries. In the U.S., a potential donor has to "opt in" to become a donor under the principle of informed consent. Many countries around the world have shifted cadaveric organ procurement to a presumed consent system where a deceased person is classified as a potential donor in absence of explicit "opting out" to donation before death. Using an event studies design and newly constructed cross-country panel data, I offer novel causal evidence on the impact of presumed consent laws on donation rates. I offer theoretical predictions on when opt in is better than opt out, and when the opposite is true. I study in the laboratory an experimental game modeled on the decision to register as an organ donor and the decision to donate someone's organ on their behalf as a decision proxy to investigate how changes in the default consent regime might impact donations. I find that an "opt in" regime dominates an "opt out" regime except in situations where a population's donation propensity is moderate and where families have little power to overturn the consent.†

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1 Introduction

Human organs are critical medical resources in shortage. Over 100,000 Americans are waiting for an organ transplant and over 5,679 died waiting for an organ in 2022. Tens of thousands more die without getting a needed transplantation due to the lack of access around the world.

The lion share (70%+) of the organs transplanted in the United States come from deceased organ donors. Various proposals have been made to improve incentives (Chan and Roth (2024), Elías et al. (2019), Elias et al. (2015)) and the organ donor registration system (Kessler and Roth (2012), Kessler and Roth (2014a), Kessler and Roth (2014b)) to increase the supply of organs. Under the principle of informed consent, potential donors in the U.S. have to "opt in" to becoming organ donors while they are alive. Many countries have shifted to a presumed consent system where everyone is presumed to be organ donors by default unless they "opt out" of being donors. Defaults have been very successful "nudges" (Thaler and Sunstein (2009)), and countries with a presumed consent system have been shown to have dramatically more people who did not opt out than people who opt in in a informed consent countries (Johnson and Goldstein (2003)). This might suggest a switch to an "opt out" system as a way to increase organ donations. However, the differences in actual, deceased organ donation (as opposed to registration) between opt in and opt out countries are far less dramatic (Abadie and Gay (2006)). If families of the potential donor can overturn donor consent, it is not clear whether switching to opt out will cause actual organ donations to increase. Furthermore, aside from the ability to overturn consent, families or other decision proxies for the deceased can hold very different beliefs regarding the true intentions of the deceased, potential donor. The question of whether opt in or opt out is better has a more nuanced answer.

In this paper, I create and utilize a cross-country panel data and an event study design and report novel causal evidence on the impact of presumed consent or "opt out" laws on deceased organ donation rates, and account for the heterogeneity of such impact. The results reveal substantial heterogeneity: while opt-out reforms are associated with increased donations in contexts with strict enforcement—where family veto power is limited—switches under weak consent frameworks often yield negligible or even negative effects. I then theoretically delineate conditions under which "opt-in" frameworks may outperform presumed consent regimes and vice versa, emphasizing the critical roles of population donation propensity and the authority granted to families in overriding donor registrations. Complementing my theoretical framework, I implement a laboratory experiment modeled on the decision to register as an organ donor and to consent to donation as a proxy decision-maker. This experimental design allows for nuanced investigation into how defaults and family veto powers interact to influence ultimate donation decisions.

This paper makes several contributions. First, using a novel cross-country panel dataset and an event study design, I provide credible causal estimates of the heterogeneous impact of opt-out laws, distinguishing effects under strict versus weak enforcement regimes. Second, I develop a parsimonious theoretical model that explicitly incorporates signaling and the role of family decision-makers to explain this heterogeneity. Third, I experimentally test the model's core comparative statics in a controlled laboratory setting, providing robust evidence on the mechanisms at play.

To explain the differential impacts of opt out regimes under strict versus weak consent regimes, I use a representative agent model with two players to model the decisions of the potential donor and the family, as well as actual institutional details around deceased organ donation. The model offers predictions on donation rates under different scenarios: opt in or opt out, strict or weak consent, high or low family priors on the willingness to donate on part of the deceased, and high or low costs of changing the default. Heterogeneity in the effects of switching to opt out can be accounted for my the model. The lab experiment then tests the full set of comparative statics for each of the scenarios against theoretical predictions. These (theoretical and experimental) insights offer, to my knowledge, novel, clarification on the conditions under which opt out will outperform opt in for organ donations.

Under either opt in or opt out, potential donors can change the default while they are still alive and express their preference to opt in by registering as an organ donor under informed consent or opt out of being one under presumed consent. In the United States, people can opt in to being organ donor at the Department of Motor Vehicles (DMV) when they are getting their drivers licenses or go online and register as an organ donor with the National Donate Life Registry. In a later time, if a potential donor unfortunately passed away in a manner compatible with organ donation,[1] their next of kin will be

[1] Most eligible deaths are deaths of individuals under 75 who are legally declared brain dead according. These deaths are typically cause of traumatic, sudden events like a car accident, gun shot wound, or hypoxia due to drug overdose (Chan and Roth (2024)).

consulted to "authorize" an organ donation. The U.S. is an example of a country with "weak consent," such that even if a potential donor has consented, the family is often able to overturn the consent and block donation at low or no cost in practice (Chan (2020)). When presumed consent legislation is applied strictly, i.e. under "strict consent," if the deceased individual did not opt out, they are deemed an organ donor, overriding family approval. Some families have taken the issue to court and are able to challenge the "strict consent," but the costs are far higher. In some other cases, organ recovery might even commence before the families are notified when there is presumed consent under a "strict consent" regime. Strict consent is increasing uncommon, if not entirely unused in the organ donation space today.[2]

A key friction arises from the fact that families often serve as default or proxy decision-makers, and their ability to overturn prior consent introduces a wedge between expressed preferences and actual donation outcomes.

Despite widespread public support for organ donation, few people across multiple continents explicitly communicate their donation preferences to family members. In fact, studies from the United States and Europe consistently find that the majority of families approached about organ donation were unaware of their loved ones' wishes or had never discussed the topic beforehand (Schulz et al. (2012), Siminoff and Lawrence (2002), Jacoby and Jaccard (2010)). The awareness is likely even lower for non-Western cultures (Ralph et al. (2016)). One possible explanation for the lack of these conversations is the influence of behavioral factors, including a visceral discomfort or "yuck factor"—a fundamental feeling of disgust or unease associated with thoughts of bodily mutilation or disfigurement after death (Morgan et al. (2008)). Such emotional or subconscious reactions may prevent individuals from openly discussing or even considering organ donation, leaving families ill-prepared to make informed decisions during highly emotional situations. Signals outside of the organ donor registration system seem to not be used in practice by potential donors to express their preference (i.e., as a substitute for opting in/out as a signal).

My simple signaling model of deceased organ donation capture this dynamic where opting in/out is relied upon as a signal of a potential's willingness-to-donate and explain

[2]In the U.K., my collaborators at the National Health Services have worked on and helped deploy a new system of layering in an "opt in" on top of a weak consent, "opt out" regime in the early to mid-2020s. We are exploring the impact of such a mixed system in our collaboration.

the patterns in the observational data. In the model, a potential donor can pay a cost to explicitly signal their donation preference. Under an opt-in system, willing donors can opt in, credibly signaling their wish to donate and helping families authorize donation. Under opt-out, however, willing donors lack an affirmative mechanism to reinforce their willingness to donate, whereas unwilling donors can pay to opt out. When signals are not too costly, this asymmetry favors opt-in regimes: willing donors have a lever to help families authorize donation, while unwilling donors under opt-out can undermine donations by opting out. Thus, when signaling is cheap, opt-in yields at least as many donations as opt-out.

Conversely, when signaling is very costly, few individuals opt in or out. In this case, family decision-making is guided primarily by priors and the structure of consent. Under strict consent regimes, presumed consent laws impose real costs on families who attempt to block donation, shifting the belief threshold toward authorizing donation even in cases of moderate uncertainty. As a result, under strict enforcement and high signaling costs, opt-out regimes can dominate opt-in by facilitating more donations.

To empirically test the model's predictions, I design and implement an incentivized laboratory experiment with about 1,000 participants. Subjects play a stylized donation game using a neutral asset ("wugs") rather than actual organs. Participants make decisions both as potential donors (whether to incur a cost to express a preference) and as family proxies (whether to authorize donation), under randomly assigned opt-in or opt-out regimes. The experimental design varies three key parameters: the cost of signaling, the cost of overturning defaults, and the family's prior beliefs about the donor's type. This factorial design allows a clean mapping between theoretical comparative statics and observed behavior.

The laboratory results closely match the theoretical predictions. Under weak consent regimes, opt-in consistently yields weakly higher donation rates than opt-out. Under strict consent regimes, opt-out improves donation rates only when signaling costs are high and family priors about donor willingness are intermediate. In the latter case, the experimental results indicate a significant doubling of donation rates. Otherwise, opt-in remains superior. These findings suggest that default policies interact critically with institutional enforcement and behavioral frictions, and that naive switches to opt-out are unlikely to uniformly improve organ donation outcomes.

Taken together, the paper offers new causal and experimental evidence on an important question of market design: how legal defaults, signaling costs, and proxy decision-making jointly shape high-stakes organ supply outcomes. The results inform ongoing policy debates in the U.S., Europe, and beyond, and illustrate broader principles for the design of consent mechanisms in healthcare and beyond.

The experimental results are summarized in two simple figures (Figures X and XI), each spanning the full parameter space defined by the three key dimensions. This structure allows readers and policymakers to flexibly interpret the results based on their own assumptions about how parameters might shift with a policy change—for instance, if presumed consent laws alter population donation propensities or family beliefs.

Finally, this paper also contributes broadly to the literature on nudges and default-based interventions, highlighting important limitations and unintended consequences of using defaults as policy tools. Prior studies, such as Beshears et al. (2024), have demonstrated how the intended effects of defaults can be partially offset by compensating individual behaviors—for instance, automatic pension enrollment leading to increased debt. My research uncovers a similar offsetting dynamic, identifying how defaults can remove opportunities for individuals to explicitly express or signal preferences, thereby reducing information available to decision-makers. Although this paper examines organ donation specifically, similar signaling frictions could affect other domains, such as inheritance rules that default to certain asset distributions, potentially increasing intra-family conflicts or costly litigation. Thus, my findings highlight a generalizable caution in default-based policy design, emphasizing the importance of understanding signaling and informational dynamics alongside behavioral nudges.

The paper is organized as follows. Section 2 presents the background information on consent regimes and describe the empirical design and results for my observational data. In Section 3, I describe the model. In Section 4 and 5, I describe the lab experiment and results from the experiment. Section 6 concludes.

2 Presume Consent, Informed Consent, and Deceased Organ Donation

2.1 Deceased Organ Donation: Importance, Shortages, and Behavioral Frictions

Organ transplantation largely depends on deceased donors (Chan and Roth (2024)). A single donor can save multiple lives, yet organ supply dramatically lags behind demand. Despite widespread public support, actual donor registration remains frustratingly low. Even though surveys show over 85% of Americans support organ donation, only about half have formally registered—perhaps procrastinating due to the grim reality of signing up for something they'll never personally benefit from.

A key reason for the shortage is the limited pool of medically eligible deceased donors—about 35,000–40,000 annually in the U.S.—with fewer than 8,000 actual donations. Much of this gap arises from authorization hurdles. Without explicit registration, hospitals must rely on grieving family members, about half of whom refuse consent in the U.S. and U.K. (Chan and Sweat (2025)), compared to just 20–30% in countries like Spain or France. Such disparities highlight the impact of institutional defaults and cultural norms on donation decisions.

Behavioral barriers further limit donor registrations (Kessler and Roth (2024)). The emotional difficulty of confronting one's own mortality can impose a cognitive cost. While registering as a donor is as easy as checking a box online or at the DMV, the psychological weight often leads to procrastination or avoidance. As a result, family members often make difficult decisions under emotional duress without clear guidance. Understanding these behavioral and institutional frictions is crucial for effectively addressing the shortage.

2.2 Informed Consent vs. Presumed Consent: History, Policy, and Global Debate

Countries differ greatly in how consent for organ donation is structured, reflecting varying legal philosophies and historical developments. Broadly, systems are classified as informed consent (opt-in), where explicit permission is required, or presumed consent (opt-out), where everyone is considered a donor unless they explicitly refuse.

Historically, most of continental Europe adopted presumed consent in the late 20th century, including France, Belgium, and Austria, each with nuanced implementations (Gevers et al. (2004)). Historically (in the 1980s), Austria employed a strict presumed consent policy allowing procurement without family approval, whereas Spain uses a "soft" approach, consulting family members despite the default assumption. By contrast, the U.S., U.K., Germany, and others retained informed consent systems emphasizing individual autonomy and explicit registration.

Asia and South America have recently seen shifts as well. Singapore implemented presumed consent in 1987, significantly raising donation rates, while Japan maintains an explicit opt-in policy, partly due to cultural sensitivities around death. In South America, Brazil briefly experimented with presumed consent in the late 1990s but reversed the decision after public backlash and widespread distrust. Argentina and Chile adopted presumed consent more recently, resulting in mixed impacts and renewed public debates (the $N = 1$-observation of how "opt out" worked in South America is well summarized by the title of Domínguez and Rojas (2013): "Presumed consent legislation failed to improve organ donation in Chile").

The U.S. remains firmly committed to explicit opt-in consent, reinforced by first-person consent laws. Under these statutes, registered donors' decisions legally override family objections. While this approach respects autonomy, its effectiveness relies heavily on proactive individual registration. Without it, hospitals must defer to families, frequently resulting in refused consent.

Advocates of presumed consent argue it significantly boosts donation rates by leveraging inertia—if people delay paperwork under informed consent, they'll similarly avoid opting out. Indeed, presumed consent countries often experience higher donation rates, as observed in Belgium and Austria following policy shifts in 1980s (Michielsen (1996), Gnant et al. (1991)). Skeptics caution, however, that correlation doesn't imply causation; presumed consent nations often differ culturally, institutionally, and in health infrastructure. For example, Spain's high donation rate is frequently attributed not only to its opt-out framework but also to its extensive transplant coordination and public awareness campaigns (Matesanz (2001)).

The debate remains unresolved due to primarily observational data. Few natural experiments exist; policy shifts typically coincide with broader institutional changes or public campaigns, complicating clear causal inference (a potential violation of the parallel trends assumption that can plague my design as well). Thus, while presumed consent is sometimes associated with higher donation rates, the extent to which the default setting itself drives these outcomes remains uncertain.

Given the high stakes—thousands of lives annually—there is a critical need for rigorous research. Future analyses must provide credible causal evidence and robust theoretical frameworks to better understand how consent policies truly influence organ donation outcomes, enabling more informed policy decisions worldwide.

2.3 The Heterogeneous Benefits of Opt Out: Some Causal Evidence

Despite the extensive policy interest in increasing organ donation, relatively few studies have attempted to evaluate the causal effect of consent regime changes on donation rates. A key reason is the scarcity of rich, cross-country panel data that envelops the event of a switch from one consenting regime to another. In particular, longitudinal data tracking the period before and after a legislative switch—especially on a per-death basis—are rarely available at the level needed for empirical identification.

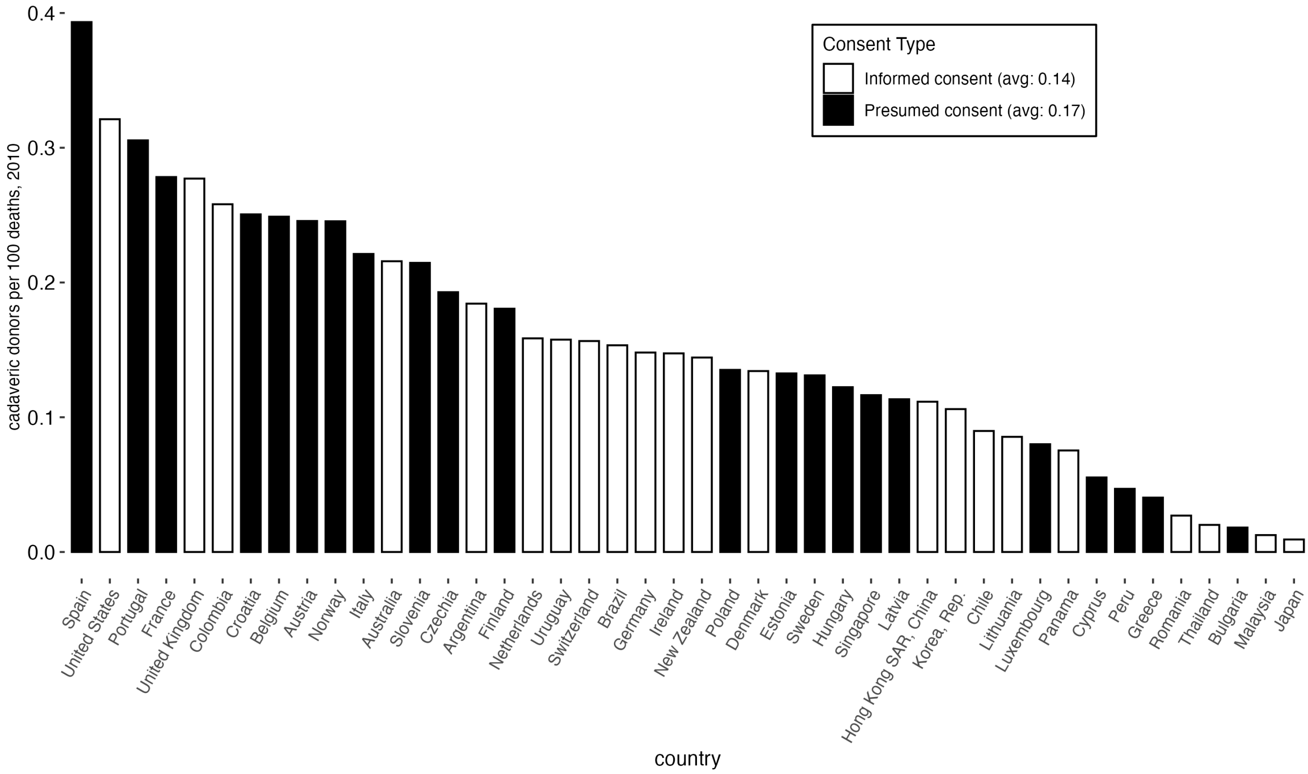
This paper addresses this gap by assembling a novel panel dataset that spans 44 countries,[3] encompassing multiple continents and legislative regimes. The dataset includes detailed annual information on deceased donation and transplant rates, as well as country-level demographic and health-related controls. Population, death rates, road traffic mortality, and health expenditure data are sourced primarily from the World Bank's World Development Indicators, while information on legal systems is drawn from the CIA World Factbook archives and other secondary sources. Data on transplant and donation rates are compiled from a range of sources, including IRODaT, EuroTransplant, Scandiatransplant, and various national transplant agencies. A full description of the data sources used for each country and variable is provided in the Online Appendix.

Figure I presents the cadaveric donation per 100 death in 2010 across the 44 countries in our sample, disaggregated by consent regime. A clear pattern emerges: countries

[3] I will refer to a region as a "country" based on what the World Bank Databases label as "country" and not necessarily by current political sovereignty.

operating under an "opt-out" (presumed consent) regime exhibit (29.6%) higher donation rates per death compared to their "opt-in" counterparts. Similar patterns emerge if we look at cadaveric donation per million population (a similar plot, with more countries and updated data, as Abadie and Gay (2006)).[4]

Figure I: Deceased organ donor per 100 deaths in 2010 across 44 countries in 5 continents



Notes: Death rates are sourced primarily from the World Bank's World Development Indicators, while donation rates are compiled from a range of sources, including IRODaT, EuroTransplant, Scandiatransplant, and various national transplant agencies.

To estimate the causal effects of switching from opt-in to opt-out regimes, we employ an event study framework. Our analysis focuses on countries that changed policy nationally from opt-in to opt-out which has at least 4 control countries (countries in the same continent) with data that extend at least 2 years before and 3 years after the event, specifically Austria (1982), Belgium (1986), Luxembourg (1982), Finland(1985), Uruguay(2013), Chile (2010), Italy (1999), and Sweden (1996). For each treatment country experiencing a regime switch, we construct a comparison group comprising all other

[4]In Abadie and Gay (2006), the plot was for the year 2002 and 36 countries. Donation per population could be increased by policy measures that have less to do with increased propensity for organ donation (e.g., executing more prisoners), in this paper I focus on deceased donations per 100 deaths.

countries from the same continent that maintained their consent regime throughout the analysis period and for which data are available at least two years before and three years after the policy change in the treatment country.

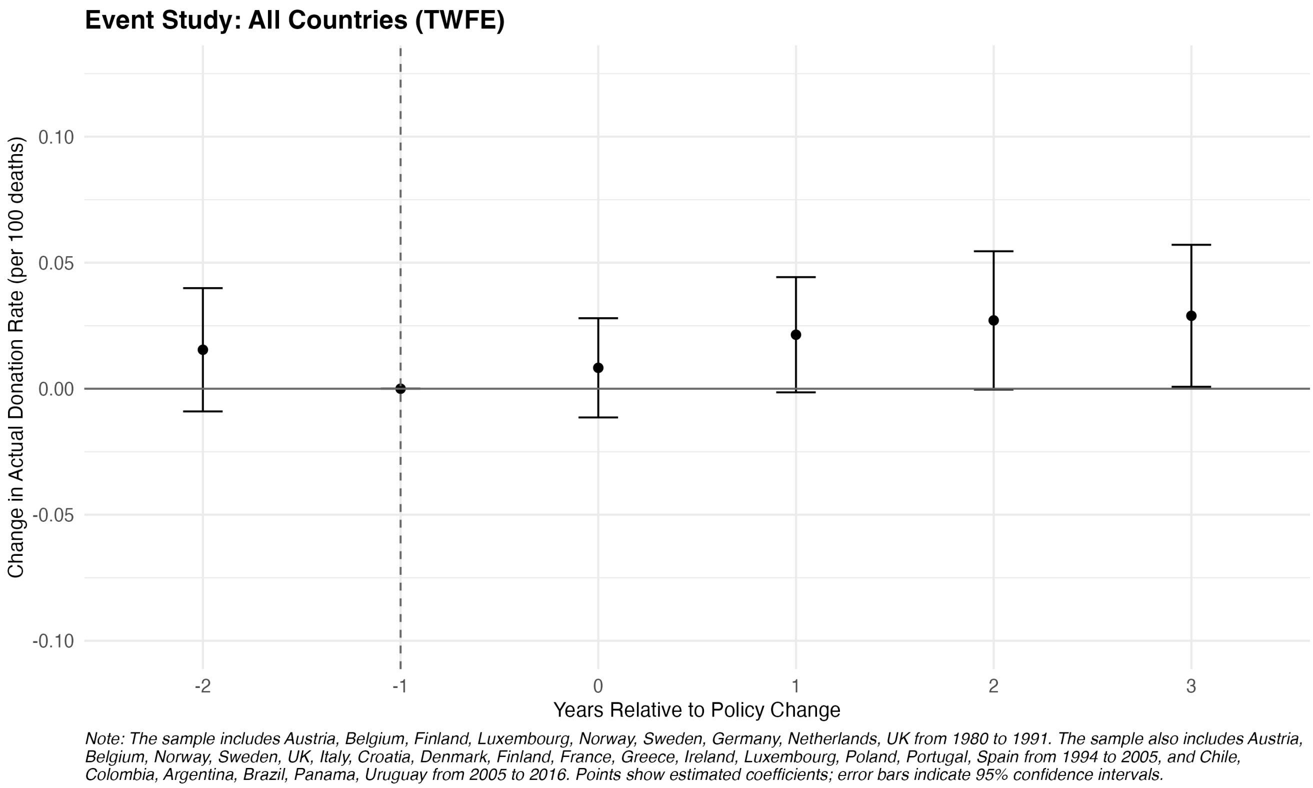
Let Y_{ct} denote the outcome of interest for country c in year t, measured as the deceased donation rate per 100 deaths. Let τ_{ct}^{k} be an event time indicator equal to one if country c is k years from the implementation of the opt-out regime in year t (with $k = 0$ representing the first year of adoption). The estimating equation is:

$$Y_{ct} = \sum_{k \neq -1} \beta_k \cdot \tau_{ct}^{k} + \gamma_c + \delta_t + \mathbf{X}_{ct}' \theta + \varepsilon_{ct}, \quad (1)$$

where γ_c and δ_t are country and year fixed effects, respectively, and $\mathbf{X}_{ct}$ includes time-varying controls (e.g., health expenditure per capita, road mortality, population, GDP). We omit $k = -1$ to normalize the event-time coefficients relative to the year prior to the reform. This specification allows us to test for dynamic treatment effects and examine whether changes in donation rates follow the implementation of opt-out laws.

Key identifying assumptions include (i) parallel trends in the absence of treatment, (ii) no anticipatory effects prior to the switch (which we assess via pre-trend coefficients), and (iii) no time-varying unobservables correlated with both the timing of policy adoption and donation rates. Given the staggered adoption and the inclusion of rich country and time fixed effects, these assumptions are plausible in our context.

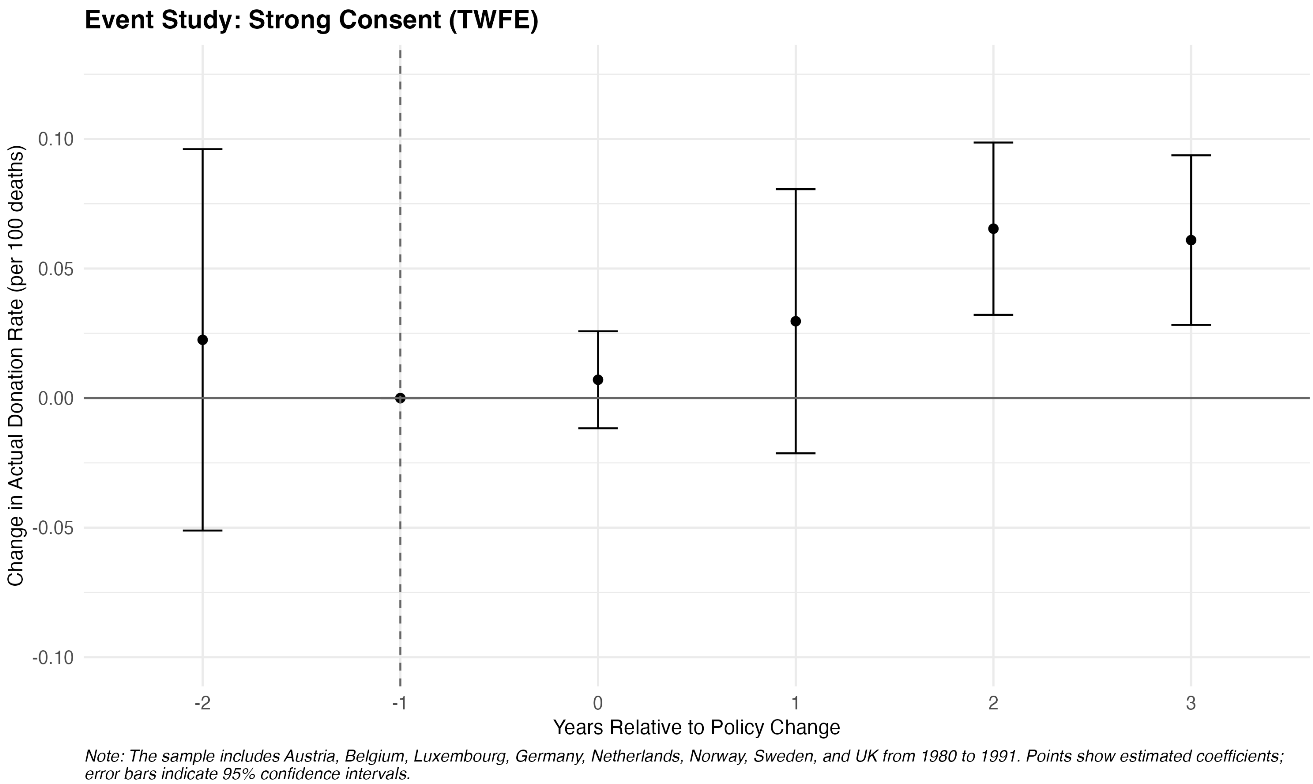
Figure II: Event Study Graph for All Countries



Notes: Estimated based on Equation 1 including panel data on all countries that changed policy nationally from opt-in to opt-out which has at least 4 control countries (countries in the same continent) with data that extend at least 2 years before and 3 years after the event.

The results of the baseline event study are shown in Figure II. While the pre-trends are similar across the regime-switching and control countries, we begin to see a divergence in trends for donation per death starting with the year of the switch to opt-out. On average, countries that switch to opt-out see a marginally significant increase in donations per death post-reform. However, treatment effects exhibit substantial heterogeneity. Chile, for instance, experienced a sharp decline in donation rates following its 2010 adoption of an opt-out regime—a drop of over 3 percentage points relative to other Latin American countries.

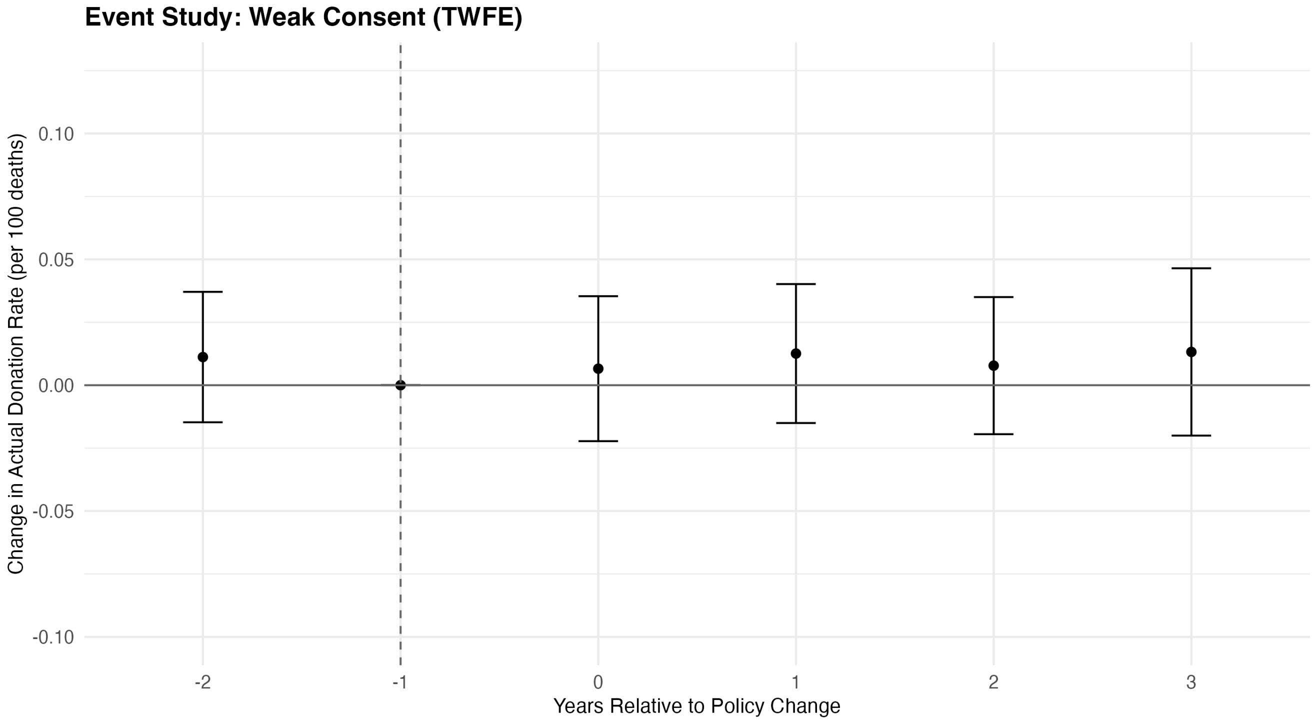
Figure III: Event Study Graph for All Countries



Notes: Estimated based on Equation 1 including panel data on all strict consent countries that changed policy nationally from opt-in to opt-out which has at least 4 control countries (countries in the same continent) with data that extend at least 2 years before and 3 years after the event.

To further investigate this heterogeneity, we disaggregate the sample based on the "strictness" of consent enforcement. We define a regime as "strict opt-out" if the family veto is limited or rarely exercised (e.g., Austria, Belgium); "weak opt-out" regimes, by contrast, continue to rely heavily on familial consent in practice (e.g., Italy, Chile). Re-estimating the event study model separately for these subsamples reveals a striking contrast. In strict opt-out countries, donation per death rises significantly shortly after the switch, with effects remaining high over time (see Figure III; and for twice as many post years see Appendix XIII). In weak opt-out countries, by contrast, the coefficients remain flat and statistically insignificant in both short (see Figure IV) and longer terms (see Appendix XIV).

Figure IV: Event Study Graph for All Countries



Note: The sample includes Finland, Germany, Netherlands, Norway, Sweden, UK from 1980 to 1991. The sample also includes Italy, Sweden, Austria, Belgium, Croatia, Denmark, Finland, France, Greece, Ireland, Luxembourg, Norway, Poland, Portugal, Spain, UK from 1994 to 2005, and Chile, Colombia, Argentina, Brazil, Panama, Uruguay from 2005 to 2016. Points show estimated coefficients; error bars indicate 95% confidence intervals.

Notes: Estimated based on Equation 1 including panel data on all weak consent countries that changed policy nationally from opt-in to opt-out which has at least 4 control countries (countries in the same continent) with data that extend at least 2 years before and 3 years after the event.

These results suggest that legal regime classification alone may be insufficient to predict donation outcomes; the institutional enforcement context plays a critical role. While opt-out reforms can raise donation rates, especially under strict implementation, policy effectiveness is contingent on the operational design and societal norms surrounding organ procurement.

3 Conceptual Framework

In many countries, the default approach to organ donation plays a critical role in determining realized donation rates. On one hand, an "opt-in" regime may require clear signaling of donation intent, thereby sending a strong message to families and medical professionals. On the other, an "opt-out" regime positions donation as the default while allowing explicit refusal. In practice, however, families often override defaults due to uncertainty about the decedent's true preference.

This section provides a simple theoretical framework to clarify how these regimes function as *signaling games*. We consider an environment with two players, a *potential donor* (Player 1) and a *decision maker* (Player 2). Player 1 has a binary type reflecting willingness to donate organs, and Player 2 must ultimately choose whether to proceed with donation. We focus on *pure-strategy Bayesian Nash equilibria* throughout, though richer (mixed) equilibria may also arise.

3.1 Players, Types, and Actions

Types. Player 1's type is $d \in \{0, 1\}$, where $d = 1$ indicates willingness to donate and $d = 0$ indicates unwillingness. The ex-ante probability that $d = 1$ is $\pi \in (0, 1)$. Player 2 does not observe d directly but sees a *noisy signal* about d. Let $p \equiv \Pr(d = 1 \,|\, \text{signal}) = \lambda d + (1 - \lambda)\pi$ for some $\lambda \in [0, 1]$.

Actions. Player 2 chooses $D \in \{0, 1\}$, where $D = 1$ means the organ is donated and $D = 0$ means no donation. Player 1 has an action $s \in \{0, 1\}$ whose interpretation depends on the *regime*. In an *opt-in* regime, $s = 1$ indicates paying a cost $c > 0$ to *opt in* (i.e. explicitly authorize donation). In an *opt-out* regime, $s = 1$ indicates paying cost $c > 0$ to *opt out* (i.e. explicitly refuse donation).

3.2 Payoffs

Player 1 (Potential Donor). If the final donation decision D aligns with d, Player 1's payoff is $x - c\,s$; if $D \neq d$, then the payoff is $-\,c\,s$. Formally:

$$u_1(d, D, s) \;=\; \begin{cases} x - c\,s, & \text{if } D = d, \\ -\,c\,s, & \text{otherwise.} \end{cases}$$

Here, $x > 0$ captures the potential donor's utility when the outcome matches their true preference, and $c > 0$ is the cost of opting in (or out). We refer to c as "large" if $c > x$, implying the donor never finds it worthwhile to pay for signaling.

Player 2 (Decision Maker). Player 2 obtains a benefit $X > 0$ if $D = d$, plus or minus additional costs:

- $\varepsilon > 0$, an "emotional cost" or disutility of donation, incurred if $D = 1$.
- $\delta > 0$, a cost to *overturn* the default (presumed consent) or explicit choice (informed consent) (depending on regime).

Opt-In Regime. When Player 1 does not opt in ($s = 0$), there is no presumed consent; thus,

$$u_2 \;=\; \mathbf{1}\{D = d\}\, X \;-\; D\,\varepsilon.$$

If Player 1 opts in ($s = 1$), overturning that expressed consent costs $\delta > 0$. Hence,

$$u_2 \;=\; \mathbf{1}\{D = d\}\, X \;-\; D\,\varepsilon \;-\; (1 - D)\,\delta.$$

Player 2 donates ($D = 1$) in each case if the expected benefit exceeds the cost. In particular:

- If $s = 0$, $D = 1$ iff $2p - 1 > \dfrac{\varepsilon}{X}$.
- If $s = 1$, $D = 1$ iff $2p - 1 > \dfrac{\varepsilon - \delta}{X}$.

Opt-Out Regime. When Player 1 does not opt out ($s = 0$), the default is to donate, so overturning it ($D = 0$) imposes cost $\delta > 0$. Thus,

$$u_2 \;=\; \mathbf{1}\{D = d\}\, X \;-\; D\,\varepsilon \;-\; (1 - D)\,\delta.$$

If Player 1 opts out ($s = 1$), then no donation default exists, so

$$u_2 \;=\; \mathbf{1}\{D = d\}\, X \;-\; D\,\varepsilon.$$

Hence (Player 2 donates ($D = 1$) in each case if the expected benefit exceeds the cost):

- If $s = 0$, $D = 1$ unless $2p - 1 \le \dfrac{\varepsilon - \delta}{X}$.
- If $s = 1$, $D = 1$ unless $2p - 1 \le \dfrac{\varepsilon}{X}$.

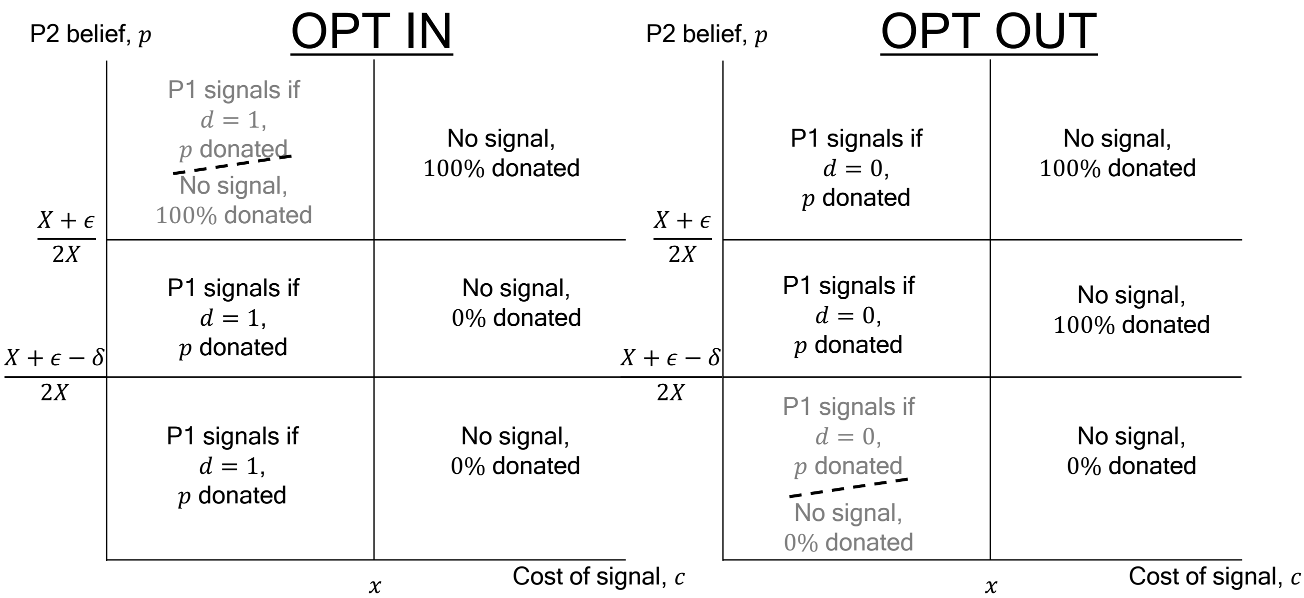
3.3 Equilibria in Pure Strategies

We focus on *pure-strategy Bayesian Nash equilibria.* Multiple equilibria can arise, but certain ones are especially *reasonable* or *intuitive.* I represent these equilibrium predictions on Figure V.

Key Parameters. Let us define:

- *Large* c: $c > x$. Signaling is too costly, so Player 1 never opts in/out. Player 2 simply bases D on p and the relevant donation threshold.
- *Large* p: In the opt-in regime, we say p is large if $2p - 1 > \frac{\varepsilon}{X}$. In the opt-out regime, we similarly say p is large if $2p - 1 > \frac{\varepsilon - \delta}{X}$.

Figure V: Pure-Strategy Bayesian Nash under Opt In and Opt Out



Notes: Theoretical Predictions based on the model outlined in Section 3. I plot the Pure-Strategy Bayesian Nash Equilibria in various parts of the parameter space.

Opt-In Equilibria

- **Pooling on** $s = 0$**:** If c is large, Player 1 never opts in ($s = 0$), and Player 2 donates if and only if $2p - 1 > \frac{\varepsilon}{X}$.

- If c is small ($c < x$), there can be a fully **separating** equilibrium:

$$s = 1 \text{ if and only if } d = 1, \quad D = 1 \text{ if and only if } s = 1.$$

  Here, the willing donor signals at cost c, ensuring donation; the unwilling type does not opt in, avoiding donation.

- **Pooling on donation** can also occur if p is high enough to justify $D = 1$ even absent explicit consent, leaving no incentive to pay c, leading both types to choose $s = 0$.

Opt-Out Equilibria

- **Pooling on $s = 0$:** If c is large, no one opts out ($s = 0$), so Player 2 donates whenever $2p - 1 > \dfrac{\varepsilon - \delta}{X}$.

- If c is small, a fully **separating** equilibrium can have

$$s = 1 \text{ if and only if } d = 0, \quad D = 1 \text{ if and only if } s = 0.$$

  (Willing donors remain silent, unwilling donors explicitly refuse.)

- A **zero-donation pooling** equilibrium may arise if p is sufficiently low, so that Player 2 always overturns presumed consent, and the donor's willingness cannot be credibly signaled.[5]

3.4 Comparison and Key Outcomes

The clearest comparison emerges when c is large. In both opt-in and opt-out, Player 1's signal is absent. However, the *threshold* for donating differs:

$$\text{Opt-in: } 2p - 1 > \frac{\varepsilon}{X},$$
$$\text{Opt-out: } 2p - 1 > \frac{\varepsilon - \delta}{X}.$$

[5]Indeed, if $d = 1$ is relatively rare and c is not too large, even a willing donor may find it unprofitable to deviate to separate from the unwilling type.

Because $(\varepsilon - \delta)/X < \varepsilon/X$, opt-out makes donation more likely, all else equal. Intuitively, refusing donation under opt-out imposes an additional cost δ on Player 2, whereas under opt-in, default non-donation is cheaper to maintain. This difference in thresholds would lead to different predictions for the two regimes, as represented by the differences in the middle-right area for the panels in Figure **??**.

When c is small, *separating equilibria* can emerge in both regimes: the willing donor can signal (by opting in) or *not* signal (by remaining in the default of donation). The difference is that under opt-out, if p is very low, Player 2 might systematically overturn presumed consent, generating a scenario in which *no* one opts out but *no* donations occur. In contrast, under opt-in, a strictly positive fraction of individuals can still donate, because a willing donor always has the option to opt in and separate.

Remark on Other Equilibria. Various equilibria beyond these "reasonable" pure strategies may exist, including mixed or partially separating strategies. We restrict attention here to pure-strategy Bayesian Nash equilibria for clarity and tractability. Additional assumptions or refinements could exclude some less intuitive equilibria.

4 Experimental Design

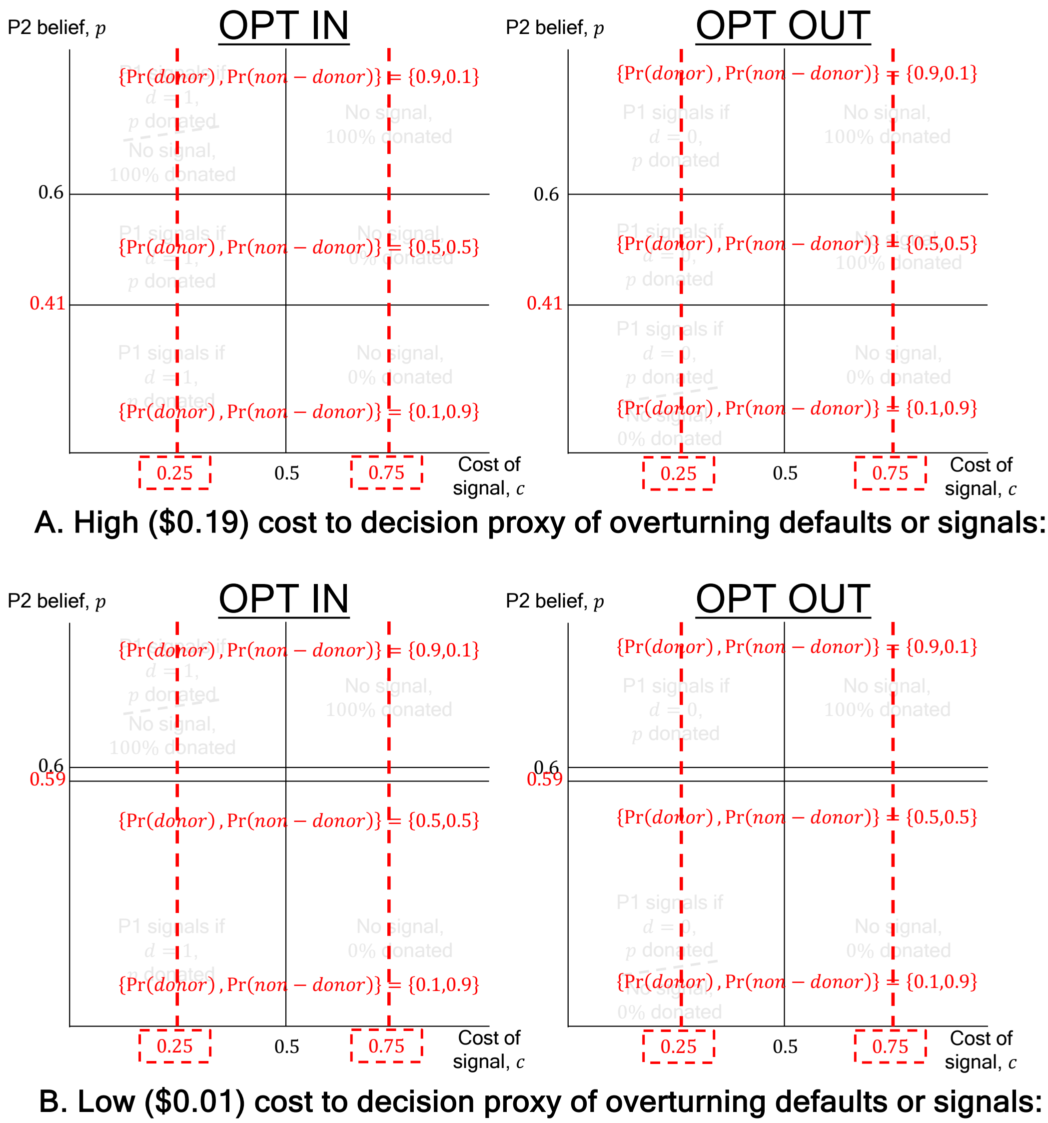
We conduct an incentivized online experiment to study the behavioral effects of different organ donation default policies. Participants ($n = 1000$) are recruited via Prolific for an experiment lasting approximately 18 minutes. The core asset in this experiment is a neutral object called a "wug," which serves as an abstract representation of a human organ, specifically designed to avoid emotional or moral connotations associated with real organs. The experiment comprises three distinct stages that reflect key phases in organ donation decision-making.

Participants are randomly assigned to treatments in a 2×2×2 factorial design with three main manipulations:

- **Default regime:** Opt-in (default is non-donation) vs. opt-out (default is donation).
- **Signal cost to wug owner:** High ($0.75) vs. low ($0.25).
- **Cost to decision proxy of overturning defaults or signals:** High ($0.19) vs.

low ($0.01). (Represented by the top two panels versus the bottom two panels of Figure VI.)

Figure VI: Experimental Treatments in Parameter Space



Notes: Various parts of the parameter space.

4.1 Participant Payments and Incentives

Participants receive a baseline completion payment of $5.00 and a default bonus of $0.94. Additional earnings ranging from $0.50 to $1.00 can be won through strategic decisions made during the experiment. Earnings can potentially decrease, but losses are capped at $0.94, guaranteeing a minimum payment of $5.00.

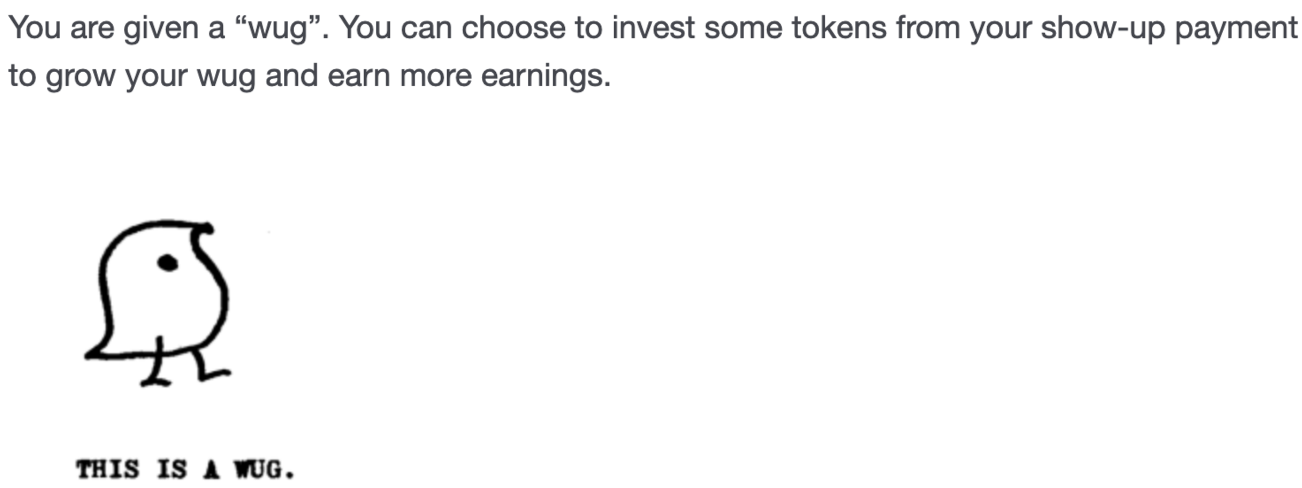
Participants who successfully pass an initial attention check proceed through three main stages of the experiment, detailed below.

4.2 Stage 1: Living Utilization of the Wug (Organ)

Participants first complete a minimal-group task (Chen and Li, 2008) where they select preferred paintings from two artists (Klee or Kandinsky) and are grouped anonymously into "families" based on their preferences. This step establishes the context of "in-group" interactions.

Each participant is then given a digital pet—a wug—which symbolizes a functioning organ during life (See Figure VII).[6] Participants name their wug to foster psychological ownership and make a single investment decision: they can feed the wug at a cost of \$0.10, yielding a guaranteed return of either \$0.15 or \$0.20. This decision models the utility and care individuals derive from an organ while alive.

Figure VII: Decision Screen: "Wug"



Notes: wug.

4.3 Stage 2: Opt-in/Opt-out Decision

Stage 2 analogously represents the donor's decision to register (opt-in) or deregister (opt-out) from organ donation while alive. Participants learn their randomly assigned type:

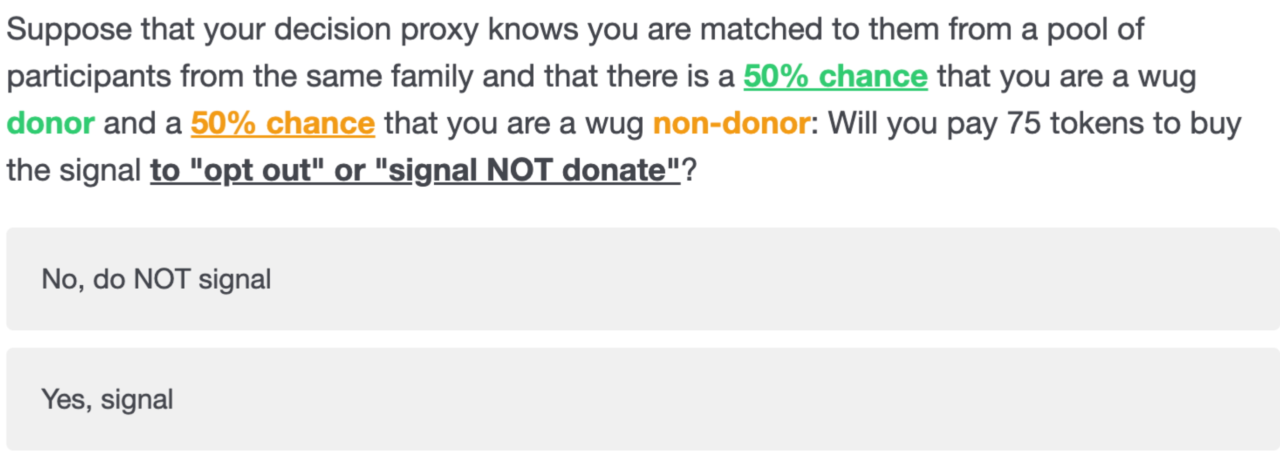
- **Wug Donor:** Gains \$0.50 if their wug is eventually donated.

[6] See Berko (1958) who developed the "wug".

- **Wug Non-Donor:** Gains \$0.50 if their wug is not donated.

Participants do not directly control their wug's final donation but can send a binding signal to a matched "decision proxy" from their minimal group, indicating their preference. The default donation status (opt-in or opt-out) depends on their assigned treatment. Sending a signal (opting-in or opting-out depending on the default) involves a treatment-specific cost (\$0.25 or \$0.75). Decisions to send signals are elicited under three informational conditions reflecting different priors (10%, 50%, 90%) that the decision proxy believes the wug owner is a donor type (See Figure VIII).

Figure VIII: Decision Screen: "Signal"



Notes: Opt in Opt out.

Participants are matched anonymously with exactly one other participant (asynchronously and managed within 24 hours) who serves as their decision proxy. Each participant is matched similarly to act as a decision proxy for another participant, ensuring reciprocal and independent matches.

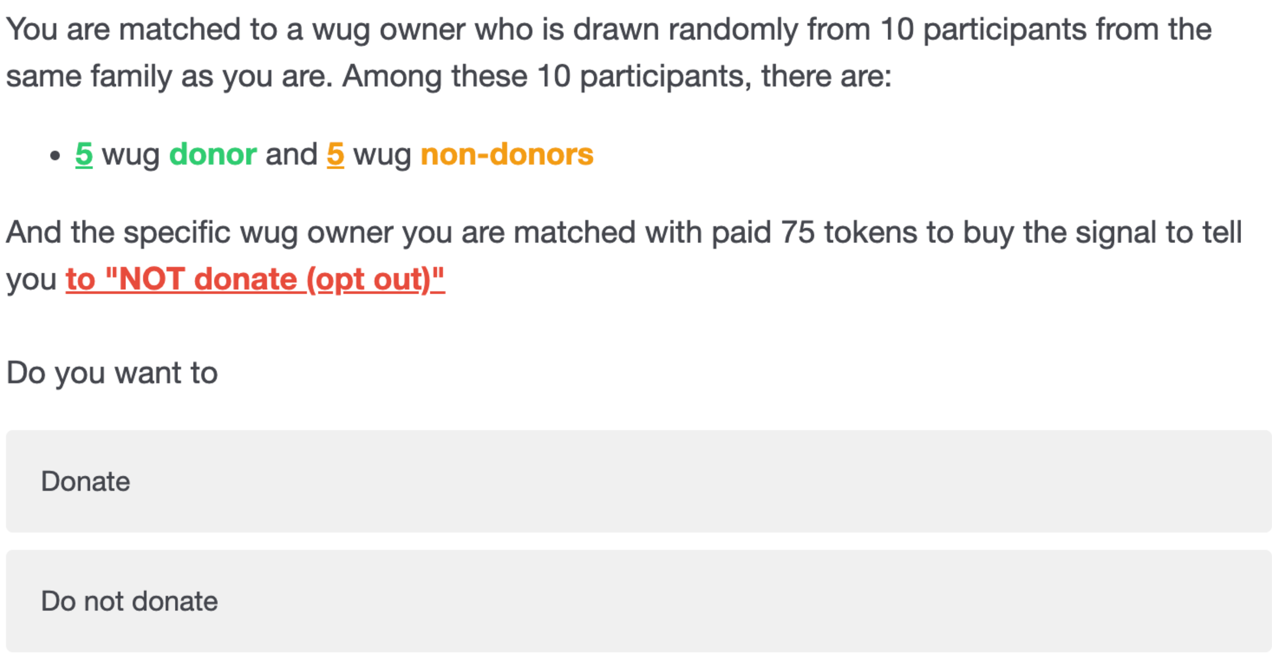
Participants are also randomly assigned (1/3 each) to subgroups of ten, with different distributions of wug donors (9 donors/1 non-donor, 5 donors/5 non-donors, 1 donor/9 non-donors). This randomized subgrouping affects the scenario under which bonus payments are calculated.

4.4 Stage 3: Decision Proxy After Death

In the final stage, participants switch roles to become the decision proxy for their matched wug owner. This stage corresponds to the post-mortem decision made by families about organ donation. Decision proxies earn \$0.50 if their decision matches the wug owner's actual type (donor or non-donor), and they must pay a fee of \$0.10 if they choose to donate the wug, regardless of the owner's type. Overturning the default or explicit signals incurs an additional treatment-specific cost (\$0.01 or \$0.19). These parameters put the empirical observations from this experiment neatly into different parts of Figure **??**, in particular the higher versus lower cost of overturning defaults or signals is represented by the top two panels versus the bottom two panels of Figure VI.)

Proxy decisions are elicited under six conditions: three priors regarding donor likelihood (10%, 50%, 90%) and two signal states (owner sent a signal vs. owner sent no signal). (See Figure IX.)

Figure IX: Decision Screen: "Donate?"



Notes: Decision.

4.5 Matching and Payoffs

The one-to-one matching is done asynchronously to ensure each participant is matched exactly once as an owner and once as a proxy, independent of simultaneous participation. Payoffs are calculated based on only one randomly realized scenario per match, and final payments, including bonuses, are completed within 48 hours of experiment completion.

4.6 Survey Questions and Data Collection

Finally, participants answer brief demographic and value-related questions adapted from Elías et al. (2019), intended for control variables in analysis.

This experimental framework allows precise examination of how defaults, signaling costs, and proxy decision costs influence the efficiency and outcomes of donation systems, abstracted from ethical or emotional biases.

4.7 Summary of Design

My experiment combines cross subject (regime, cost of signaling, donor type) and within subject (priors) designs. The experiment was run on Prolific with 1004 participants, 988 participants passed the attention check and are included in the final sample.[7] The experiment was done on September 27, 2024. Balance Table I summarizes the treatments and the corresponding volume of participants. Balance is achieved across subject demographics, reported moral values and life satisfaction, and politics.

[7]Including the subjects who failed the attention check does not change the results.

Table I: Balance Check by Treatment Arm

	D/25T/1T		D/25T/19T		D/75T/1T		D/75T/19T		ND/25T/1T		ND/25T/19T		ND/75T/1T		ND/75T/19T		p-value
	mean	s.d.	mean	s.d.	mean	s.d.	mean	s.d.	mean	s.d.	mean	s.d.	mean	s.d.	mean	s.d.	(Across Arms)
Female	0.44	0.50	0.45	0.50	0.48	0.50	0.56	0.50	0.48	0.50	0.45	0.50	0.52	0.50	0.48	0.50	0.62
White	0.66	0.48	0.64	0.48	0.80	0.40	0.70	0.46	0.69	0.46	0.69	0.46	0.72	0.45	0.67	0.47	0.22
Black	0.19	0.40	0.20	0.40	0.14	0.35	0.16	0.37	0.21	0.41	0.20	0.40	0.13	0.34	0.20	0.40	0.68
Asian	0.10	0.31	0.10	0.30	0.04	0.20	0.07	0.26	0.07	0.26	0.09	0.29	0.28	0.11	0.11	0.31	0.62
Hispanic	0.07	0.26	0.09	0.29	0.04	0.20	0.06	0.25	0.06	0.23	0.06	0.23	0.06	0.24	0.10	0.30	0.68
Disability	0.16	0.37	0.12	0.33	0.12	0.32	0.16	0.37	0.16	0.37	0.13	0.34	0.17	0.37	0.16	0.36	0.91
College Graduate	0.57	0.50	0.64	0.48	0.58	0.50	0.66	0.48	0.63	0.49	0.61	0.49	0.57	0.50	0.57	0.50	0.74
High School Grad	0.99	0.09	1.00	0.00	0.99	0.09	1.00	0.00	0.99	0.09	0.99	0.09	0.99	0.09	1.00	0.00	0.89
Married	0.51	0.50	0.45	0.50	0.47	0.50	0.42	0.50	0.42	0.50	0.37	0.49	0.40	0.49	0.43	0.50	0.54
Number of Children	2.02	1.14	2.16	1.37	2.18	1.21	2.06	1.20	1.80	1.10	1.99	1.23	2.10	1.38	1.96	1.09	0.28
Fully Employed	0.52	0.50	0.60	0.49	0.61	0.49	0.61	0.49	0.57	0.50	0.54	0.50	0.58	0.50	0.60	0.49	0.83
Unemployed	0.18	0.38	0.17	0.37	0.20	0.40	0.21	0.41	0.22	0.42	0.22	0.42	0.17	0.38	0.15	0.36	0.77
Life Satisfaction	6.60	2.34	6.96	2.22	6.57	2.28	6.71	2.00	6.44	2.34	6.44	2.19	6.63	2.18	6.35	2.02	0.49
Health Insurance	0.29	0.46	0.29	0.46	0.38	0.49	0.34	0.48	0.27	0.45	0.35	0.48	0.32	0.47	0.30	0.46	0.60
Lower Class	0.42	0.50	0.33	0.47	0.41	0.49	0.34	0.48	0.45	0.50	0.41	0.49	0.40	0.49	0.42	0.50	0.53
Middle Class	0.46	0.50	0.52	0.50	0.45	0.50	0.51	0.50	0.40	0.49	0.47	0.50	0.46	0.50	0.47	0.50	0.65
Upper Class	0.12	0.33	0.15	0.36	0.13	0.34	0.14	0.35	0.15	0.36	0.11	0.32	0.13	0.34	0.11	0.32	0.98
Democrat	0.42	0.50	0.39	0.49	0.46	0.50	0.36	0.48	0.48	0.50	0.36	0.48	0.43	0.50	0.43	0.50	0.38
Republican	0.27	0.44	0.36	0.48	0.36	0.48	0.34	0.47	0.27	0.45	0.27	0.44	0.34	0.48	0.26	0.44	0.32
Moral Score	6.24	1.04	6.32	1.17	6.23	1.13	6.29	1.11	6.05	1.15	6.25	1.06	6.32	1.16	6.18	1.13	0.59
Subjects	124		121		121		125		126		123		126		122		

Note: This table reports the background characteristics of 988 subjects in the main sample, pooled and by treatment group. Treatment arms are labeled as "DefaultStatus / SignalingCost / OverturnCost." For example, "D / 25T / 1T" indicates subjects with a default status of Donated, who could send a signal to others for 25 tokens and override others' decisions for 1 token. Other arms (e.g., "D / 25T / 19T", "D / 75T / 1T", "D / 75T / 19T") follow the same structure, varying the costs of signaling and overturning. The "Not Donated" arms (e.g., "ND / 25T / 1T", "ND / 25T / 19T", etc.) represent subjects with a default status of Not Donated, under the same token cost conditions. "Female" indicates the share of female sex; "White," "Black," "Asian," and "Hispanic" indicate the shares of subjects belonging to each of these categories. "Disability" indicates the share of subjects who reported having a disability or other chronic condition. "High School Grad" indicates the share of subjects who graduate from high school, "College Graduate" indicates the share of subjects who reported that they have a bachelor's or advanced degree. "Married" indicates the share of subjects who are married, while "Number of Children" indicates the number of children the subjects have. "Fully Employed" indicates the share of subjects who are employed full-time, while "Unemployed" indicates the share of subjects who selected are not employed. "Life Satisfaction" indicates the average life satisfaction score on a scale from 1 to 10. "Health Insurance" indicates the share of subjects who covered by Medicare, Medical Assistance, or Medicaid. "Lower Class," "Middle Class," and "Upper Class" indicate the shares of subjects who reported belonging to each of these social classes. "Democrat" and "Republican" indicate the shares of subjects who reported identifying with these political parties. "Moral Score" indicates the average moral score on a scale from -1 to 7. Table shows averages ("mean") and standard deviations ("s.d."). The p-value (Across Arms) column reports the p-value from tests of equality across the eight treatment arms: chi-squared test for binary variables and ANOVA F-test for continuous variables.

5 Lab Experiment Results

This section presents the results of my laboratory experiment on organ donation decisions under different consent regimes.

To analyze the experimental data, I first randomly match Player 1s with Player 2s, ensuring they are matched based on the regime (opt-in or opt-out), the cost of signaling (c), and the strictness of consent (δ). For each matched pair of players, we generate an observation which includes an outcome variable: an indicator variable of whether a donation occurred. The "observations" generated this way number between 244 to 250 across the the cost of signaling (c) and the strictness of consent (δ) versions (4 versions in total).

We initially run an Ordinary Least Squares (OLS) regression on this single, randomly chosen matching. Subsequently, we randomly generate a new matching and estimate a separate OLS regression for each of 1000 different permutations. The average coefficients and standard errors from these 1000 permutations are reported in the bottom panel of the regression table (Table II).

Table II: Impact of Opt-out on Actual Donation Rate

Single Permutation												
	Cheap Signal (p=0.1)		Costly Signal (p=0.1)		Cheap Signal (p=0.5)		Costly Signal (p=0.5)		Cheap Signal (p=0.9)		Costly Signal (p=0.9)	
	Weak Consent	Strong Consent	Weak Consent	Strong Consent	Weak Consent	Strong Consent	Weak Consent	Strong Consent	Weak Consent	Strong Consent	Weak Consent	Strong Consent
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Opt-out	-0.219***	0.005	-0.025	0.073	-0.024	-0.033	0.063	0.392***	-0.132**	-0.135**	0.023	-0.083
	(0.058)	(0.060)	(0.051)	(0.061)	(0.063)	(0.064)	(0.061)	(0.059)	(0.056)	(0.054)	(0.055)	(0.054)
Constant	0.429***	0.309***	0.206***	0.311***	0.492***	0.528***	0.317***	0.344***	0.794***	0.829***	0.746***	0.811***
	(0.041)	(0.042)	(0.035)	(0.043)	(0.045)	(0.045)	(0.043)	(0.042)	(0.039)	(0.038)	(0.038)	(0.038)
N	250	244	247	247	250	244	247	247	250	244	247	247
Overall for 1000 Simulations												
	Cheap Signal (p=0.1)		Costly Signal (p=0.1)		Cheap Signal (p=0.5)		Costly Signal (p=0.5)		Cheap Signal (p=0.9)		Costly Signal (p=0.9)	
	Weak Consent	Strong Consent	Weak Consent	Strong Consent	Weak Consent	Strong Consent	Weak Consent	Strong Consent	Weak Consent	Strong Consent	Weak Consent	Strong Consent
	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)
Opt-out	-0.160***	-0.049	-0.026	0.083	-0.069	-0.023	0.051	0.420***	-0.154***	-0.120**	-0.013	-0.050
	(0.057)	(0.060)	(0.052)	(0.061)	(0.063)	(0.064)	(0.062)	(0.057)	(0.055)	(0.057)	(0.056)	(0.053)
Constant	0.377***	0.349***	0.225***	0.307***	0.511***	0.543***	0.344***	0.343***	0.808***	0.780***	0.743***	0.800***
	(0.040)	(0.042)	(0.037)	(0.043)	(0.044)	(0.045)	(0.043)	(0.041)	(0.039)	(0.040)	(0.039)	(0.038)
N	250	244	247	247	250	244	247	247	250	244	247	247

Standard errors in parentheses
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Note: This table presents the estimated parameter results for the estimation model $Donation_i = \beta_0 + \beta_1 OptOut_i + \epsilon_i$. The data for the top panel is from a single random matching of Player 1 and Player 2 in the main experiment, while the bottom panel reports the average of OLS coefficients and standard errors estimated across $1,000$ permutations. The outcome of interest reported in this table is the indicator variable of whether Player 2 made a donation for that observation. The independent variable in this table is the indicator for "Opt Out". Each column reports the result from one subsample, subsampled by weak-vs-strict consent (δ = \$0.01-vs-δ = \$0.19), signal cost (c = \$0.25 or c = \$0.75), and prior for Player 2 ($p = 0.1$, $p = 0.5$, or $p = 0.9$)

5.1 Opt In Weakly Dominates Opt Out Under Weak Consent

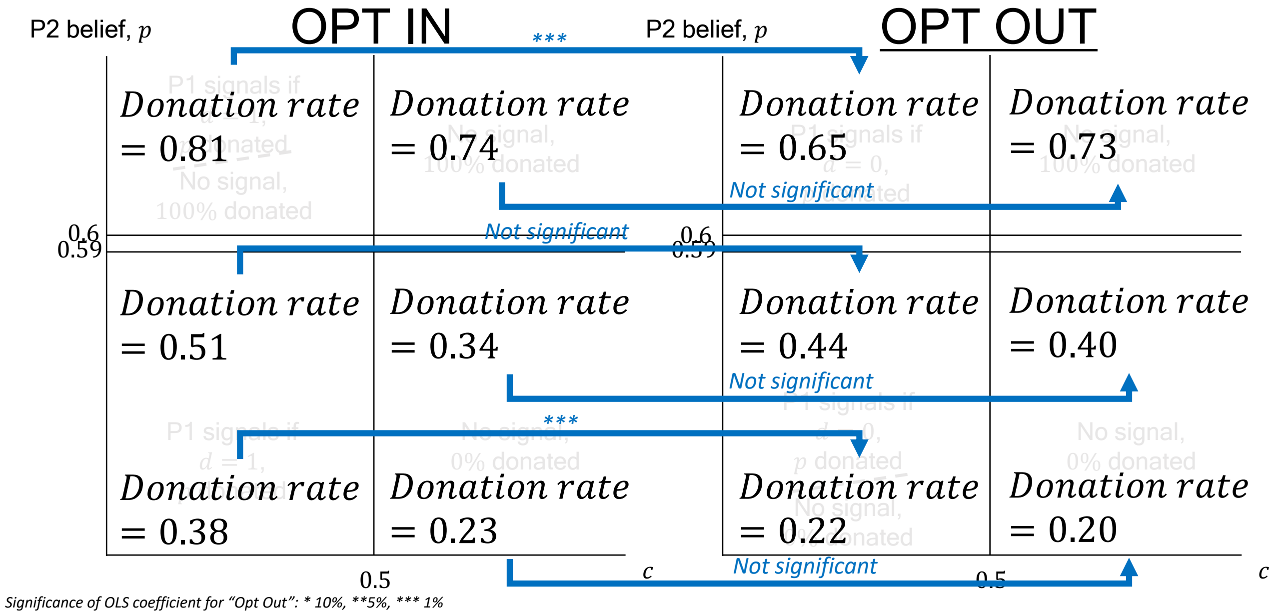
Starting from a weak consent regime (δ = \$0.01) where the cost of signaling is low (c = \$0.25), theory predicts that at high Player 2 priors ($p = 0.9$), as we move from opt in to opt out, we will be moving from the multiple equilibria where donation rates are at p or 100% to an equilibrium where the donation rate is p. Thus, we expect the donation rate to weakly decrease (from opt in to opt out). Experimental data indicate that under these parameters the average donation under opt in is 0.81 while average donation under opt out is 0.65 with a significant drop of 0.15 (significant at the 1% level) (see Column (21) of Table II).

When Player 2 priors are middling ($p = 0.5$) or low ($p = 0.1$), we will be moving from an equilibrium where the donation rate is p to the multiple equilibria where donation rates are at p or 0%. Thus, we expect the donation rate to weakly decrease (from opt in to opt out). Experiment data indicate that under these parameters the average donation under opt in is 0.51 for $p = 0.5$ and 0.38 for $p = 0.1$ while average donation under opt out is 0.44 for $p = 0.5$ and 0.22 for $p = 0.1$. These represent a change that is not significantly different from zero for $p = 0.5$ (see Column (17) of Table II) and a significant drop of 0.16 for $p = 0.1$ (significant at the 1% level) (see Column (13) of Table II).

In contrast to the case of low cost of signaling, the theoretical predictions and results are different when the cost of signaling is high ($c = \$0.75$). Theory predicts that at high Player 2 priors ($p = 0.9$), we are moving between equilibria where the donation rate are both 100% when switching from opt in to opt out. And when Player 2 either $p = 0.5$ or $p = 0.1$, we are moving between equilibria where the donation rate are all expected to be 0%. Thus, we expect the donation rate to remain unchanged (from opt in to opt out). Experimental data indicate that under these parameters the average donation rates under opt in are 0.74, 0.34, and 0.23 for $p = 0.9$, $p = 0.5$, and $p = 0.1$; while average donation rates under opt out are 0.73, 0.40, and 0.20 respectively. These represent no significant change at conventional levels (see Columns (23), (19), and (15) of Table II).

Under a weak consent regime ($\delta = \$0.01$), a switch to opt out holding other parameters constant leads to either a decrease or no significant changes to donation rates. These results are summarized in Figure X.

Figure X: Impact of Switching to Opt Out (Weak Consent)



Notes: This figure presents the average donation rate and the significance of estimated parameter from the estimation model $Donation_i = \beta_0 + \beta_1 OptOut_i + \epsilon_i$*, on different parts of the parameter space as presented in Figure VI. The data is from the average of OLS coefficients and standard errors estimated across* $1,000$ *permutations.*

5.2 Opt In and Opt Out Relative Advantages Depends on Cost of Signal and Priors Under Strict Consent

Now, let's consider a strict consent regime ($\delta = \$0.19$) where the cost of signaling is low ($c = \$0.25$), theory predicts that at high Player 2 priors ($p = 0.9$), as we move from opt in to opt out, we will be moving from the multiple equilibria where donation rates are at p or 100% to an equilibrium where the donation rate is p. Thus, we expect the donation rate to weakly decrease (from opt in to opt out). Experimental data indicate that under these parameters the average donation under opt in is 0.78 while average donation under opt out is 0.66 with a significant drop of 0.12 (significant at the 5% level) (see Column (22) of Table II). When Player 2 priors are low ($p = 0.1$), we will be moving from an equilibrium where the donation rate is p to the multiple equilibria where donation rates are at p or 0%. Thus, we expect the donation rate to weakly decrease (from opt in to opt out). Experimental data indicate that under these parameters the average donation under opt in is 0.35 for $p = 0.1$ while average donation under opt out is 0.30 for $p = 0.1$

. This represent a change that is not significantly different from zero for $p = 0.1$ (see Column (14) of Table II).

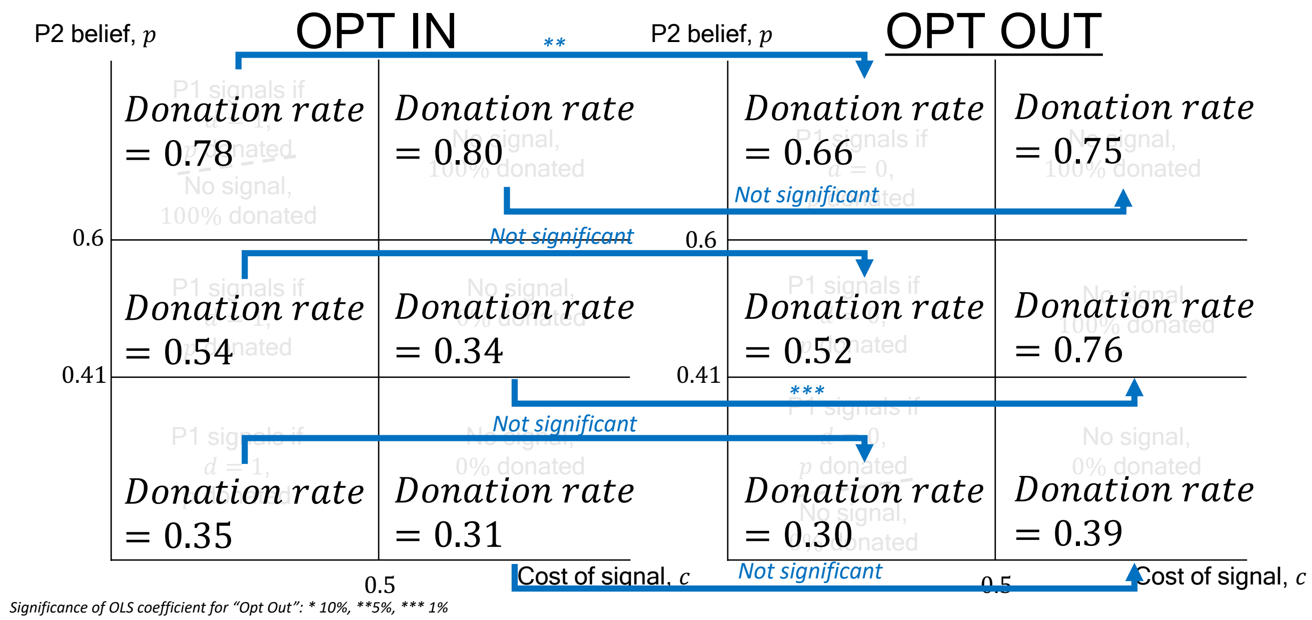
In the case of low cost of signaling ($c = \$0.25$) and Player 2 priors are middling ($p = 0.5$), we are moving between equilibria where the donation rate are both p when switching from opt in to opt out. Experimental data indicate that under these parameters the average donation rate under opt in are 0.54 while average donation rates under opt out is 0.52. These represent no significant changes at conventional levels (see Column (18) of Table II).

In the case of high cost of signaling ($c = \$0.75$) and Player 2 priors are high ($p = 0.9$) or low ($p = 0.1$), we are moving between equilibria where the donation rate are both 100% or 0% when switching from opt in to opt out. Thus, we expect the donation rate to remain unchanged (from opt in to opt out). Experimental data indicate that under these parameters the average donation under opt in is 0.80 for $p = 0.9$ and 0.34 for $p = 0.1$ while average donation under opt out is 0.75 for $p = 0.9$ and 0.39 for $p = 0.1$. These represent changes that are not significantly different from zero at conventional levels (see Columns (24) and (16) of Table II).

Finally, in the case of high cost of signaling ($c = \$0.75$) and middling Player 2 priors ($p = 0.5$), we move from an equilibrium with very low donation rate (0%) to an equilibrium with very high donation rate (100%). The experimental data bear out the theoretical prediction, as donation rate jumped from 0.34 to 0.76, an increase of 0.42 that is significant at the 1% level (see Column (20) of Table II).

Under a strict consent regime ($\delta = \$0.19$), a switch to opt out holding other parameters constant MOSTLY leads to either a decrease or no significant change to donation rates, except for high cost of signaling ($c = \$0.75$) and middling Player 2 priors when switching to opt out strictly increases donation. These results are summarized in Figure XI.

Figure XI: Impact of Switching to Opt Out (Strict Consent)



Notes: This figure presents the average donation rate and the significance of estimated parameter from the estimation model $Donation_i = \beta_0 + \beta_1 OptOut_i + \epsilon_i$*, on different parts of the parameter space as presented in Figure VI. The data are from the average of OLS coefficients and standard errors estimated across* 1,000 *permutations.*

6 Discussion and Conclusion

6.1 What Should Countries Do?

The findings presented in this paper offer crucial insights for policymakers grappling with strategies to increase organ donation rates. While intuitive behavioral nudges might suggest that a simple transition to an opt-out system would universally boost donation, our model and experimental results demonstrate a more nuanced reality. The analysis indicates that, holding other parameters constant, a shift to an opt-out regime in many circumstances leads to either a decrease or no statistically significant change in donation rates. A positive and significant increase in donation under opt-out is primarily observed under specific conditions: high costs of signaling and middling Player 2 priors, particularly within a strict consent framework, as shown in our experimental results.

Recent international experiences appear to corroborate these findings. For instance, England and Wales transitioned to a soft opt-out system, with England adopting the

Organ Donation (Deemed Consent) Act in May 2020, following a similar move by Wales in 2015. This change was motivated by the persistent gap between public support for donation and the number of registered donors. However, the impact on donation rates has been debated, and evidence suggests that a simple switch in the default may not be the solution. My collaborators at the National Health Services have recognized the signaling value of opting in. England and Wales have recently reintroduced the opt-in approach on top of their opt-out regime, which in practice already resembled an opt-in system—except in cases where family members or next of kin could not be located.

It is also imperative to recognize that the introduction of an opt-out policy can itself influence the very parameters that determine its effectiveness. A change in the default can coincide with or even trigger shifts in social norms and family priors regarding organ donation. Therefore, as countries consider policy changes, it is essential to analyze the potential impact of the entire package of reforms, not just the default rule, on factors such as the cost of signaling, Player 2 beliefs, and the strictness of consent. Policymakers should consider how these interrelated factors might shift, moving the outcomes from one region to another within the parameter spaces illustrated in Figures X and XI.

With appropriate caveats regarding the potential for dynamic shifts in underlying parameters, our results offer a flexible and informative framework to guide policy decisions aimed at increasing organ supply and saving lives. As countries like the United States continue to debate these policy choices (Chan (2020)), our findings suggest that careful consideration of the specific context, including existing social norms, family dynamics, and the infrastructure supporting organ procurement and transplantation, is paramount. Simplistic reliance on a behavioral nudge without considering the broader economic and social context may fail to yield the desired increase in donation rates.

6.2 Conclusion

This paper investigates the complex effects of consent defaults in organ donation, combining new causal evidence, a formal theoretical framework, and incentivized laboratory experiments to provide a unified understanding of how legal defaults, signaling frictions, and institutional context jointly determine organ supply outcomes.

Using a newly constructed cross-country panel dataset and an event study design, I find that presumed consent reforms lead to higher donation rates only when strictly enforced—that is, when family veto power is substantially constrained. In weak enforcement environments, by contrast, switching from opt-in to opt-out often yields no improvement and sometimes even reduces donation rates. This heterogeneity motivates the need for a deeper theoretical understanding.

To address this, I develop a signaling model in which potential donors can pay a cost to explicitly register their preferences, and surviving family members must decide whether to authorize donation under uncertainty. The model highlights an important asymmetry: under opt-in, willing donors can affirmatively signal their willingness to donate; under opt-out, by contrast, unwilling donors have the primary opportunity to signal. When signals are not too costly, opt-in thus yields at least as many donations as opt-out. However, when signaling is prohibitively costly, family authorization decisions hinge on priors and default costs, and opt-out can dominate if consent enforcement is strict enough to make overturning presumed consent meaningfully costly.

These predictions are tested in a laboratory experiment that systematically varies the default regime, signaling costs, and the cost of overriding defaults. Experimental results closely match theoretical predictions. Under weak consent, opt-in consistently weakly outperforms opt-out. Under strict consent, opt-out can substantially increase donation rates—but only when signaling costs are high and family beliefs about donor willingness are intermediate.

Taken together, the findings caution against the simplistic view that switching to presumed consent will universally increase organ donation. The effectiveness of opt-out depends critically on the broader enforcement environment, on the behavioral cost of signaling, and on the prior beliefs held by families at the time of decision-making. In many realistic settings, preserving or strengthening opt-in systems—particularly those that facilitate and encourage explicit registration—may yield higher donation rates than shifting to opt-out. Conversely, where strict enforcement is possible and signaling frictions are large, opt-out can play an important role in increasing organ supply.

More generally, this research contributes to broader themes in market design and behavioral economics, illustrating how the interaction between legal defaults, costly signaling, and noisy proxy decision-making can produce heterogeneous policy outcomes. Policymakers should be wary of "one-size-fits-all" prescriptions: optimal policies must be tailored to the institutional, legal, and behavioral context of each country. Future research could explore how changes in default rules might endogenously shift social norms and family beliefs over time, and how complementary interventions—such as public education or incentives for explicit registration—can be layered onto default reforms to maximize their effectiveness.

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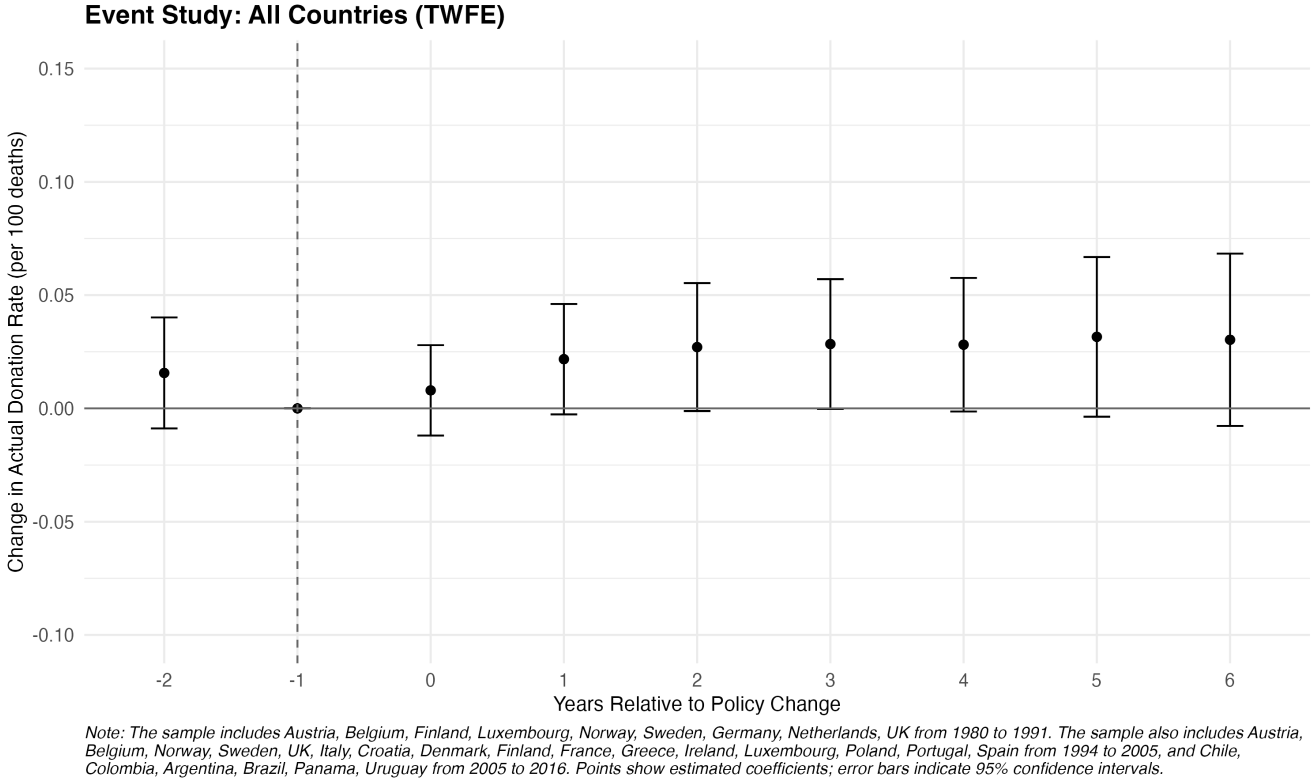
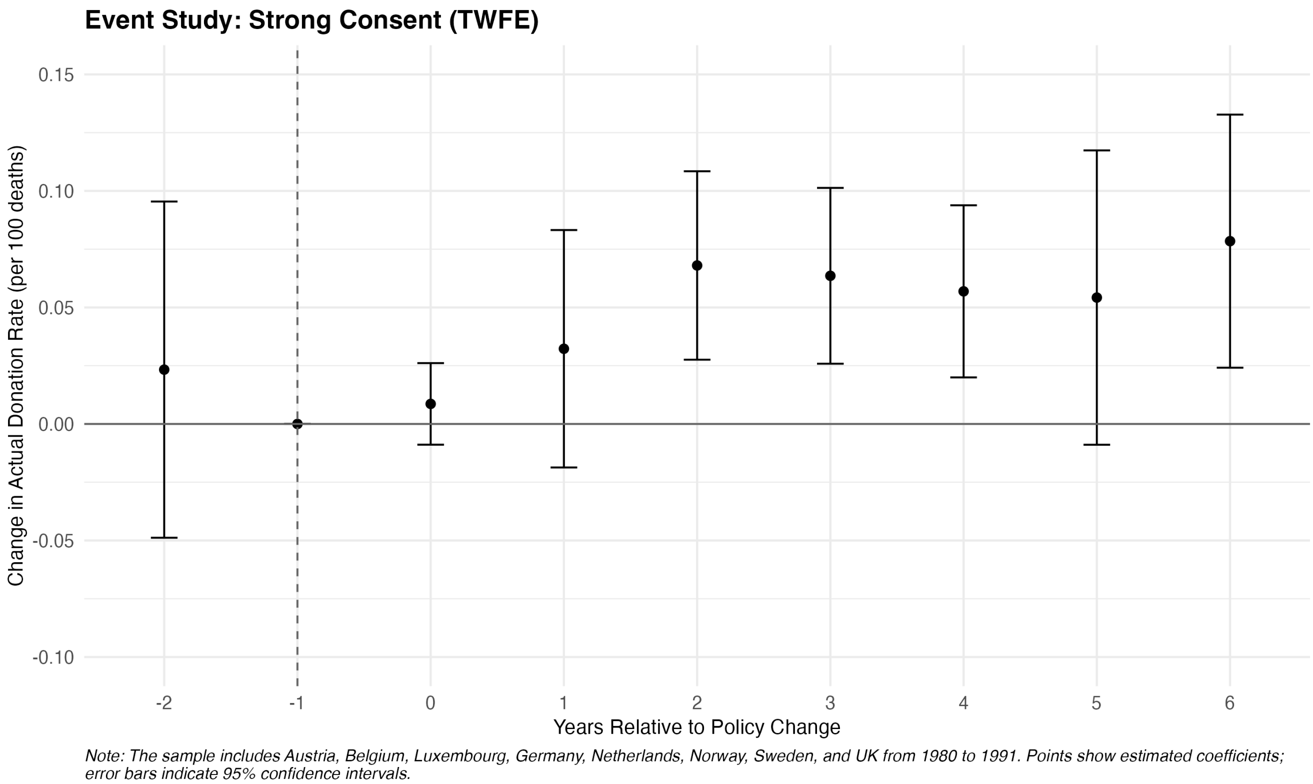
A Appendix

Figure XII: Event Study Graph for All Countries (6 post years)



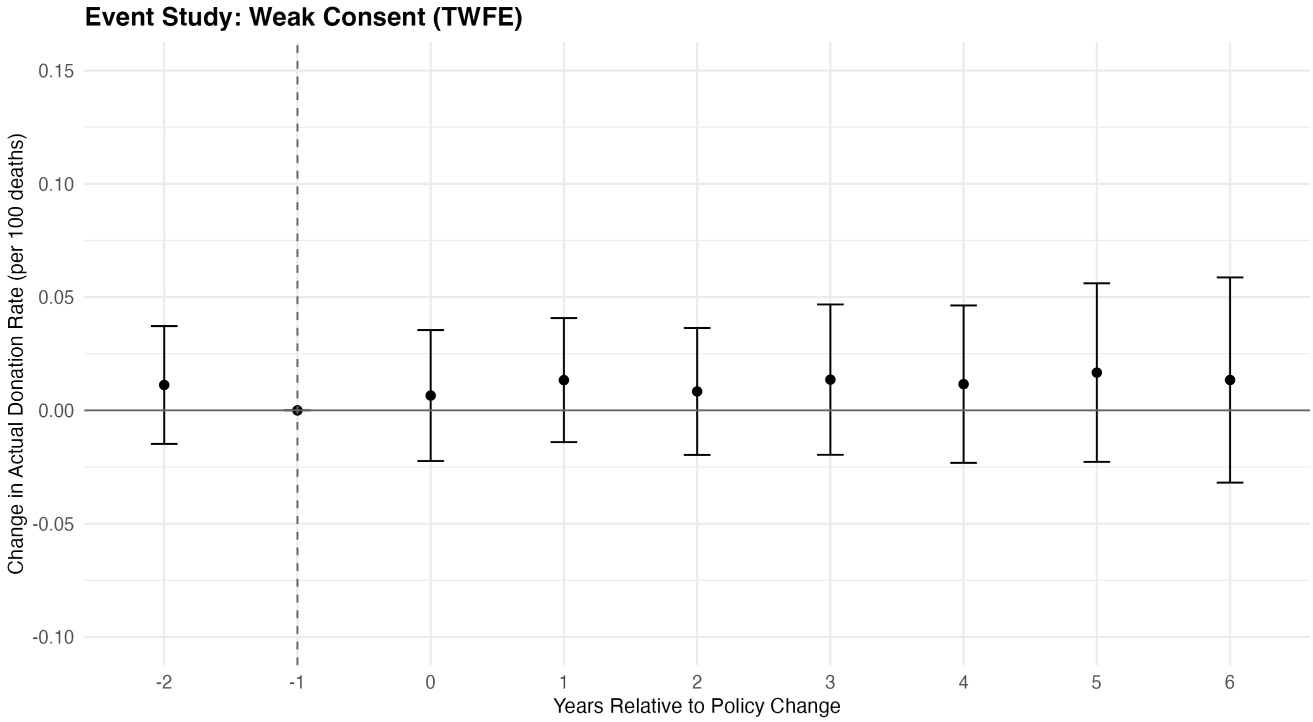
Notes: Estimated based on Equation 1 including panel data on all countries that changed policy nationally from opt-in to opt-out which has at least 4 control countries (countries in the same continent) with data that extend at least 2 years before and 3 years after the event.

Figure XIII: Event Study Graph for All Countries (6 post years)



Notes: Estimated based on Equation 1 including panel data on all strict consent countries that changed policy nationally from opt-in to opt-out which has at least 4 control countries (countries in the same continent) with data that extend at least 2 years before and 3 years after the event.

Figure XIV: Event Study Graph for All Countries (6 post years)



Note: The sample includes Finland, Germany, Netherlands, Norway, Sweden, UK from 1980 to 1991. The sample also includes Italy, Sweden, Austria, Belgium, Croatia, Denmark, Finland, France, Greece, Ireland, Luxembourg, Norway, Poland, Portugal, Spain, UK from 1994 to 2005, and Chile, Colombia, Argentina, Brazil, Panama, Uruguay from 2005 to 2016. Points show estimated coefficients; error bars indicate 95% confidence intervals.

Notes: Estimated based on Equation 1 including panel data on all weak consent countries that changed policy nationally from opt-in to opt-out which has at least 4 control countries (countries in the same continent) with data that extend at least 2 years before and 3 years after the event.