Opt In? Opt Out?

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Abstract

Cadaveric organ shortages leave thousands without life-saving transplants each year. Countries differ in using opt-in (informed consent) or opt-out (presumed consent) systems for donor registration. Using newly assembled cross-country panel data and an event-study design, this paper provides causal evidence that presumed-consent laws increase organ donation only when strictly enforced and family veto power is limited; weak opt-out regimes show negligible or even negative effects. A theoretical signaling model explains when opt-in or opt-out yields more donations, emphasizing the roles of donation propensity, signaling costs, and the family's ability to overturn defaults. A large laboratory experiment further tests these mechanisms, showing that opt-in generally produces equal or higher donation rates unless signaling is costly and family veto power is minimal. The results underscore that defaults alone rarely increase donations unless paired with strong institutional enforcement.†

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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 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), Gimbel et al. (2003), Johnson and Goldstein (2003)).[1] If families of the potential donor can overturn donor consent readily, 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, we create and utilize a cross-country panel data and an event study design and report new causal evidence on the impact of presumed consent or "opt out" laws on deceased organ donation rates, and account for the heterogeneity of such im-

[1] In the updated "Final Edition," Thaler and Sunstein (2021) thoughtfully revise their earlier support for opt-out policies. They offer a nuanced explanation—highly consistent with the core insight developed in the theoretical section of this paper—regarding why a weak opt-out regime is unlikely to generate meaningful increases in actual organ donations. Their discussion anticipates some of the mechanisms formalized here, reflecting the characteristic clarity and intellectual rigor of Thaler and Sunstein (2021)'s work.

pact. 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 to weak opt out frameworks often yield negligible or even negative effects. We then theoretically delineate conditions under which opt-in frameworks may outperform opt-out regimes and vice versa, emphasizing the critical roles of population donation propensity and the authority granted to families in overriding donor registrations. Complementing our theoretical framework, we 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, we provide credible causal estimates of the heterogeneous impact of opt-out laws, distinguishing effects under strict versus weak enforcement regimes. Second, we develop a parsimonious theoretical model that explicitly incorporates signaling and the role of family decision-makers to explain this heterogeneity. Third, we 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 strict opt out versus weak opt out regimes, we 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 by 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 our 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 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. At a later time, if a potential donor unfortunately passed away in a manner compatible with organ donation,[2] their next of kin will be 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 opt-out," 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/or are able to challenge the "strict opt-out," 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 opt-out" regime. Strict opt-out is increasing uncommon, if not entirely unused in the organ donation space today.[3]

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

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

[3]In the U.K., our 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 opt-out" regime in the early to mid-2020s. We are exploring the impact of such a mixed system in our collaboration.

practice by potential donors to express their preference (i.e., as a substitute for opting in/out as a signal).

Our simple signaling model of deceased organ donation captures this dynamic where opting in/out is relied upon as a signal of a potential donor's willingness-to-donate and explain 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 opt-out 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 result in more donations.

To empirically test the model's predictions, we design and implement an incentivized laboratory experiment with about 1,000 participants. Subjects play a stylized donation game using a neutral asset ("wug") 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. Our research uncovers another 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, our 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 describes the empirical design and results for our observational data. In Section 3, we describe the model. In Section 4 and 5, we describe the lab experiment and results from the experiment. Section 6 concludes.

2 Presumed 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, followed by raising donation rates, while Japan maintains an informed consent 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 our 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

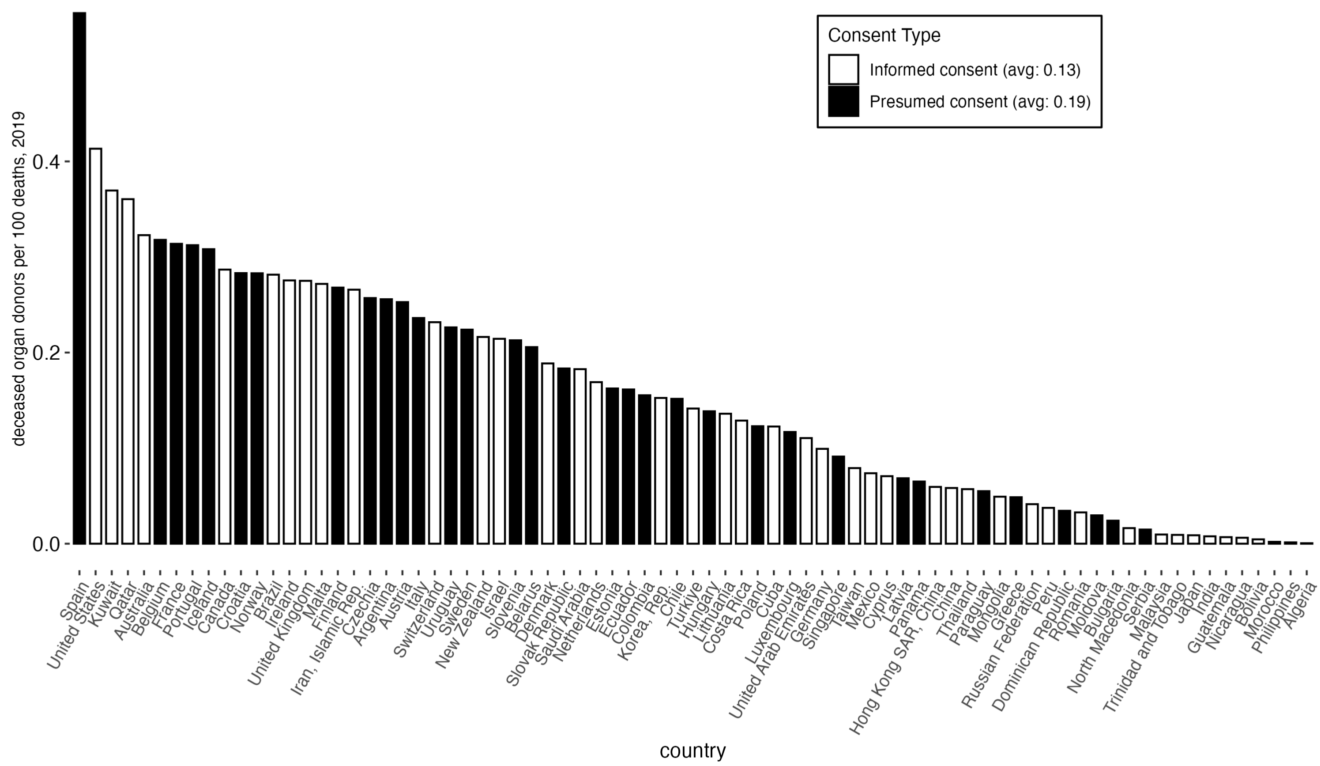
Despite the extensive policy interest in increasing organ donation, relatively few studies have attempted to evaluate the causal effect of consent regime changes on donation rates. A key reason is the scarcity of rich, cross-country panel data that envelops the event of a switch from one consenting regime 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 94 countries,[4] 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, and health expenditure data are sourced primarily from the World Bank's World Development Indicators, while the number of deaths caused by traffic accidents and cerebro-vascular failures are extracted from the World Health Organization Mortality Database, and 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, GODT, 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.

[4] We 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.

Figure I presents the cadaveric donation per 100 deaths in 2019 across the 77 countries in our sample, disaggregated by consent regime. A clear pattern emerges: countries operating under an "opt-out" (presumed consent) regime exhibit (39.87%) higher donation rates per death compared to their "opt-in" counterparts. Similar patterns emerge if we look at cadaveric donation per million population.[5]

Figure I: Deceased organ donors per 100 deaths in 2019 across 77 countries in 6 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, GODT, EuroTransplant, Scandiatransplant, and various national transplant agencies.

[5]In Abadie and Gay (2006), a plot similar to our latter one in the Online Appendix but with fewer and more dated data was presented and 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 we focus on deceased donations per 100 deaths.

Table I: The effect of presumed consent legislation on cadaveric organ donation

	Dependent variable: Log cadaveric organ donors per 100 deaths										
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Presumed consent	0.245	0.212	0.269	0.292*	0.245	0.226	0.286	0.245	0.189	0.247	0.201
	(0.228)	(0.229)	(0.175)	(0.174)	(0.180)	(0.189)	(0.192)	(0.191)	(0.186)	(0.190)	(0.188)
Log GDP per capita			0.707***		0.697***	0.720***	0.680***	0.688***	0.794***	0.759***	0.773***
			(0.146)		(0.182)	(0.209)	(0.192)	(0.191)	(0.207)	(0.193)	(0.190)
Log of health expenditures per capita				0.548***							
				(0.129)							
Catholic country					0.239	0.268			0.268		
					(0.218)	(0.205)			(0.209)		
Common law					0.250	0.272	0.232	0.254	0.361	0.328	0.359
					(0.299)	(0.278)	(0.293)	(0.289)	(0.295)	(0.310)	(0.308)
Log of MVA and CVD deaths (per 1000 population)						0.093	0.034	0.072			
						(0.245)	(0.256)	(0.255)			
Log of MVA deaths (per 1000 population)									0.219	0.222	0.250
									(0.172)	(0.179)	(0.174)
Log of CVD deaths (per 1000 population)									0.079	0.034	0.058
									(0.193)	(0.201)	(0.199)
Include Spain	Yes	No	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	No
Num. Obs.	851	837	839	825	839	823	823	809	823	823	809
R^2	0.353	0.348	0.560	0.573	0.571	0.563	0.553	0.556	0.571	0.561	0.566

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

Note: This table reports OLS estimates of the effect of presumed consent legislation on cadaveric organ donation. The estimating equation is $ActualDonation_{ct} = \alpha + \beta\,\mathrm{OptOut}_{ct} + \mathbf{X}'_{ct}\theta + \gamma_r + \delta_t + \varepsilon_{ct}$, where $ActualDonation_{ct}$ is the log of cadaveric organ donors per 100 deaths in country c and year t, OptOut_{ct} is an indicator for whether presumed consent is in effect, $\mathbf{X}_{ct}$ includes time-varying controls such as GDP per capita, health expenditures, mortality rate from motor vehicle accidents (MVA) and cerebro-vascular disease (CVD) and country-level characteristics (Catholic, Common law), γ_r are region fixed effects, and δ_t are year fixed effects. Countries are grouped into eight regions (South America, Oceania, Europe, North America, Central America and the Caribbean, East and Southeast Asia, Middle East, and Africa) following the CIA World Factbook classification. Standard errors are clustered at the country level.

By using data from 62 countries over the period 2006 to 2019, Table I shows the estimates of the effect of presumed consent legislation and other predictors on the deceased organ donations per 100 deaths. Note that, the dependent variable is the natural logarithm of cadaveric donors per 100 deaths. Generally, while considering other predictors, the estimates suggest that countries operating under an "opt-out" (presumed consent) regime have, on average, 20–30% (insignificantly, at conventional levels) higher cadaveric organ donation rates than their "opt-in" counterparts.

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 3 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 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.

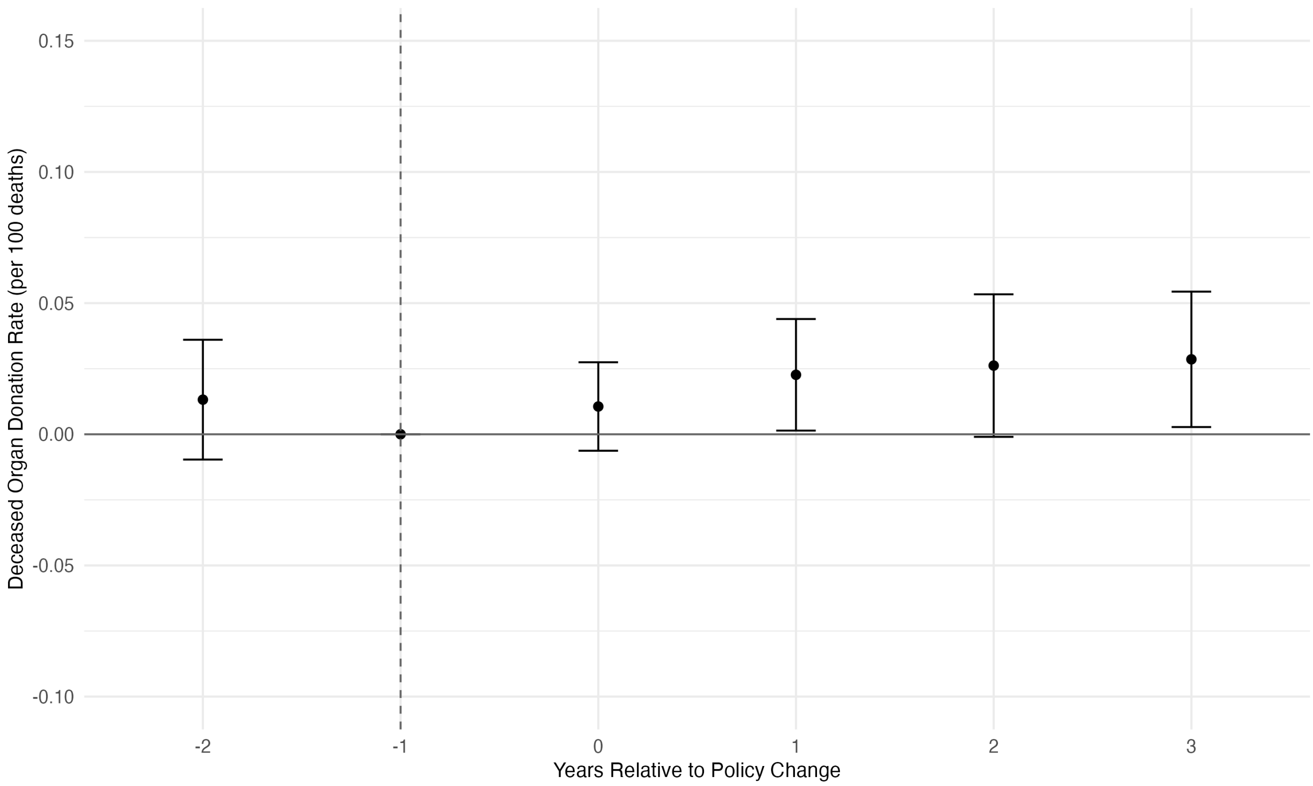
We analyze effects on organ donation with a two-way fixed effects specification, exploiting the staggered adoption of opt out and comparing before and after each country's policy shift. Let Y_{ct} denote the outcome of interest for country c in year t, measured as the deceased donation rate per 100 deaths. 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:

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

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. We also ran a series of placebo checks to ensure that there are no significant structural shifts in relevant placebo observables (e.g. motor vehicle accident deaths) around of times of policy shifts (see Online Appendix Section A.1.4).

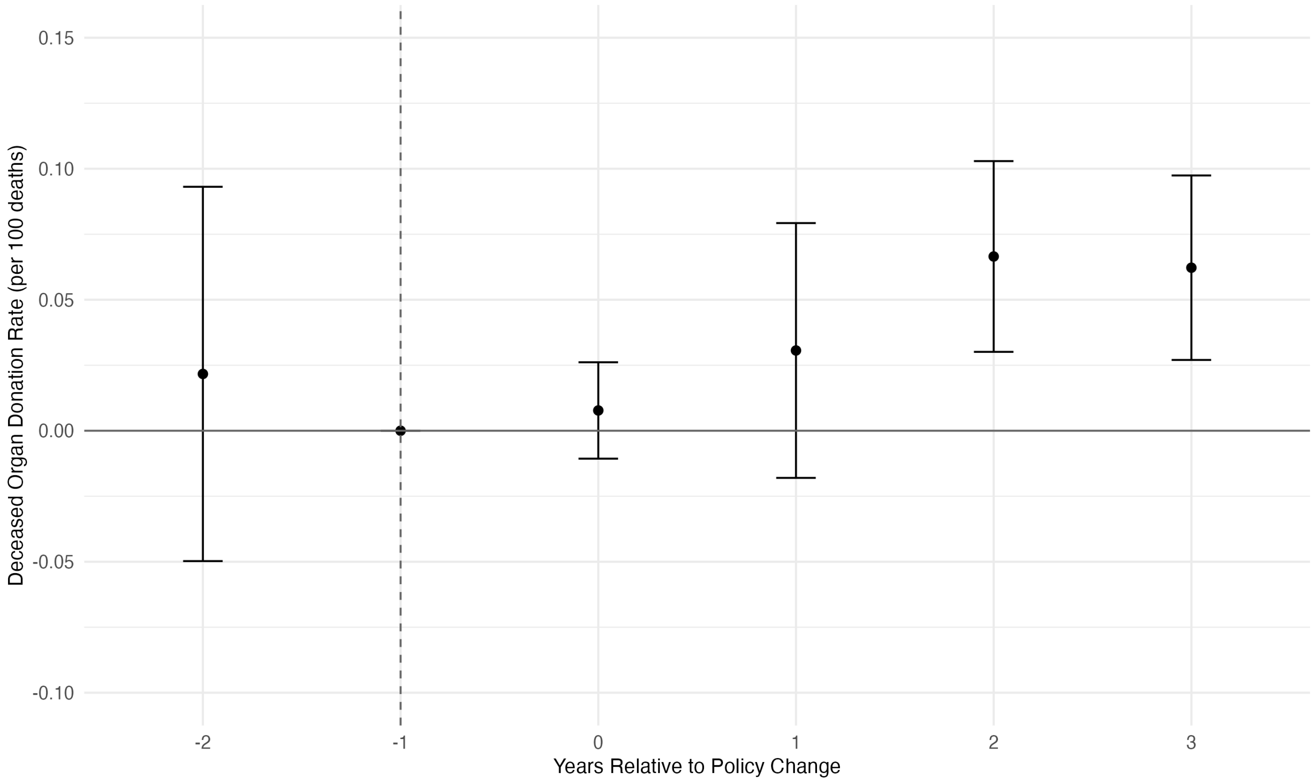
Figure II: Event Study Graph for All Countries



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 3 control countries (countries in the same continent) with data that extend at least 2 years before and 3 years after the event. The sample includes Austria, Luxembourg* (1980-1985), Belgium* (1984-1989), Finland* (1983-1988), Norway, Sweden (1981-1989), Germany, Netherlands, and UK (1980-1989). The sample also includes Italy* (1997-2002), Sweden* (1994-1999), Greece (1995-2002), Austria, Belgium, Croatia, Czechia, Denmark, Finland, France, Germany, Hungary, Ireland, Luxembourg, Netherlands, Norway, Poland, Portugal, Slovak Republic, Slovenia, Spain, Switzerland, UK (1994-2002), and Chile* (2008-2013), Uruguay* (2011-2016), Bolivia (2008, 2010-2016), Ecuador (2009-2016), Argentina, Brazil, Colombia, Cuba, Dominican Republic, Panama, Paraguay (2008-2016). Points show estimated coefficients; Countries marked with an asterisk * changed policy nationally from opt-in to opt-out; error bars indicate 95% confidence intervals.*

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.[6]

Figure III: Event Study Graph for Strict Opt Out Countries



Notes: Estimated based on Equation 1 including panel data on all strict opt out countries that changed policy nationally from opt-in to opt-out which has at least 3 control countries (countries in the same continent) with data that extend at least 2 years before and 3 years after the event. The sample includes Austria, Luxembourg* (1980-1985), Belgium* (1984-1989), Norway, Sweden (1981-1989), Germany, Netherlands, and UK (1980-1989). Points show estimated coefficients; Countries marked with an asterisk * changed policy nationally from opt-in to opt-out; error bars indicate 95% confidence intervals*

[6]Luxembourg's data are particularly noisy and have been excluded from some previous analyses (e.g., Abadie and Gay (2006)). To maintain transparency and avoid discretionary sample selection, we retain Luxembourg in the main figures (Figure II, Figure III, and Figure IV). Excluding Luxembourg yields virtually identical results.

To further investigate this heterogeneity, we disaggregate the treatment 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).[7] 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 A97). 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 A98).

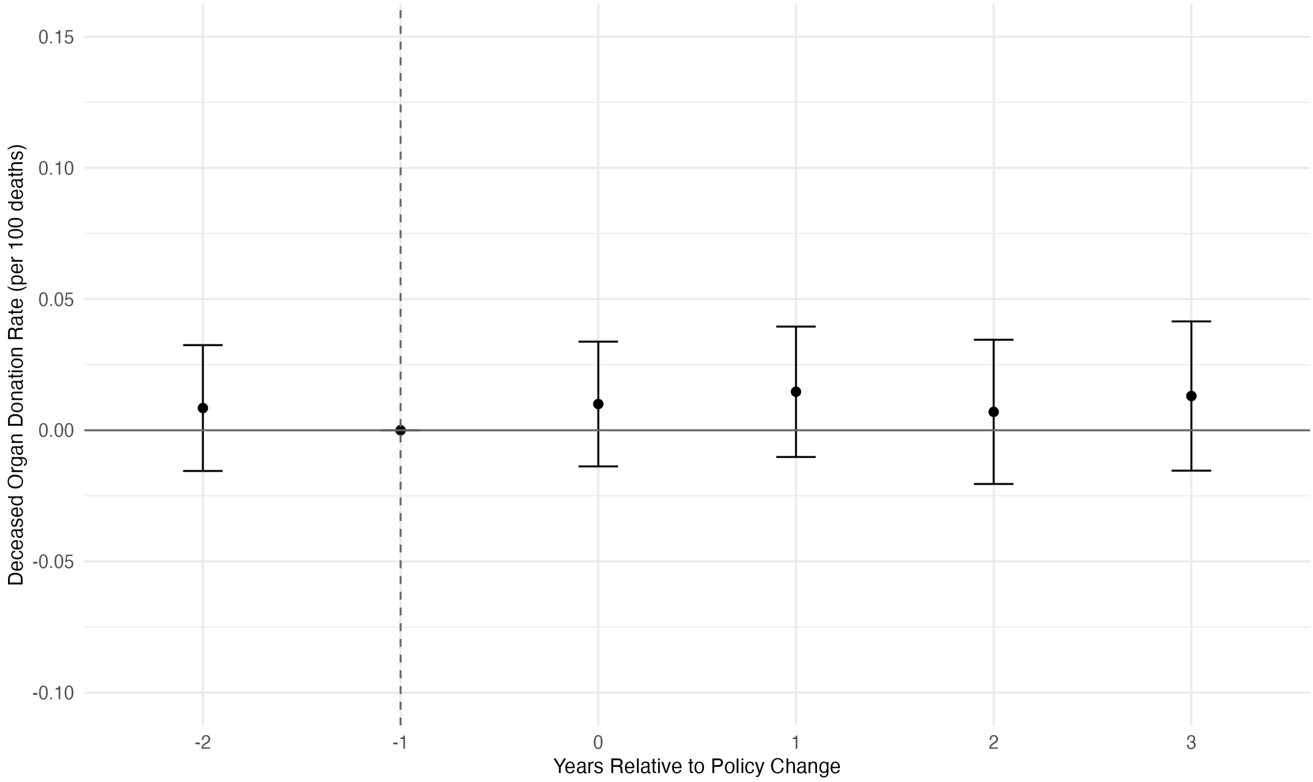
Recent work shows that TWFE with staggered adoption can be biased under treatment-effect heterogeneity, dynamic effects, or near-universal treatment. We therefore implement Sun and Abraham (2021), Callaway and Sant'Anna (2021), and Borusyak et al. (2021) estimators as robustness checks. Across all three approaches, the estimated dynamic effects closely match our baseline TWFE results in sign, magnitude, and timing. Given this concordance, and because OLS/TWFE is more transparent and parsimonious for our setting, we report OLS estimates in the main text and provide the alternative estimators in the Online Appendix.

A potential concern is that strict opt—out adopting countries started from lower pre-treatment levels ("more room to grow"), whereas weak opt-out adopters were closer to saturation. We address this in a few ways. First, we stratify the sample by baseline outcome quartiles and compare strict and weak opt-out countries within strata that include at least two of each type; the strict–weak contrast persists in the middle quartiles, where treatment and control countries exhibit similar average baseline levels. Next, we apply the estimator of De Chaisemartin and d'Haultfoeuille (2024), and find results consistent with our baseline—positive, stable effects for strict opt-out regimes with no

[7] We focus on direct evidence based on primary or secondary sources from physicians/surgeons who operated in the years surrounding the policy shift. For instance, Belgium is categorized as "strict opt-out" because we know from a published source, by a Belgian doctor who operated in the years following Belgium's shift to opt-out, that "As a rule when death is notified, the family is informed of the intention to proceed with organ removal, but explicit permission is seldom asked. This information is usually given by the doctor in charge and not by the transplant coordinator, whose role is often limited to technical and administrative support. No information is given when ... the relatives cannot be contacted in due time." (Michielsen (1996)). Similarly, Chile is categorized as "weak opt-out" because we know from a published source, by Chilean doctors who operated in the years following Chile's shift to opt-out, that "In our society the family plays a crucial role. They are always approached for consent for organ donation making the real applicability of the law debatable." (Domínguez and Rojas (2013)).

evidence of bias from pre-treatment levels or dynamic adjustments. Collectively, these exercises (reported in the Online Appendix) rule out mean reversion and concavity as explanations.

Figure IV: Event Study Graph for Weak Opt Out Countries



Notes: Estimated based on Equation 1 including panel data on all weak opt out countries that changed policy nationally from opt-in to opt-out which has at least 5 control countries (countries in the same continent) with data that extend at least 2 years before and 3 years after the event. The sample includes Finland, Germany, Netherlands, Norway, Sweden, and UK (1983-1988). The sample also includes Italy* (1997-2002), Sweden* (1994-1999), Greece (1995-2002), Austria, Belgium, Croatia, Czechia, Denmark, Finland, France, Germany, Hungary, Ireland, Luxembourg, Netherlands, Norway, Poland, Portugal, Slovak Republic, Slovenia, Spain, Switzerland, UK (1994-2002), and Chile* (2008-2013), Uruguay* (2011-2016), Bolivia (2008, 2010-2016), Ecuador (2009-2016), Argentina, Brazil, Colombia, Cuba, Dominican Republic, Panama, Paraguay (2008-2016). Points show estimated coefficients; Countries marked with an asterisk * changed policy nationally from opt-in to opt-out; error bars indicate 95% confidence intervals*

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 $p \in (0, 1)$. Player 2 does not observe d but knows the value of p.[8]

Actions. Player 1 chooses 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). Player 2 observes the choice of s and chooses $D \in \{0, 1\}$, where $D = 1$ means the organs are donated and $D = 0$ means no donation.

[8]We assume throughout that p is common knowledge.

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,

$$u_2^{OI}(s = 0) \;=\; \mathbf{1}\{D = d\}\,X \;-\; D\,\varepsilon.$$

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

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

Let $p' \in [0, 1]$ be Player 2's posterior belief that $D = 1$ after observing Player 1's choice of s. Then Player 2 donates ($D = 1$) 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,

$$u_2^{OO}(s = 0) \;=\; \mathbf{1}\{D = d\}\, X \;-\; D\,\varepsilon \;-\; (1 - D)\,\delta.$$

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

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

Hence Player 2 donates ($D = 1$) if, given the posterior belief p', the expected benefit exceeds the cost:

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

3.3 Equilibria in Pure Strategies

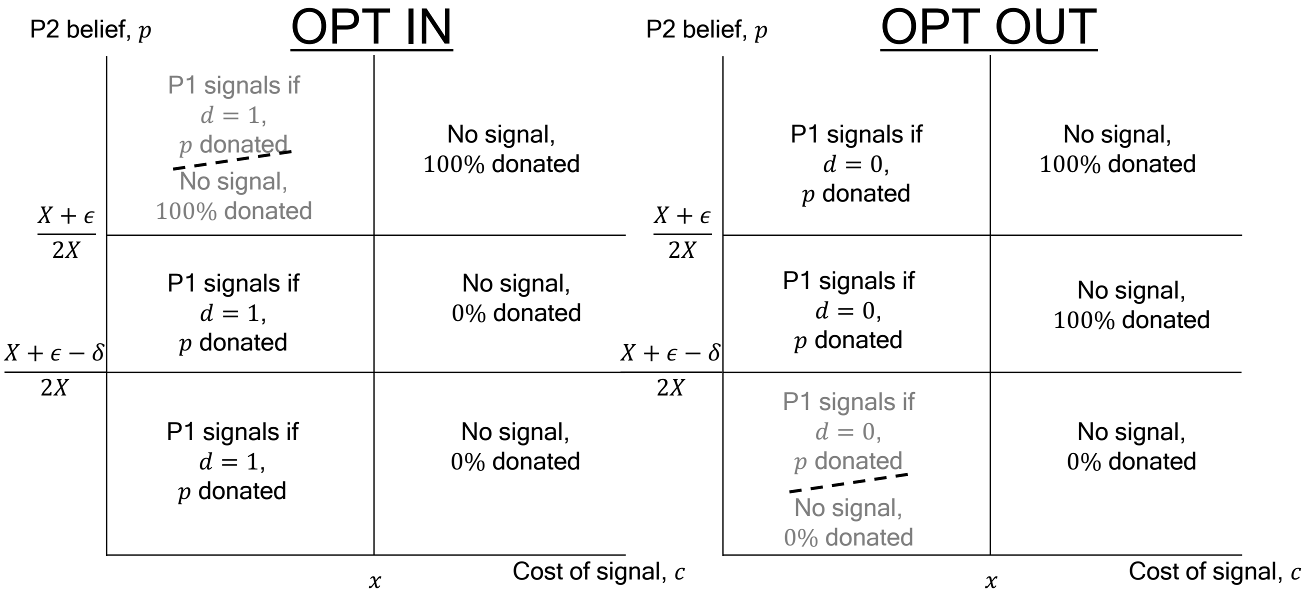
We focus on *pure-strategy Bayesian Nash equilibria.* Multiple equilibria can arise, but certain ones are especially *reasonable* or *intuitive.* We represent these equilibrium predictions on Figure V.

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 the prior belief p and the relevant donation threshold.[9]
- *Large p*: In the opt-in regime, we say p is large if $2p - 1 > \dfrac{\varepsilon}{X}$. In the opt-out regime, we similarly say p is large if $2p - 1 > \dfrac{\varepsilon - \delta}{X}$.

[9] Player 1 never opts in/out so the posterior belief is equal to the prior.

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



Notes: Theoretical Predictions based on the model outlined in Section 3. We 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 $2p - 1 > \dfrac{\varepsilon}{X}$.

- 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. Player 1 never opts out so Player 2 has to rely on her prior belief and always overturns presumed consent.[10]

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:

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

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 V.

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

[10]Opting out convinces Player 2 that Player 1 does not want to donate. So willing donors have no way to signal their preference in this equilibrium.

assumptions or refinements could exclude some less intuitive equilibria.

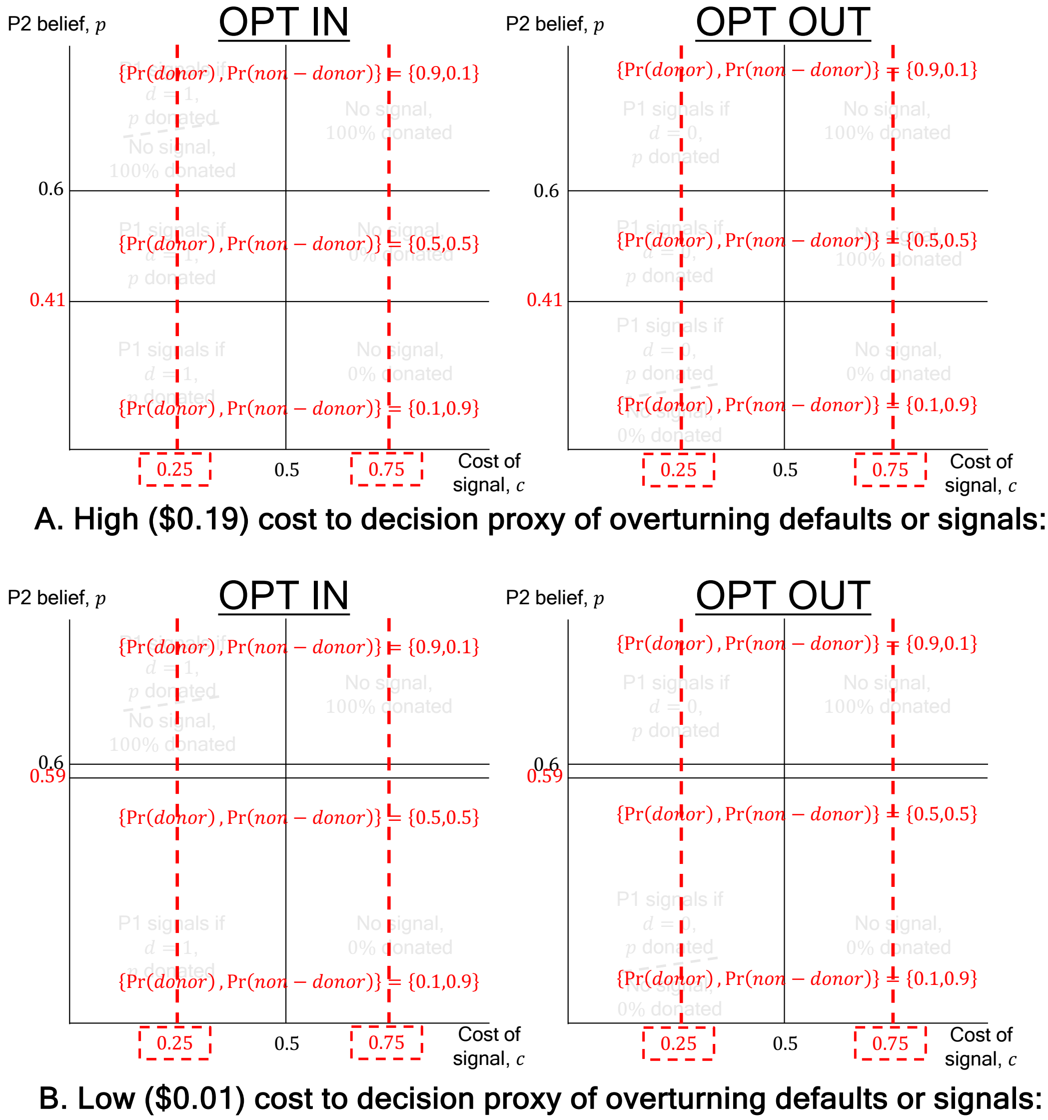
4 Experimental Design

We conduct an incentivized online experiment to study the behavioral effects of different organ donation default policies. Participants ($n = 1004$) 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, in particular cost to Player 2 to overturn "consent", Player 2 beliefs and Cost of signaling for Player 1.

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.

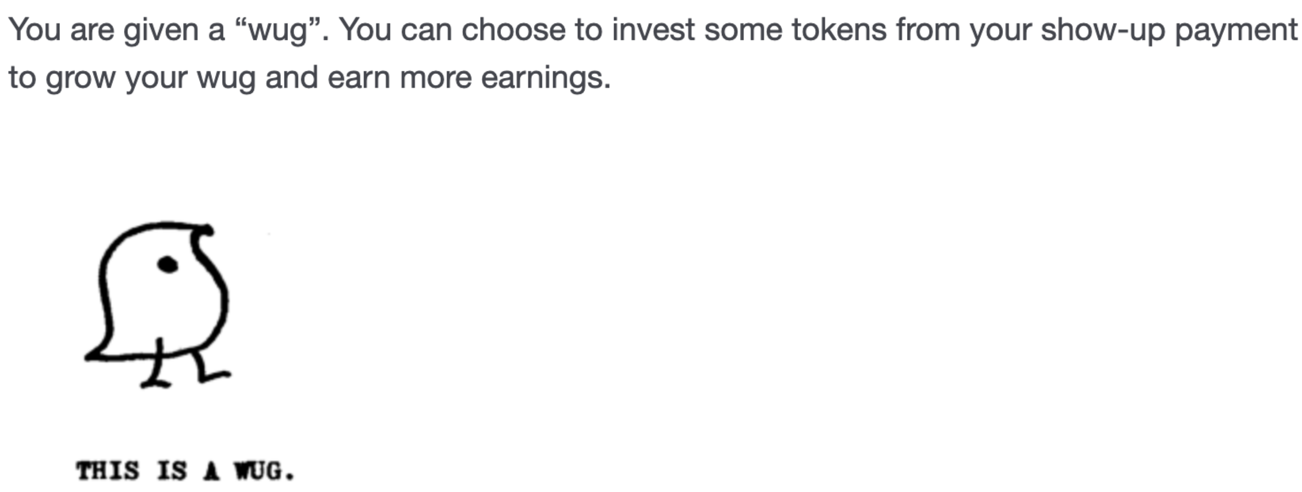
Participants who successfully pass an initial attention check proceed through three main stages of the experiment, detailed below.

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. (See Online Appendix A.2.2) 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).[11] 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: The wug which symbolizes a functioning organ during life.

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

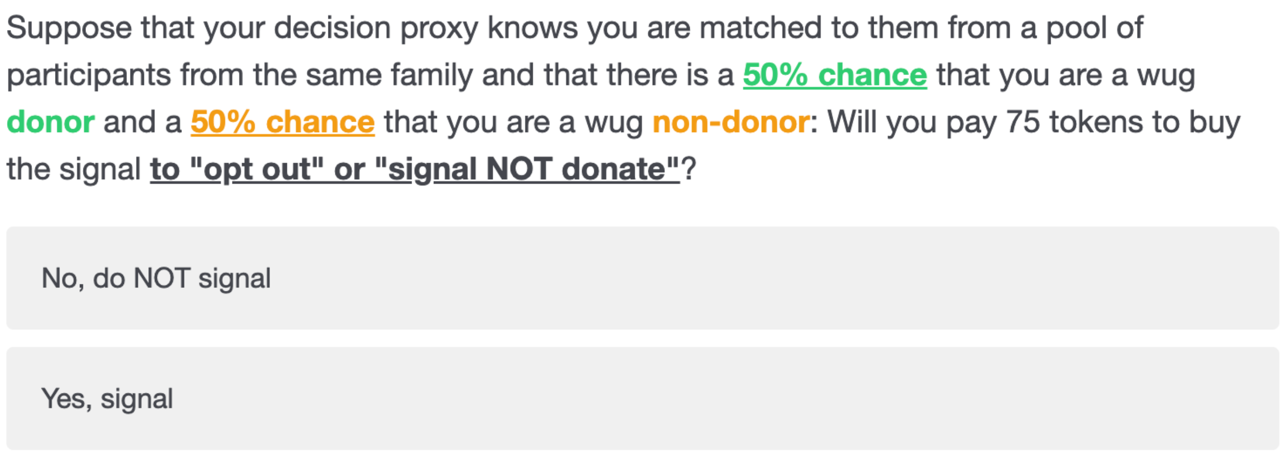
Stage 2 analogously represents the donor's decision to register (opt-in) or deregister (opt-out) from organ donation while alive. Participants learn their randomly assigned type:

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

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

Participants do not directly control their wug's final donation but can send a non-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"



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.

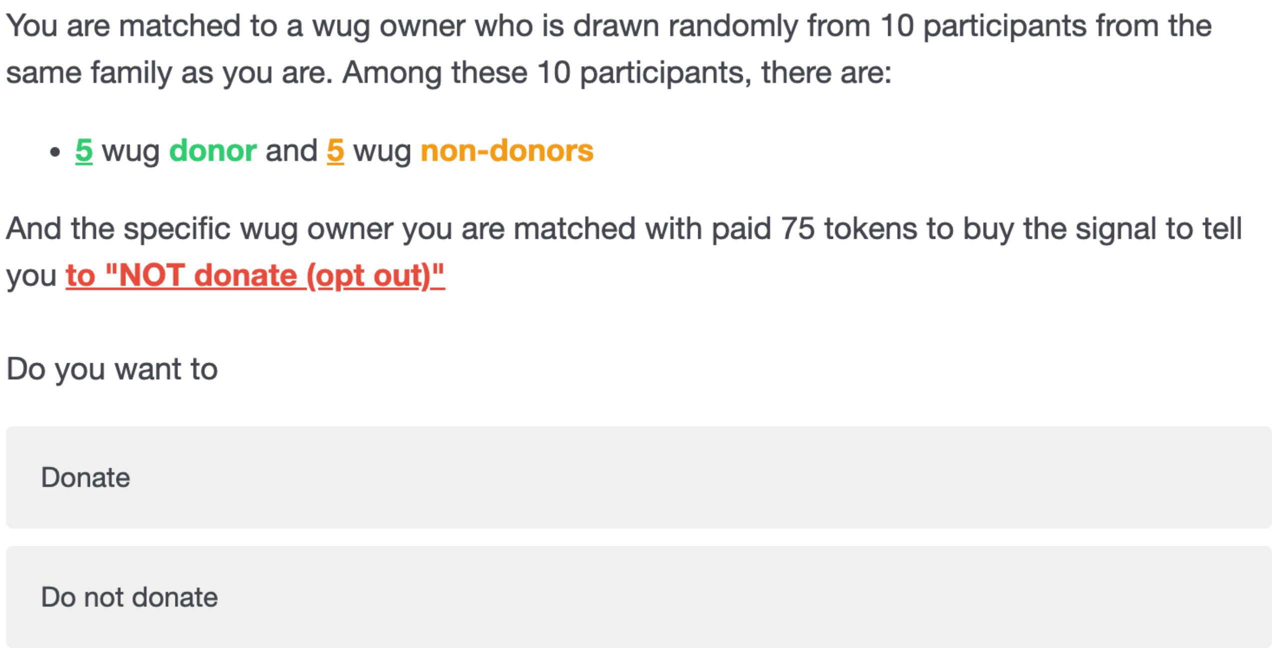
Participants are also randomly assigned (1/3 each) to subgroups of ten, with different distributions of wug donors (9 donors/1 non-donor, 5 donors/5 non-donors, 1 donor/9 non-donors). This randomized subgrouping affects the scenario under which bonus payments are calculated.

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 V, 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.[12]

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?"



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.

[12]When the cost of overturning defaults or signals is low, the middle region of Figure V collapses to the small area between $y = 0.59$ and $y = 0.6$ in the bottom two panels of Figure VI.

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

Our 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.[13] The experiment was done on September 27, 2024. Balance Table II summarizes the treatments and the corresponding volume of participants. Balance is achieved across subject demographics, reported moral values and life satisfaction, and politics.

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

Table II: 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 our laboratory experiment on organ donation decisions under different consent regimes.

To analyze the experimental data, we 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 III).

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

Single Permutation

	Cheap Signal (p=0.1) Weak Consent (1)	Cheap Signal (p=0.1) Strong Consent (2)	Costly Signal (p=0.1) Weak Consent (3)	Costly Signal (p=0.1) Strong Consent (4)	Cheap Signal (p=0.5) Weak Consent (5)	Cheap Signal (p=0.5) Strong Consent (6)	Costly Signal (p=0.5) Weak Consent (7)	Costly Signal (p=0.5) Strong Consent (8)	Cheap Signal (p=0.9) Weak Consent (9)	Cheap Signal (p=0.9) Strong Consent (10)	Costly Signal (p=0.9) Weak Consent (11)	Costly Signal (p=0.9) Strong Consent (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) Weak Consent (13)	Cheap Signal (p=0.1) Strong Consent (14)	Costly Signal (p=0.1) Weak Consent (15)	Costly Signal (p=0.1) Strong Consent (16)	Cheap Signal (p=0.5) Weak Consent (17)	Cheap Signal (p=0.5) Strong Consent (18)	Costly Signal (p=0.5) Weak Consent (19)	Costly Signal (p=0.5) Strong Consent (20)	Cheap Signal (p=0.9) Weak Consent (21)	Cheap Signal (p=0.9) Strong Consent (22)	Costly Signal (p=0.9) Weak Consent (23)	Costly Signal (p=0.9) Strong Consent (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 ($\delta = \$0.01$ vs $\delta = \$0.19$), 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 Produces More Donations Than Weak Opt Out

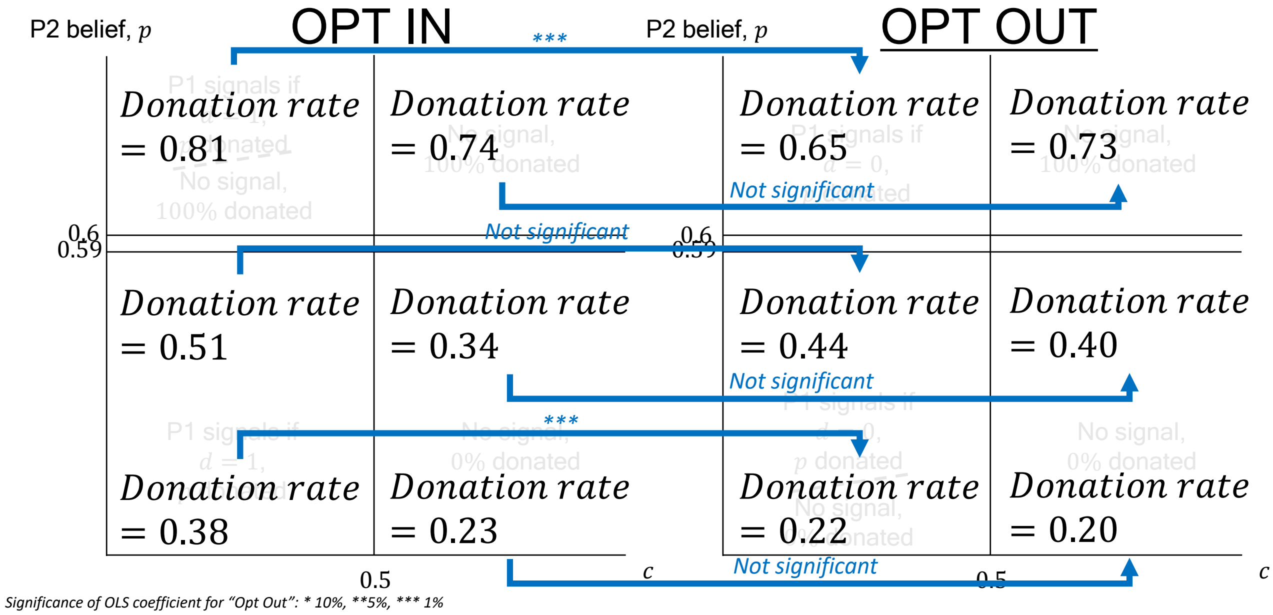
Starting from a weak consent regime (δ = \$0.01) where the cost of signaling is low (c = \$0.25), theory predicts that at high Player 2 priors ($p = 0.9$), as we move from opt in to opt out, we will be moving from the multiple equilibria where donation rates are at p or 100% to an equilibrium where the 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 III).

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 III) and a significant drop of 0.16 for $p = 0.1$ (significant at the 1% level) (see Column (13) of Table III).

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 $p = 0.5$ 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 III).

Under a weak consent regime (δ = \$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 Relative Advantages of Opt In and Strict Opt Out Depend on Cost of Signal and Priors

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 III). 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 III).

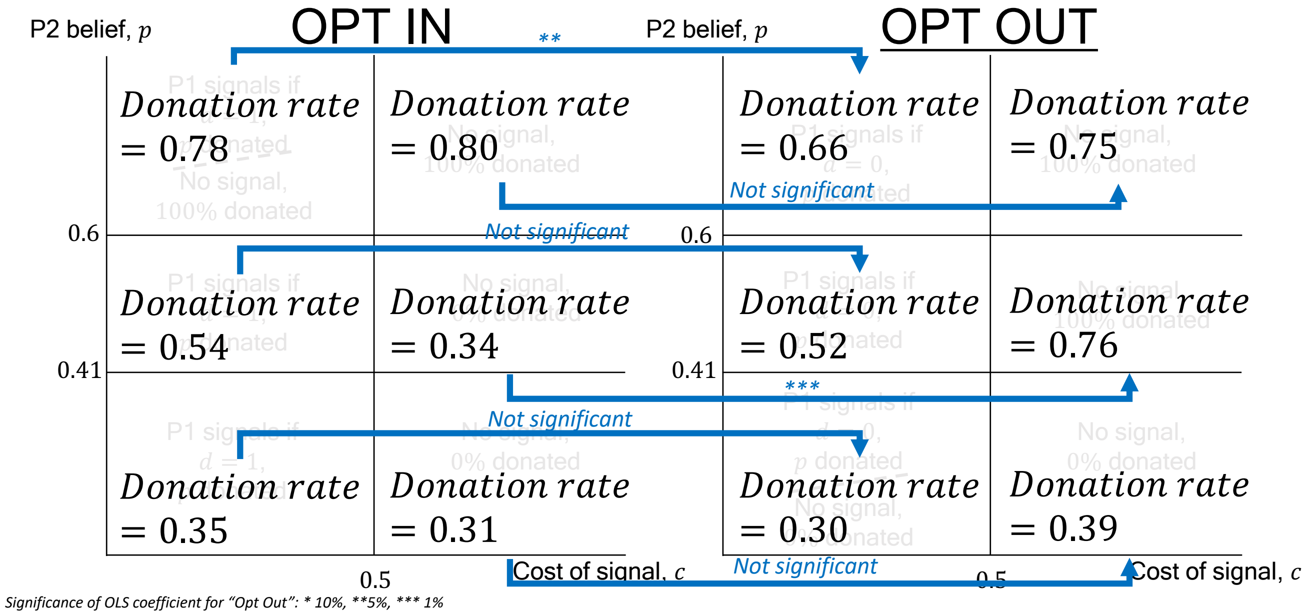
In the case of low cost of signaling ($c = \$0.25$) and Player 2 priors are middling ($p = 0.5$), we are moving between equilibria where the donation rate are both p when switching from opt in to opt out. Experimental data indicate that under these parameters the average donation rate under opt in are 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 III).

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 III).

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 III).

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 opt-out framework, as shown in our experimental results.

Recent international experiences appear to corroborate these findings. For instance, England and Wales transitioned to a weak 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. Our 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, we 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, we 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 increase donations 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

This is the appendix for "Opt In? Opt Out?" by Alex Chan, Ayush Gupta, and Yetong Xu.

A.1 Event Study

A.1.1 Data sources

Global data on the number of deceased organ donors are collected from the International Registry in Organ Donation and Transplantation, and the Global Observatory on Donation and Transplantation. Organ donation and transplantation data for Austria, Belgium, Germany, Luxembourg, and the Netherlands are provided by Agita Strelniece from EuroTransplant. Data on organ donation and transplantation for Denmark, Norway, Sweden, and Finland are provided by Anne Ørskov Boserup from ScandiaTransplant. NHS Blood and Transplant provides the UK's organ donation and transplantation data. Organ donation and transplantation data for France, Portugal, Thailand are given by Michel Tsimaratos from Agence de la biomédecine, Portuguese Blood and Transplantation Institute, and Supanit Nivatvongs from Thai Red Cross Organ Donation Centre, respectively. After compiling all the data we collected, we create a comprehensive organ donation and transplant dataset with around 94 countries across six continents.

We collected data on GDP per capita, total population, health expenditure per capita, birth rate and death rate from the World Bank's World Development indicators. We compiled the World Health Organization Mortality Database to get the number of deaths caused by traffic accidents (MVA deaths) and cerebro-vascular failures (CVD deaths). We obtained the religious beliefs and legal systems from the CIA's World Factbook (mainly refer to four versions: 2024, 2019, 2009, 2000).

Considering the influence of COVID-19, we decided to use the data prior to 2020 for Figure I and Table I. For Figure I, we included all 77 unique countries which have data in 2019. For Table I, there are 90 countries which have data from 2006 to 2019, among them, there are 71 countries having 10 or more observations. Thus, we dropped Algeria, Bosnia and Herzegovina, China, Jordan, Kazakhstan, Moldova, Mongolia, Montenegro, Morocco, Myanmar, Nicaragua, North Macedonia, Oman, Puerto Rico (US), Serbia, Trinidad and Tobago, Ukraine, United Arab Emirates, Vietnam. Due to the MVA and

CVD Deaths data missing problem, we also dropped Belarus, Bolivia, India, Iran (Islamic Rep.), Lebanon, Russian Federation, Saudi Arabia, Taiwan, Tunisia. In the end, we totally used 79 unique countries in our sample for Figure I and Table I and we collect data on legislative defaults on deceased organ donations for all these countries, as listed in Appendix A.1.2

The 62 countries used in Table I are: Argentina, Australia, Austria, Belgium, Brazil, Bulgaria, Canada, Chile, Colombia, Costa Rica, Croatia, Cuba, Cyprus, Czechia, Denmark, Dominican Republic, Ecuador, Estonia, Finland, France, Germany, Greece, Guatemala, Hong Kong SAR China, Hungary, Iceland, Ireland, Israel, Italy, Japan, Korea Rep., Kuwait, Latvia, Lithuania, Luxembourg, Malaysia, Malta, Mexico, Netherlands, New Zealand, Norway, Panama, Paraguay, Peru, Philippines, Poland, Portugal, Qatar, Romania, Singapore, Slovak Republic, Slovenia, South Africa, Spain, Sweden, Switzerland, Thailand, Turkiye, United Kingdom, United States, Uruguay, Venezuela.

A.1.2 Legislative defaults

Table IV: Organ Donation Consent Policies by Country (2006 - 2019)

Country	**Policy in 2019**	**Policy Change**[14]	**Evidence**
Algeria	Opt-in	—	Cherdoud et al. (2025); Algérie1[15]
Argentina	Opt-out	—	Dallacker et al. (2024); Gondolesi et al. (2018)
Australia	Opt-in	—	Library of Parliament, HillNotes[16]; DonateLife[17]

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Table IV – continued from previous page

Country	Policy in 2019	Policy Change	Evidence
Austria	Opt-out	—	Abadie and Gay (2006); Eurotransplant[18]; Federal Act from European Federation for Organ Donation (EFOD)[19]
Belarus	Opt-out	—	Library of Parliament, HillNotes[16]
Belgium	Opt-out	—	Abadie and Gay (2006); Federal Act from EFOD[19]
Bolivia	Opt-in	—	Law No. 1716 (1996)[20]
Brazil	Opt-in	—	Garcia et al. (2024)
Bulgaria	Opt-out	—	Scholz (2020); Federal Act from EFOD[19]
Canada	Opt-in	—	Library of Parliament, HillNotes[16]
Chile	Opt-out	Opt-in → Opt-out (2010)	Steffel et al. (2019)
China	Opt-in	—	Zeng et al. (2023)
Colombia	Opt-out	—	Aguirre-Villarreal et al. (2023)
Costa Rica	Opt-in	Opt-out → Opt-in (2014)	Aguirre-Villarreal et al. (2023)

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Table IV – continued from previous page

Country	**Policy in 2019**	**Policy Change**	**Evidence**
Croatia	Opt-out	—	Abadie and Gay (2006); Federal Act from EFOD[19]
Cuba	Opt-in	—	Reed (2016)
Cyprus	Opt-in	—	Scholz (2020)
Czechia	Opt-out	—	Abadie and Gay (2006); Federal Act from EFOD[19]
Denmark	Opt-in	—	Abadie and Gay (2006); Library of Parliament, HillNotes[16]; Federal Act from EFOD[19]
Dominican Republic	Opt-out	—	da Silva et al. (2024)
Ecuador	Opt-out	—	Mizraji et al. (2007)
Estonia	Opt-out	—	Abadie and Gay (2006); Federal Act from EFOD[19]
Finland	Opt-out	—	Abadie and Gay (2006); Federal Act from EFOD[19]
France	Opt-out	—	Abadie and Gay (2006); Federal Act from EFOD[19]
Germany	Opt-in	—	Abadie and Gay (2006); Library of Parliament, HillNotes[16]; Federal Act from EFOD[19]

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Table IV – continued from previous page

Country	Policy in 2019	Policy Change	Evidence
Greece	Opt-out	—	Abadie and Gay (2006); Library of Parliament, HillNotes[16]; Scholz (2020)
Guatemala	Opt-in	—	da Silva et al. (2024)
Hong Kong (China)	Opt-in	—	Human Organ Transplant Ordinance, Cap. 465[21]
Hungary	Opt-out	—	Abadie and Gay (2006); Federal Act from EFOD[19]
Iceland	Opt-out	Opt-in → Opt-out (2018)	Iceland Review[22]; INEDYTO[23]
India	Opt-in	—	Transplantation of Human Organs and Tissues Act (1994)[24]
Iran	Opt-in	—	Brain Death and Organ Transplantation Act[25]
Ireland	Opt-in	—	Scholz (2020); Federal Act from EFOD[19]

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[21] Human Organ Transplant Ordinance, Cap. 465, Hong Kong SAR, China. Available at: https://www.elegislation.gov.hk/hk/cap465

[22] Iceland Review. All Icelanders are now organ donors. Available at: https://www.icelandreview.com/news/all-icelanders-are-now-organ-donors/

[23] INEDYTO. European regulations on organ donation: consent models, family involvement, and national registries. Available at: https://www.inedyto.com/mapping-consent-systems-in-europe.html

[24] THE TRANSPLANTATION OF HUMAN ORGANS AND TISSUES ACT, 1994. Available at: https://www.indiacode.nic.in/bitstream/123456789/15433/1/transplantation_of_human_organs_and_tissues_act,_1994.pdf

[25] Brain Death and Organ Transplantation Act, 2000. Available at: https://rc.majlis.ir/fa/law/show/93297

Table IV – continued from previous page

Country	Policy in 2019	Policy Change	Evidence
Israel	Opt-in	—	Scott and Jacobson (2007)
Italy	Opt-out	—	Federal Act from EFOD[19]
Japan	Opt-in	—	Japan Organ Transplant Network[26]
Kuwait	Opt-in	—	AlSulaiman et al. (2021)
Latvia	Opt-out	—	Abadie and Gay (2006); Scholz (2020)
Lithuania	Opt-in	—	Abadie and Gay (2006); Scholz (2020)
Luxembourg	Opt-out	—	Abadie and Gay (2006); Scholz (2020); Eurotransplant[18]
Malaysia	Opt-in	—	Khoo and Ballesté (2024)
Malta	Opt-in	—	Ellul (2013)
Mexico	Opt-in	—	da Silva et al. (2024)
Moldova	Opt-out	—	Arseni (2023)
Mongolia	Opt-in	—	Mongolian Organ Transplantation Association[27]
Morocco	Opt-in	—	Moutabari3[28]
Netherlands	Opt-in	—	Abadie and Gay (2006); Eurotransplant[18]

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[26] The Enactment of the Organ Transplantation Law, and the revised Organ Transplant Act. Available at: https://www.jotnw.or.jp/en/04/
[27] Improving public relationships for organ donation in Mongolia. Available at: https://s3.amazonaws.com/media.guidebook.com/upload/99821/Vqtw9C4CuW2Dz4btaP7aF6OR8N12sbreCmR5.pdf
[28] Moutabari3. À propos du don d'organes. Available at: https://moutabari3.ma/fr/a-propos-du-don-dorganes/

Table IV – continued from previous page

Country	Policy in 2019	Policy Change	Evidence
New Zealand	Opt-in	—	Abadie and Gay (2006); Organ Donation New Zealand Annual Report 2019[29]
Nicaragua	Opt-in	—	Agence France-Presse[30]
North Macedonia	Opt-in	—	Deutsches Referenzzentrum für Ethik in den Biowissenschaften[31]
Norway	Opt-out	—	Library of Parliament, HillNotes[16]; Abadie and Gay (2006)
Panama	Opt-out	—	Shepherd et al. (2014);
Paraguay	Opt-out	—	Mizraji et al. (2007); The Asuncion Times[32]
Peru	Opt-in	—	da Silva et al. (2024)
Philippines	Opt-in	—	Organ Donation Act of 1991 (Republic Act No. 7170)[33]
Poland	Opt-out	—	Abadie and Gay (2006)

Continued on next page

[29] Organ Donation New Zealand Annual Report 2019. Available at: https://donor.co.nz/media-centre/annual-report-2019/

[30] AFP. Nicaragua legaliza donación y trasplante de órganos. Published via Teletica. Available at: https://www.teletica.com/internacional/nicaragua-legaliza-donacion-y-trasplante-de-organos_28032

[31] Deutsches Referenzzentrum für Ethik in den Biowissenschaften (DRZE). Regulations of organ donation in Europe. Available at: https://www.drze.de/en/research-publications/in-focus/organ-transplantation/modules/regulations-of-organ-donation-in-europe

[32] The Asuncion Times. Paraguay's National Transplant Day: Over 300 People Awaiting Organ Donation. Available at: https://asunciontimes.com/paraguay-news/health-news/paraguays-national-transplant-day-over-300-people-awaiting-organ-donation/

[33] Organ Donation Act of 1991 (Republic Act No. 7170). Available at: https://lawphil.net/statutes/repacts/ra1992/ra_7170_1992.html

Table IV – continued from previous page

Country	Policy in 2019	Policy Change	Evidence
Portugal	Opt-out	—	Abadie and Gay (2006); Federal Act from EFOD[19]
Qatar	Opt-in	—	Law No. 15 (2015)[34]
Romania	Opt-in	—	Cotrau et al. (2024); Federal Act from EFOD[19]
Russia	Opt-out	—	Shepherd et al. (2014)
Saudi Arabia	Opt-in	—	AlSulaiman et al. (2021)
Serbia	Opt-out	Opt-in → Opt-out (2018)	Ninkov (2025)
Singapore	Opt-out	—	Steffel et al. (2019)
Slovak Republic	Opt-out	—	Abadie and Gay (2006); Federal Act from EFOD[19]
Slovenia	Opt-out	—	Abadie and Gay (2006); Eurotransplant[18];
South Africa	Opt-in	—	Slabbert and Venter (2019)
South Korea	Opt-in	—	Organ Transplant Act (2013)[35]
Spain	Opt-out	—	Abadie and Gay (2006); Federal Act from EFOD[19]
Sweden	Opt-out	—	Abadie and Gay (2006); Federal Act from EFOD[19]

Continued on next page

[34] Law No. (15) of 2015 on Regulating the Human Organs Transfer and Transplantation. Available at: https://www.lexismiddleeast.com/law/Qatar/Law_15_2015

[35] Organ Transplant Act (2013). Available at: https://elaw.klri.re.kr/eng_mobile/viewer.do?hseq=29060&type=part&key=36

Table IV – continued from previous page

Country	**Policy in 2019**	**Policy Change**	**Evidence**
Switzerland	Opt-in	—	Library of Parliament, HillNotes[16]; Transplantation Act (2004)[36]
Taiwan (China)	Opt-in	—	da Silva et al. (2024)
Thailand	Opt-in	—	Cowie et al. (2023)
Trinidad & Tobago	Opt-in	—	Mohammed et al. (2021)
Turkey	Opt-in	—	da Silva et al. (2024); Sevimli (2022)
United Kingdom	Opt-in	—	Abadie and Gay (2006)
United Arab Emirates	Opt-in	—	AlSulaiman et al. (2021)
Uruguay	Opt-out	Opt-in → Opt-out (2013)	Aguirre-Villarreal et al. (2023)
United States	Opt-in	—	Abadie and Gay (2006)
Venezuela	Opt-out	Opt-in → Opt-out (2011)	da Silva et al. (2024); BBC News[37]

A.1.3 Evidence of Strict or Weak Opt Out

For the eight treatment countries analyzed in our event study in Section 2.3, we rely primarily on direct evidence from physicians or surgeons who operated during the years surrounding the policy shift. Where such direct evidence is unavailable, we instead draw on published research studies.

- Austria: Strict opt-out country by Mehlman (1991), who had personal communi-

[36]Federal Act on the Transplantation of Organs, Tissues and Cells (2004). Available at: https://www.freedomofresearch.org/wp-content/uploads/2019/11/5-CC-810.21-Federal-Act-of-8-October-2004-on-the-Transplantation-of-Organs-Tissues-and-Cells-Loi-sur-la-transplantation.pdf

[37]Cappa D.G. El dramático limbo de las personas que esperan un órgano en Venezuela. donde el sistema de trasplantes lleva años suspendido (2022). Available at: https://www.bbc.com/mundo/noticias-america-latina-60470404

cation with an Austrian transplant coordinator in 1990 that "One true presumed consent system in Europe is found in Austria. A patient who does not wish to donate organs must state his objection in writing. Donation is not discussed with families unless they raise the issue." And several other secondary sources corroborates the strictness of the opt-out.

- Belgium: Strict opt-out country by Michielsen (1996) that "As a rule when death is notified, the family is informed of the intention to proceed with organ removal, but explicit permission is seldom asked. This information is usually given by the doctor in charge and not by the transplant coordinator, whose role is often limited to technical and administrative support."

- Chile: Weak opt-out country by Domínguez and Rojas (2013) that "In our society the family plays a crucial role. They are always approached for consent for organ donation making the real applicability of the law debatable."

- Finland: Weak opt-out country by Williams (1994) that "Some countries which have laws based on presumed consent such as Finland, Greece, Italy, Norway, Spain, and Sweden, also insist that physicians consult with the deceased's relatives."

- Italy: Weak opt-out country by Gevers et al. (2004) that "At the end of 2003, transitional provisions were still in force that allow relatives to make an objection in writing in case an explicit will of the potential donor is lacking. Furthermore, there are indications that in practice relatives are often asked not to object against organ removal." Also, by Abadie and Gay (2006) that "In practice, families are consulted before organs are extracted."

- Luxembourg: Strict opt-out country by Bilgel (2012) that "Family Veto is not allowed."[38] Also, interviewed organ transplantation professionals in Western Europe concurs with this view for the time period of policy change.

- Sweden: Weak opt-out country by Gevers et al. (2004) that "If the will of the deceased person is not known, removal of organs is in principle allowed. However, the next of kin have a legal right to refuse, and they have to be informed in advance

[38] After tracing the citations behind this paper's claim about Luxembourg, we were unable to locate primary materials indicating that the claim is grounded in field evidence.

of the removal and their right to oppose. We found no evidence that actual practice was not in accordance with this legal regime."

- Uruguay: Weak opt-out country by Contreras et al. (2020) that "Family consultation is needed."

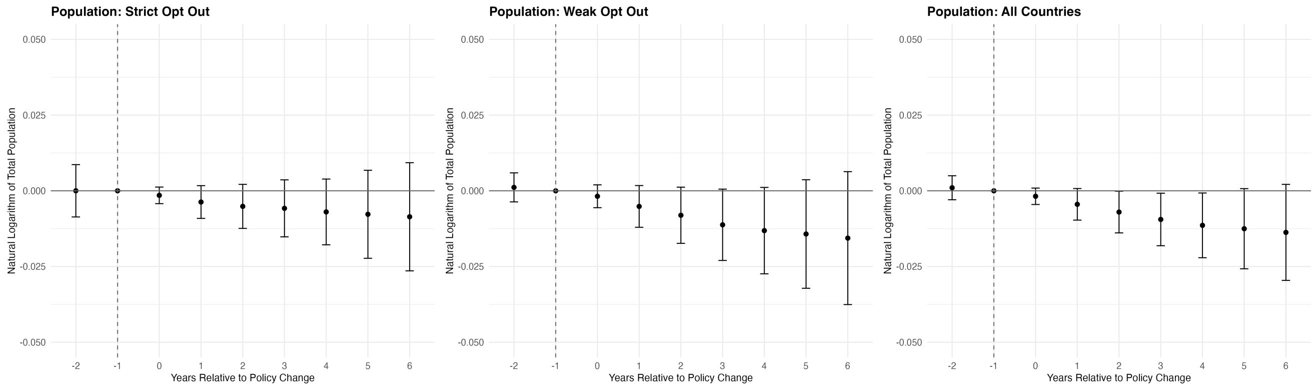
A.1.4 Placebo Tests

As a robustness check, we conduct placebo tests using outcomes that should not be affected by changes in the regime. Figures A1, A2, A3, A4, and A5 report event-study estimates for total population, total deaths, death rate from motor vehicle accidents (MVA), death rate from cerebro-vascular failures (CVD), and health spending. Note that, since health expenditure per capita and GDP per capita are highly collinear and health expenditure accounts for around 10% of GDP constantly (Abadie and Gay (2006)), we use GDP per capita as the outcome variable for the placebo test on health spending.

The same set of countries and years is used as in the original strict opt-out (Figure A97), weak opt-out (Figure A98), and all-country (Figure A96) event-study plots. Except for the weak opt-out MVA and CVD death rate specifications, where Bolivia (2008-2019), Dominican Republic (2008-2019), Poland (1994-2005), UK (1994-2005), and Uruguay (2008-2019) are excluded due to missing data[39].

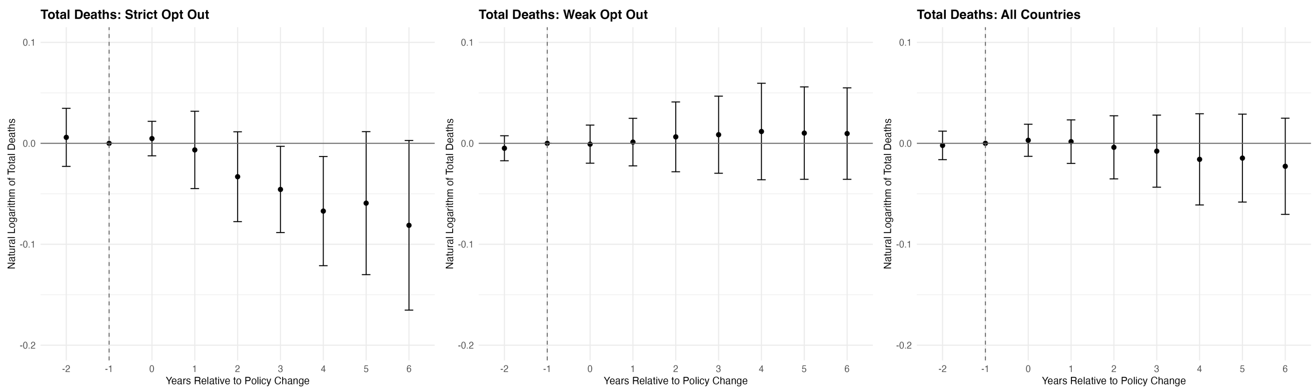
[39] As a result, for weak opt-out MVA and CVD death rate specifications, the sample includes Finland*, Germany, Netherlands, Norway, Sweden, and UK (1983-1991). The sample also includes Italy* (1997-2005), Sweden* (1994-2002), Greece (1995-2005), Austria, Belgium, Croatia, Czechia, Denmark, Finland, France, Germany, Hungary, Ireland, Luxembourg, Netherlands, Norway, Portugal, Slovak Republic, Slovenia, Spain, Switzerland (1994-2005), and Chile* (2008-2016), Ecuador (2009-2016), Argentina, Brazil, Colombia, Cuba, Panama, Paraguay (2008-2016). Countries marked with an asterisk * changed policy nationally from opt-in to opt-out;

Figure A1: Placebo Test on Total Population



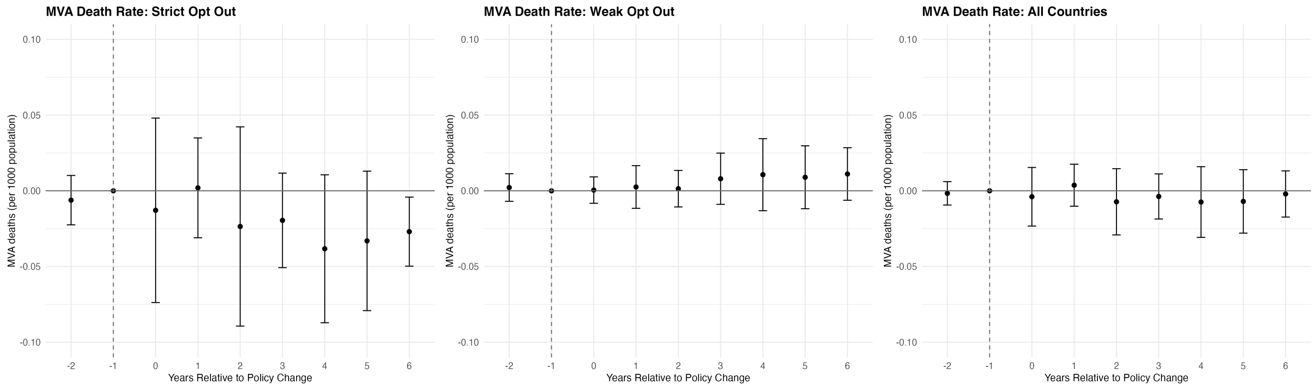
Notes: This plot presents event-study coefficients relative to the year of the policy change, separately for strict opt-out countries, weak opt-out countries, and the pooled sample. Estimates are based on Equation 1, but with the natural logarithm of total population replacing the deceased donation rate per 100 deaths. Points show estimated coefficients; error bars indicate 95% confidence intervals.

Figure A2: Placebo Test on Total Deaths



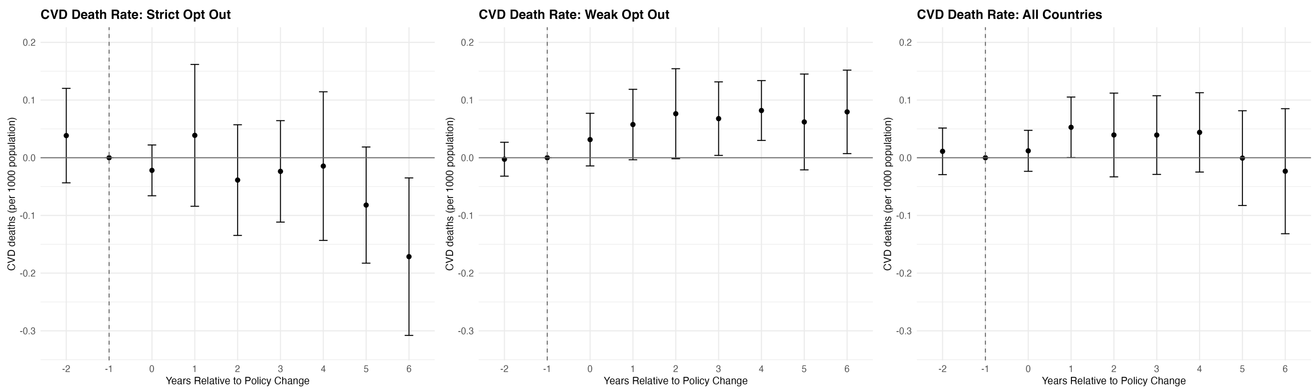
Notes: This plot presents event-study coefficients relative to the year of the policy change, separately for strict opt-out countries, weak opt-out countries, and the pooled sample. Estimates are based on Equation 1, but with the natural logarithm of total deaths replacing the deceased donation rate per 100 deaths. Points show estimated coefficients; error bars indicate 95% confidence intervals.

Figure A3: Placebo Test on MVA Deaths Rate



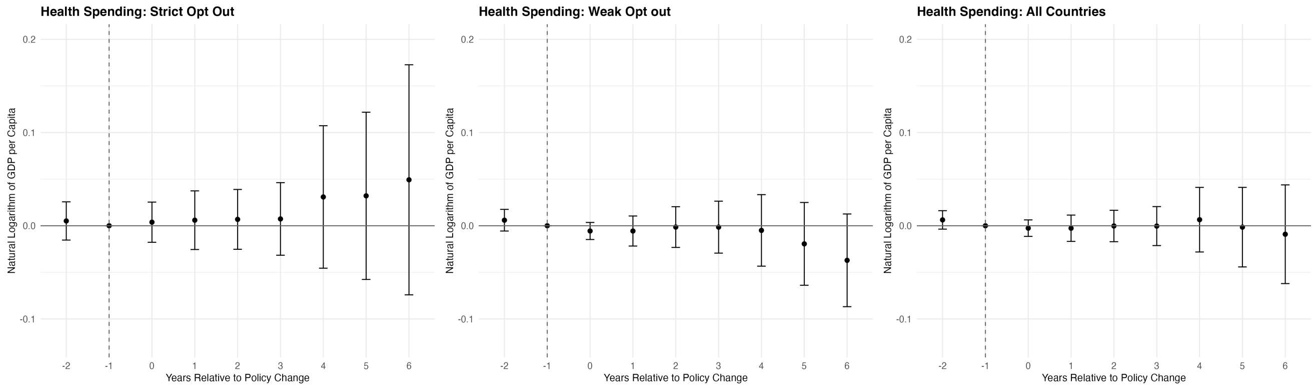
Notes: This plot presents event-study coefficients relative to the year of the policy change, separately for strict opt-out countries, weak opt-out countries, and the pooled sample. Estimates are based on Equation 1, but with the MVA deaths per 1000 population replacing the deceased donation rate per 100 deaths. Points show estimated coefficients; error bars indicate 95% confidence intervals.

Figure A4: Placebo Test on CVD Deaths Rate



Notes: This plot presents event-study coefficients relative to the year of the policy change, separately for strict opt-out countries, weak opt-out countries, and the pooled sample. Estimates are based on Equation 1, but with the CVD deaths per 1000 population replacing the deceased donation rate per 100 deaths. Points show estimated coefficients; error bars indicate 95% confidence intervals.

Figure A5: Placebo Test on Health Spending

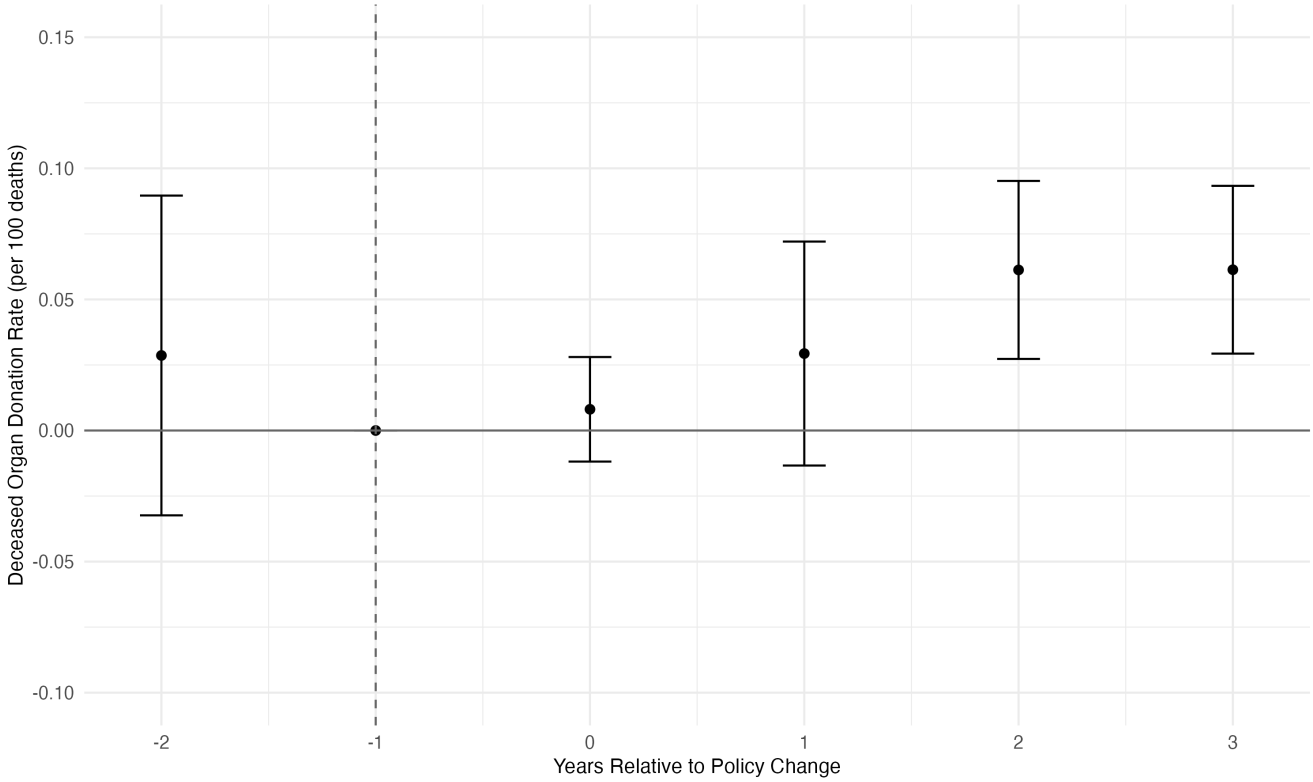


Notes: This plot presents event-study coefficients relative to the year of the policy change, separately for strict opt-out countries, weak opt-out countries, and the pooled sample. Estimates are based on Equation 1, but with the natural logarithm of total population replacing the deceased donation rate per 100 deaths. Points show estimated coefficients; error bars indicate 95% confidence intervals.

In all specifications, we find no systematic or significant structural shifts for any of these placebo variables around the time of changing to strict/weak/general opt-out.

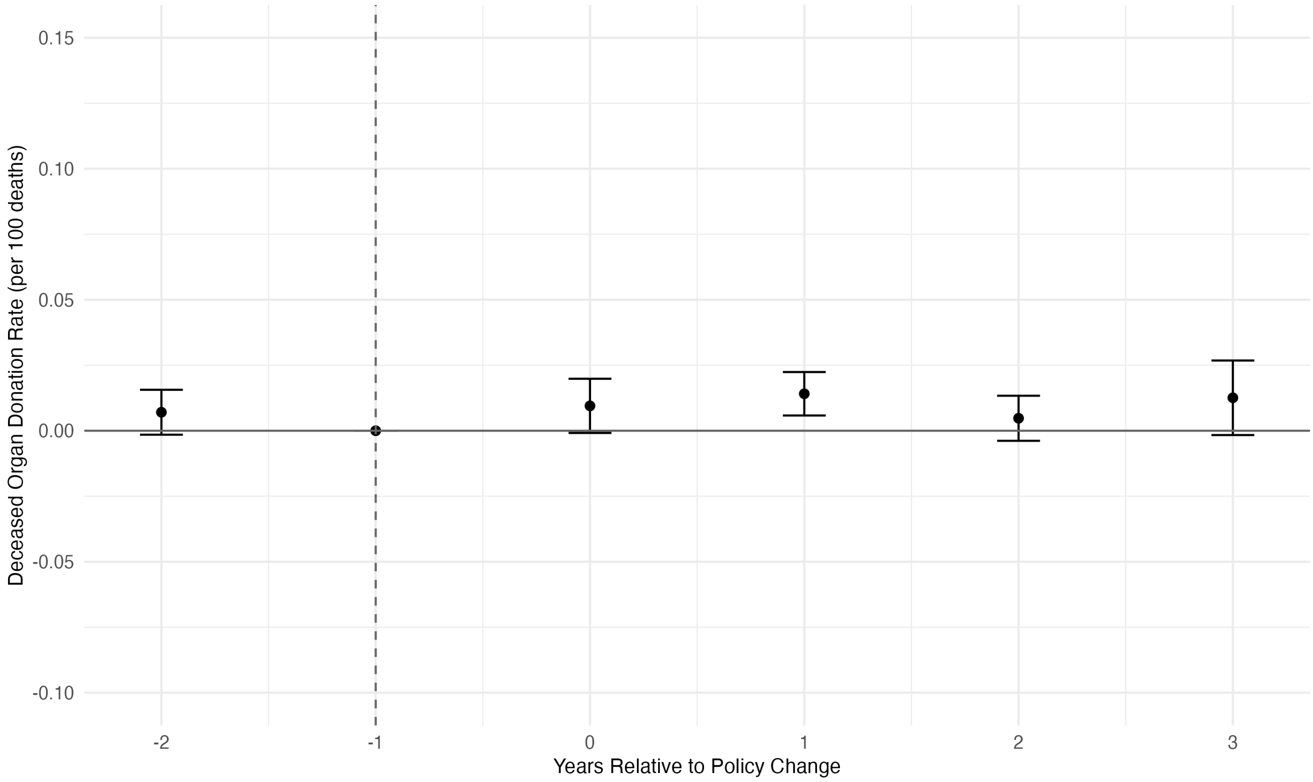
A.1.5 Robustness Check: Sun & Abraham

Figure A6: Event Study Graph for Strict Opt Out Countries (Sun & Abraham)



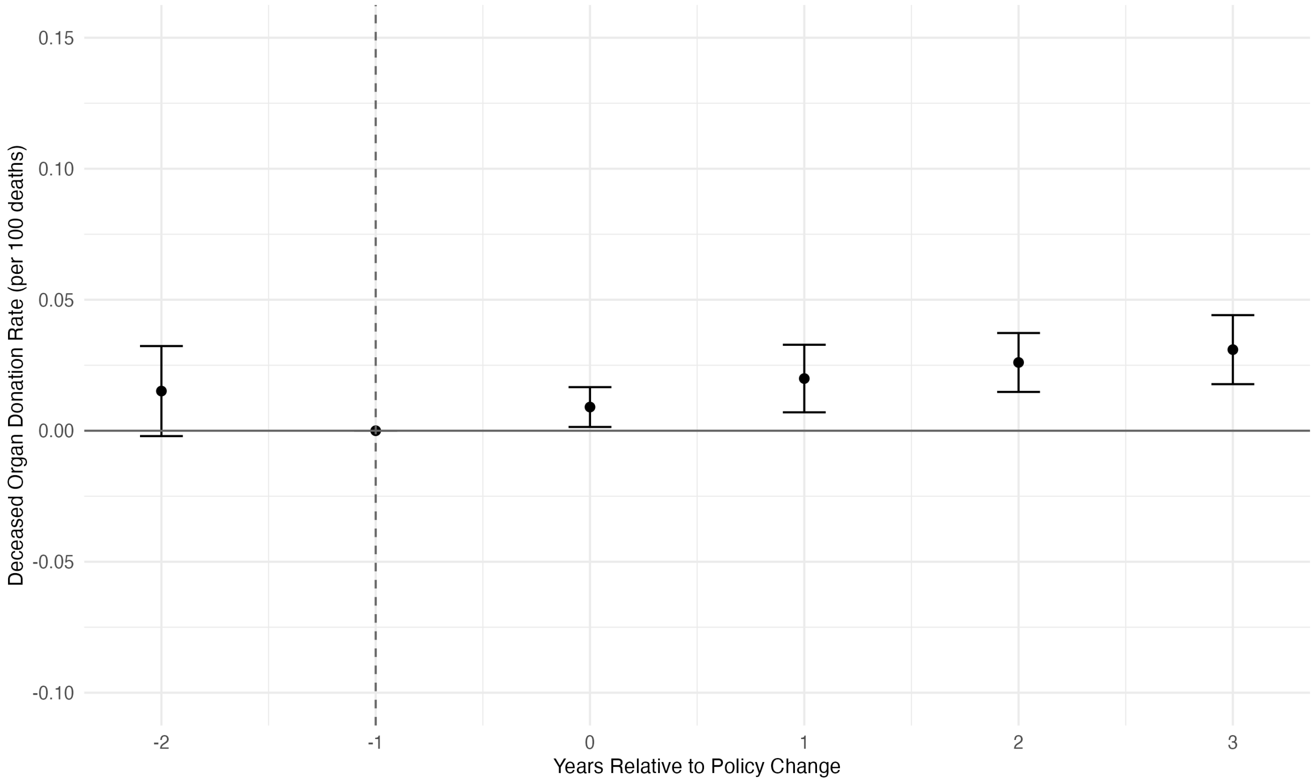
Notes: Estimated based on Equation 1 including panel data on all strict opt out countries that changed policy nationally from opt-in to opt-out which has at least 3 control countries (countries in the same continent) with data that extend at least 2 years before and 3 years after the event. The sample includes Austria, Luxembourg* (1980-1985), Belgium* (1984-1989), Norway, Sweden (1981-1989), Germany, Netherlands, and UK (1980-1989). Points show estimated coefficients; Countries marked with an asterisk * changed policy nationally from opt-in to opt-out; error bars indicate 95% confidence intervals*

Figure A7: Event Study Graph for Weak Opt Out Countries (Sun & Abraham)



Notes: Estimated based on Equation 1 including panel data on all weak opt out countries that changed policy nationally from opt-in to opt-out which has at least 5 control countries (countries in the same continent) with data that extend at least 2 years before and 3 years after the event. The sample includes Finland, Germany, Netherlands, Norway, Sweden, and UK (1983-1988). The sample also includes Italy* (1997-2002), Sweden* (1994-1999), Greece (1995-2002), Austria, Belgium, Croatia, Czechia, Denmark, Finland, France, Germany, Hungary, Ireland, Luxembourg, Netherlands, Norway, Poland, Portugal, Slovak Republic, Slovenia, Spain, Switzerland, UK (1994-2002), and Chile* (2008-2013), Uruguay* (2011-2016), Bolivia (2008, 2010-2016), Ecuador (2009-2016), Argentina, Brazil, Colombia, Cuba, Dominican Republic, Panama, Paraguay (2008-2016). Points show estimated coefficients; Countries marked with an asterisk * changed policy nationally from opt-in to opt-out; error bars indicate 95% confidence intervals*

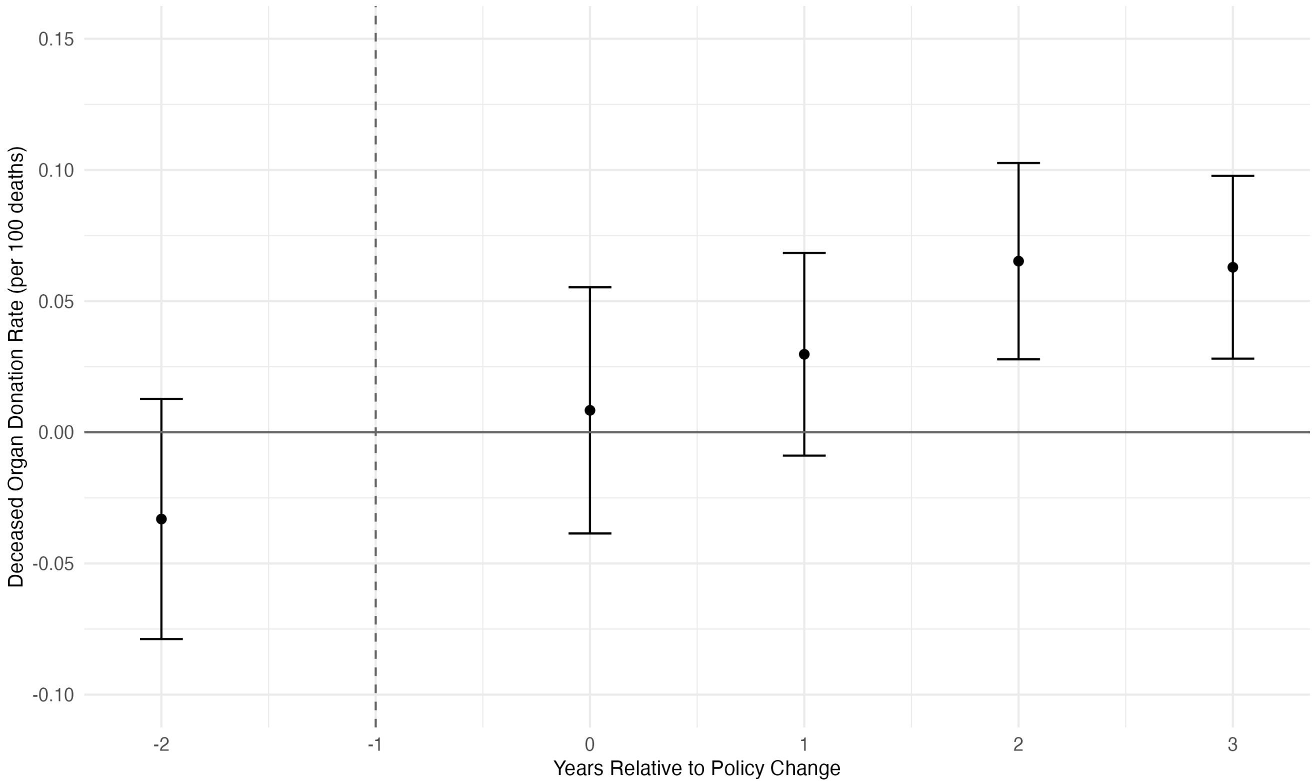
Figure A8: Event Study Graph for All Countries (Sun & Abraham)



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 3 control countries (countries in the same continent) with data that extend at least 2 years before and 3 years after the event. The sample includes Austria, Luxembourg* (1980-1985), Belgium* (1984-1989), Finland* (1983-1988), Norway, Sweden (1981-1989), Germany, Netherlands, and UK (1980-1989). The sample also includes Italy* (1997-2002), Sweden* (1994-1999), Greece (1995-2002), Austria, Belgium, Croatia, Czechia, Denmark, Finland, France, Germany, Hungary, Ireland, Luxembourg, Netherlands, Norway, Poland, Portugal, Slovak Republic, Slovenia, Spain, Switzerland, UK (1994-2002), and Chile* (2008-2013), Uruguay* (2011-2016), Bolivia (2008, 2010-2016), Ecuador (2009-2016), Argentina, Brazil, Colombia, Cuba, Dominican Republic, Panama, Paraguay (2008-2016). Points show estimated coefficients; Countries marked with an asterisk * changed policy nationally from opt-in to opt-out; error bars indicate 95% confidence intervals.*

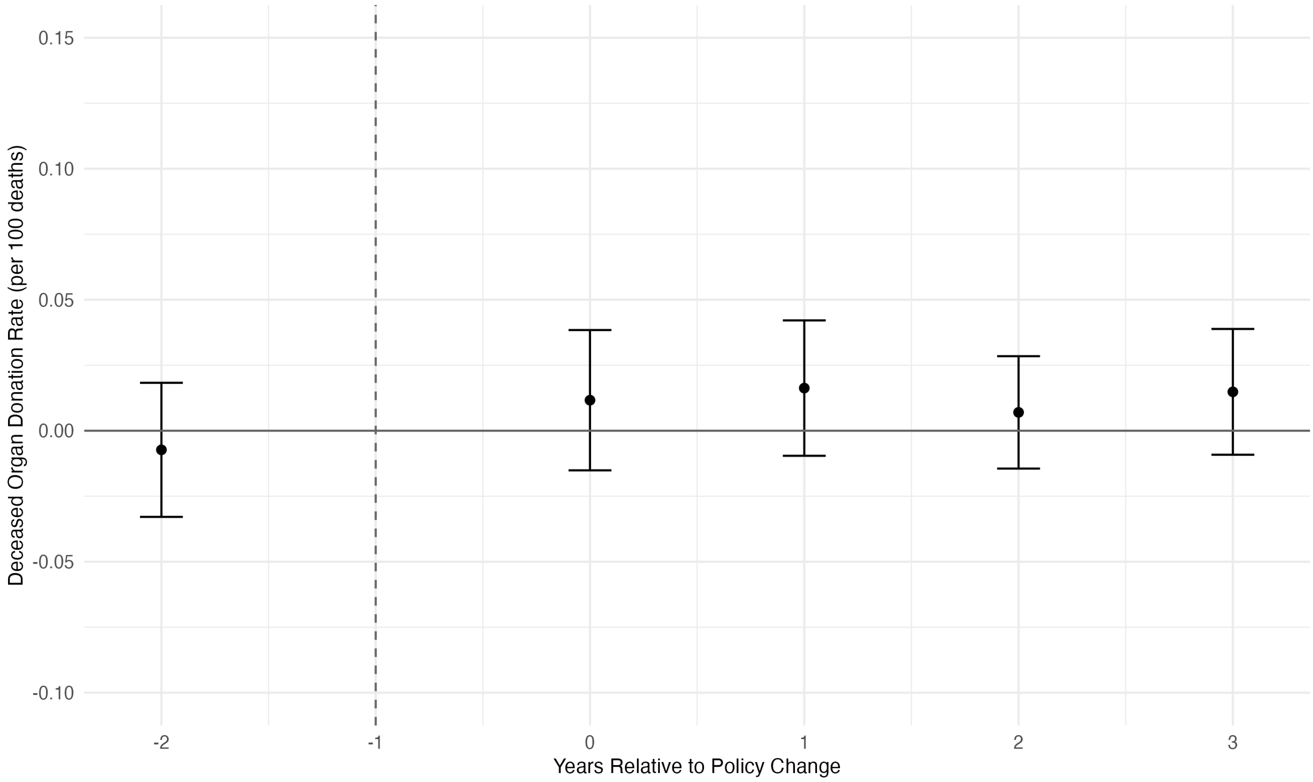
A.1.6 Robustness Check: Callaway & Sant'Anna

Figure A9: Event Study Graph for Strict Opt Out Countries (Callaway & Sant'Anna)



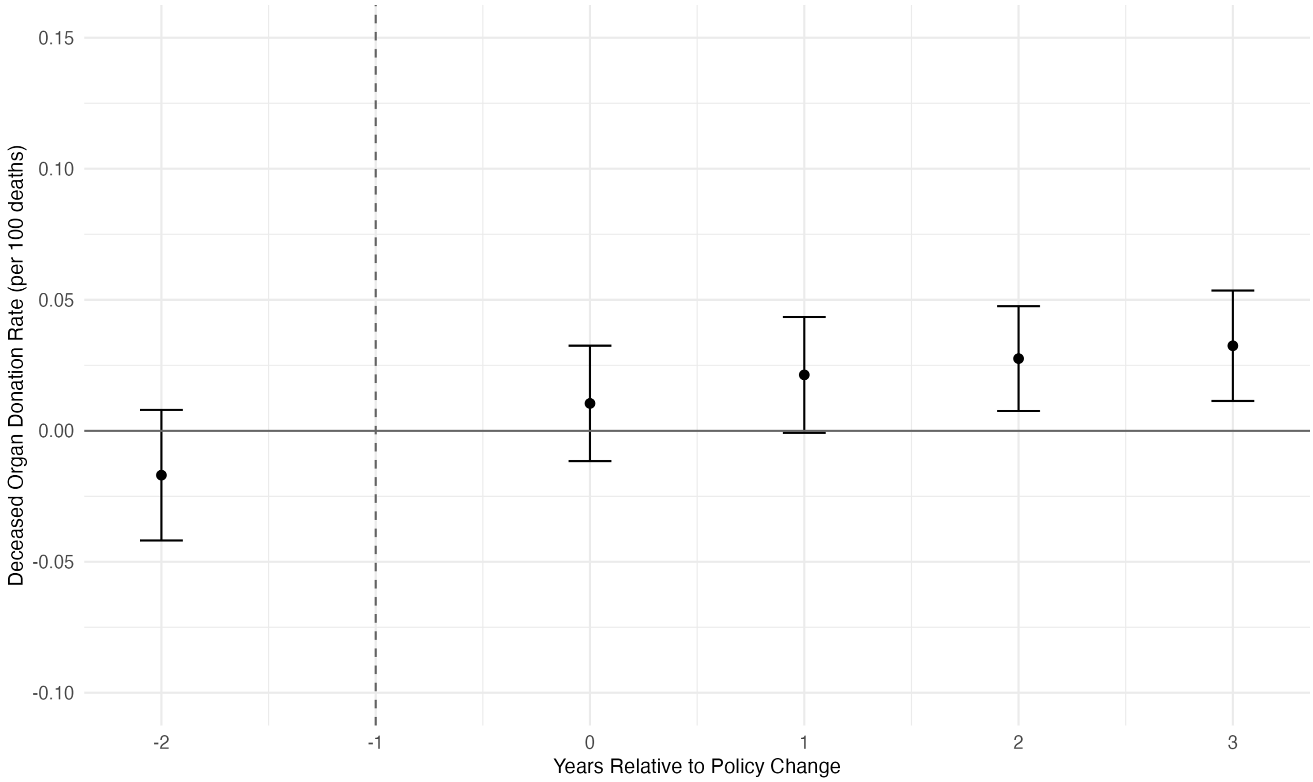
Notes: Estimated based on Equation 1 including panel data on all strict opt out countries that changed policy nationally from opt-in to opt-out which has at least 3 control countries (countries in the same continent) with data that extend at least 2 years before and 3 years after the event. The sample includes Austria, Luxembourg* (1980-1985), Belgium* (1984-1989), Norway, Sweden (1981-1989), Germany, Netherlands, and UK (1980-1989). Points show estimated coefficients; Countries marked with an asterisk * changed policy nationally from opt-in to opt-out; error bars indicate 95% confidence intervals*

Figure A10: Event Study Graph for Weak Opt Out Countries (Callaway & Sant'Anna)



Notes: Estimated based on Equation 1 including panel data on all weak opt out countries that changed policy nationally from opt-in to opt-out which has at least 5 control countries (countries in the same continent) with data that extend at least 2 years before and 3 years after the event. The sample includes Finland, Germany, Netherlands, Norway, Sweden, and UK (1983-1988). The sample also includes Italy* (1997-2002), Sweden* (1994-1999), Greece (1995-2002), Austria, Belgium, Croatia, Czechia, Denmark, Finland, France, Germany, Hungary, Ireland, Luxembourg, Netherlands, Norway, Poland, Portugal, Slovak Republic, Slovenia, Spain, Switzerland, UK (1994-2002), and Chile* (2008-2013), Uruguay* (2011-2016), Bolivia (2008, 2010-2016), Ecuador (2009-2016), Argentina, Brazil, Colombia, Cuba, Dominican Republic, Panama, Paraguay (2008-2016). Points show estimated coefficients; Countries marked with an asterisk * changed policy nationally from opt-in to opt-out; error bars indicate 95% confidence intervals*

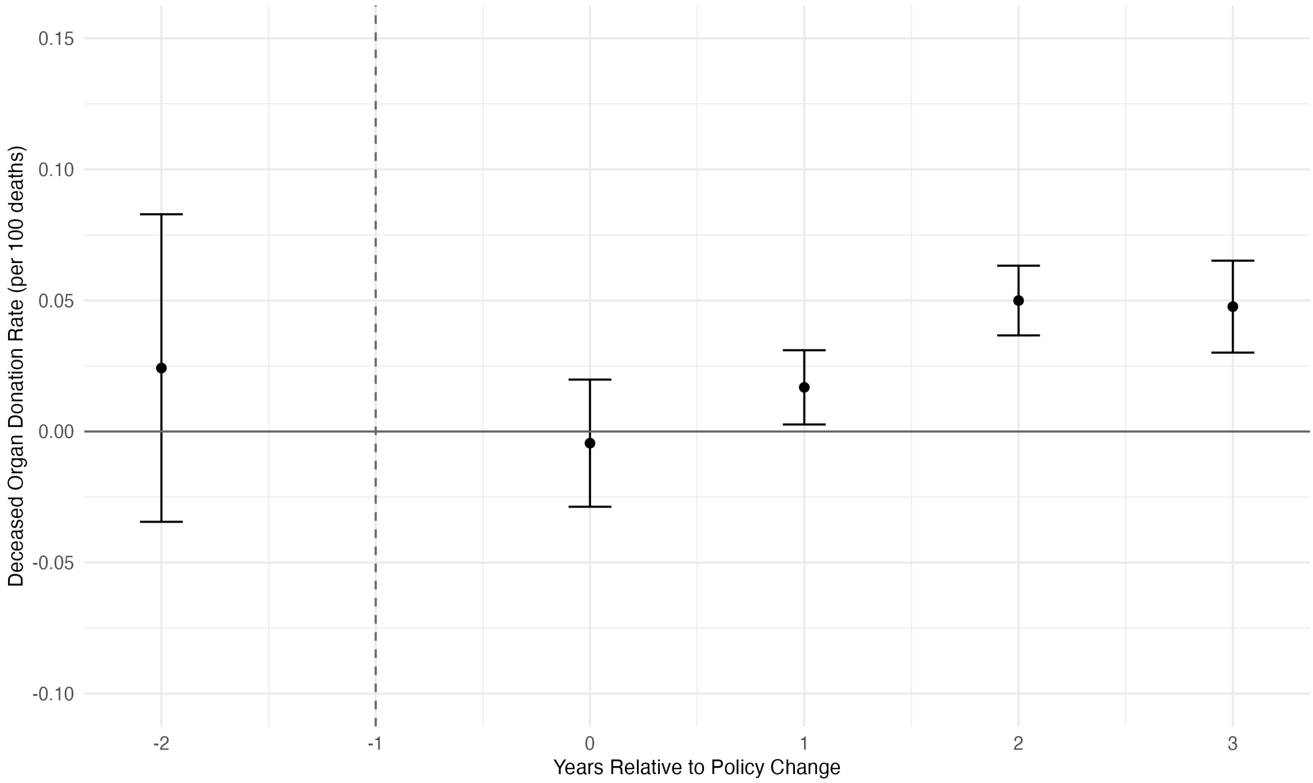
Figure A11: Event Study Graph for All Countries (Callaway & Sant'Anna)



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 3 control countries (countries in the same continent) with data that extend at least 2 years before and 3 years after the event. The sample includes Austria, Luxembourg* (1980-1985), Belgium* (1984-1989), Finland* (1983-1988), Norway, Sweden (1981-1989), Germany, Netherlands, and UK (1980-1989). The sample also includes Italy* (1997-2002), Sweden* (1994-1999), Greece (1995-2002), Austria, Belgium, Croatia, Czechia, Denmark, Finland, France, Germany, Hungary, Ireland, Luxembourg, Netherlands, Norway, Poland, Portugal, Slovak Republic, Slovenia, Spain, Switzerland, UK (1994-2002), and Chile* (2008-2013), Uruguay* (2011-2016), Bolivia (2008, 2010-2016), Ecuador (2009-2016), Argentina, Brazil, Colombia, Cuba, Dominican Republic, Panama, Paraguay (2008-2016). Points show estimated coefficients; Countries marked with an asterisk * changed policy nationally from opt-in to opt-out; error bars indicate 95% confidence intervals.*

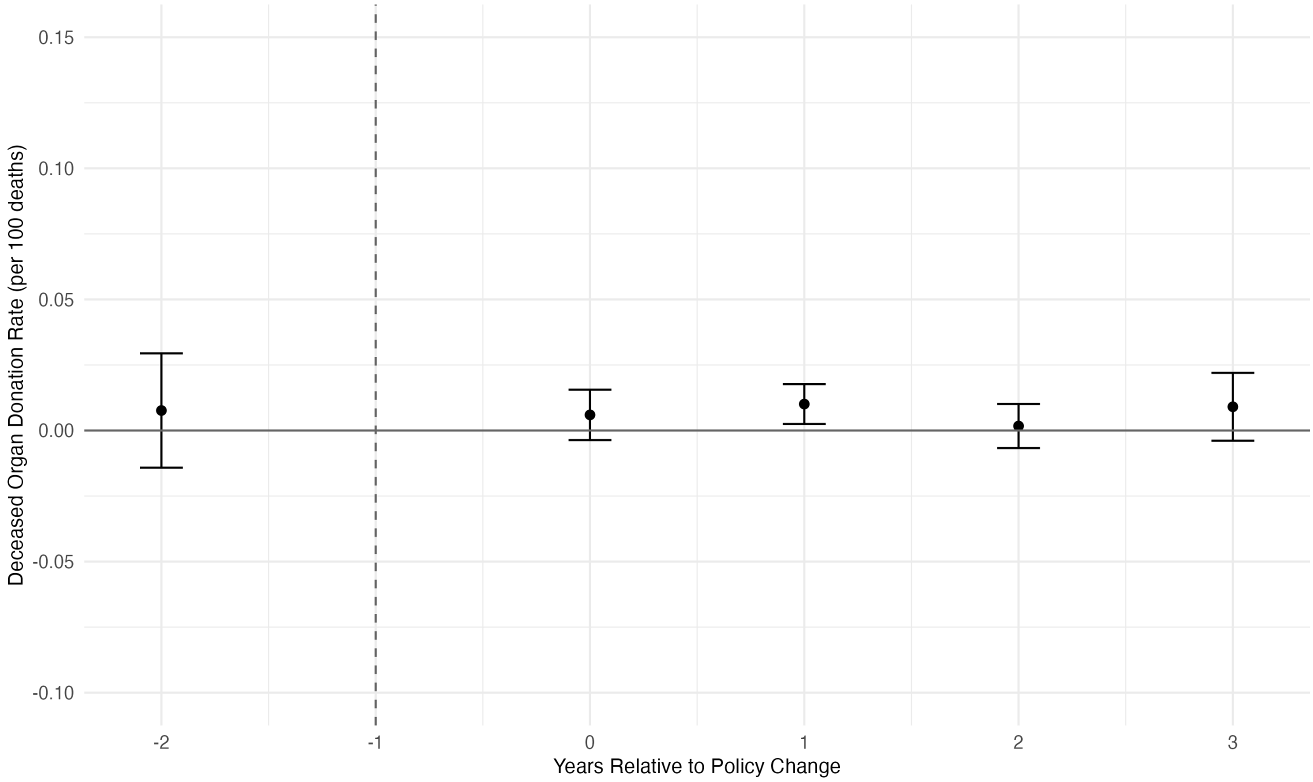
A.1.7 Robustness Check: Borusyak, Jaravel & Spiess

Figure A12: Event Study Graph for Strict Opt Out Countries (Borusyak, Jaravel & Spiess)



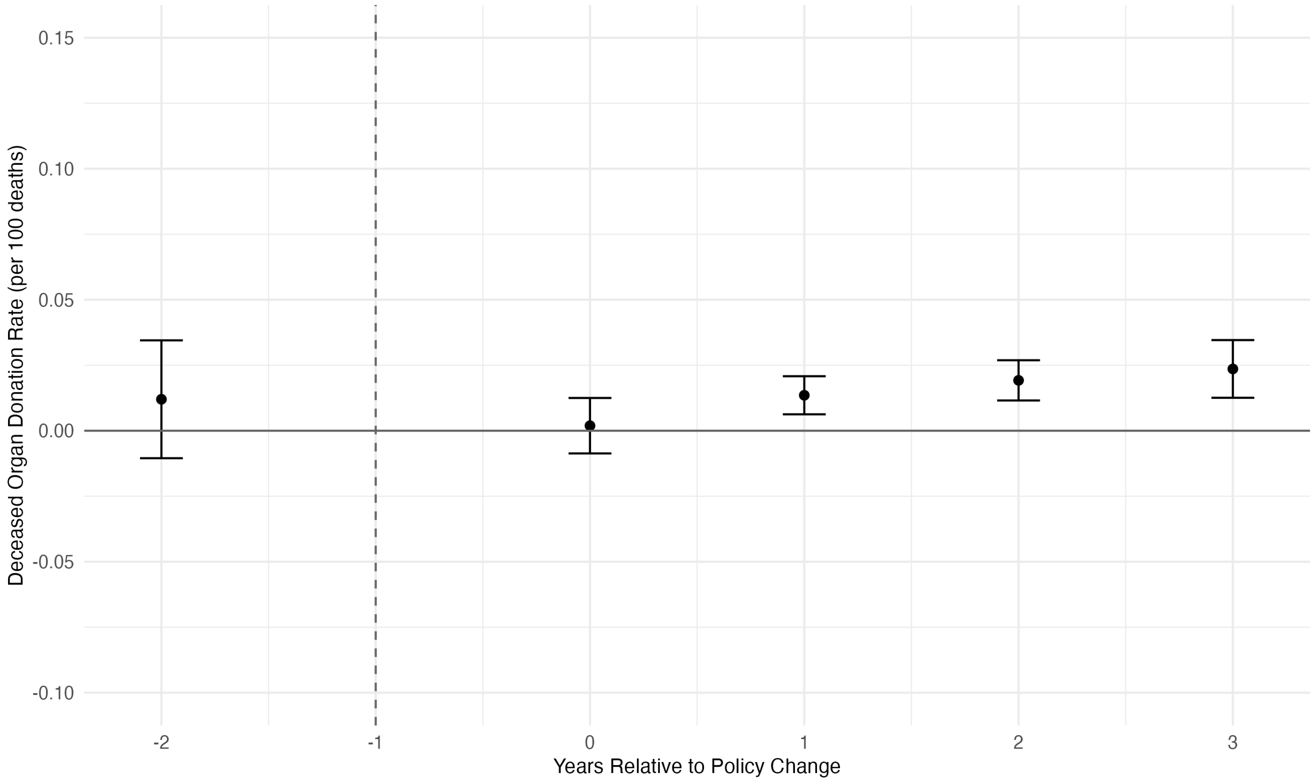
Notes: Estimated based on Equation 1 including panel data on all strict opt out countries that changed policy nationally from opt-in to opt-out which has at least 3 control countries (countries in the same continent) with data that extend at least 2 years before and 3 years after the event. The sample includes Austria, Luxembourg* (1980-1985), Belgium* (1984-1989), Norway, Sweden (1981-1989), Germany, Netherlands, and UK (1980-1989). Points show estimated coefficients; Countries marked with an asterisk * changed policy nationally from opt-in to opt-out; error bars indicate 95% confidence intervals*

Figure A13: Event Study Graph for Weak Opt Out Countries (Borusyak, Jaravel & Spiess)



Notes: Estimated based on Equation 1 including panel data on all weak opt out countries that changed policy nationally from opt-in to opt-out which has at least 5 control countries (countries in the same continent) with data that extend at least 2 years before and 3 years after the event. The sample includes Finland, Germany, Netherlands, Norway, Sweden, and UK (1983-1988). The sample also includes Italy* (1997-2002), Sweden* (1994-1999), Greece (1995-2002), Austria, Belgium, Croatia, Czechia, Denmark, Finland, France, Germany, Hungary, Ireland, Luxembourg, Netherlands, Norway, Poland, Portugal, Slovak Republic, Slovenia, Spain, Switzerland, UK (1994-2002), and Chile* (2008-2013), Uruguay* (2011-2016), Bolivia (2008, 2010-2016), Ecuador (2009-2016), Argentina, Brazil, Colombia, Cuba, Dominican Republic, Panama, Paraguay (2008-2016). Points show estimated coefficients; Countries marked with an asterisk * changed policy nationally from opt-in to opt-out; error bars indicate 95% confidence intervals*

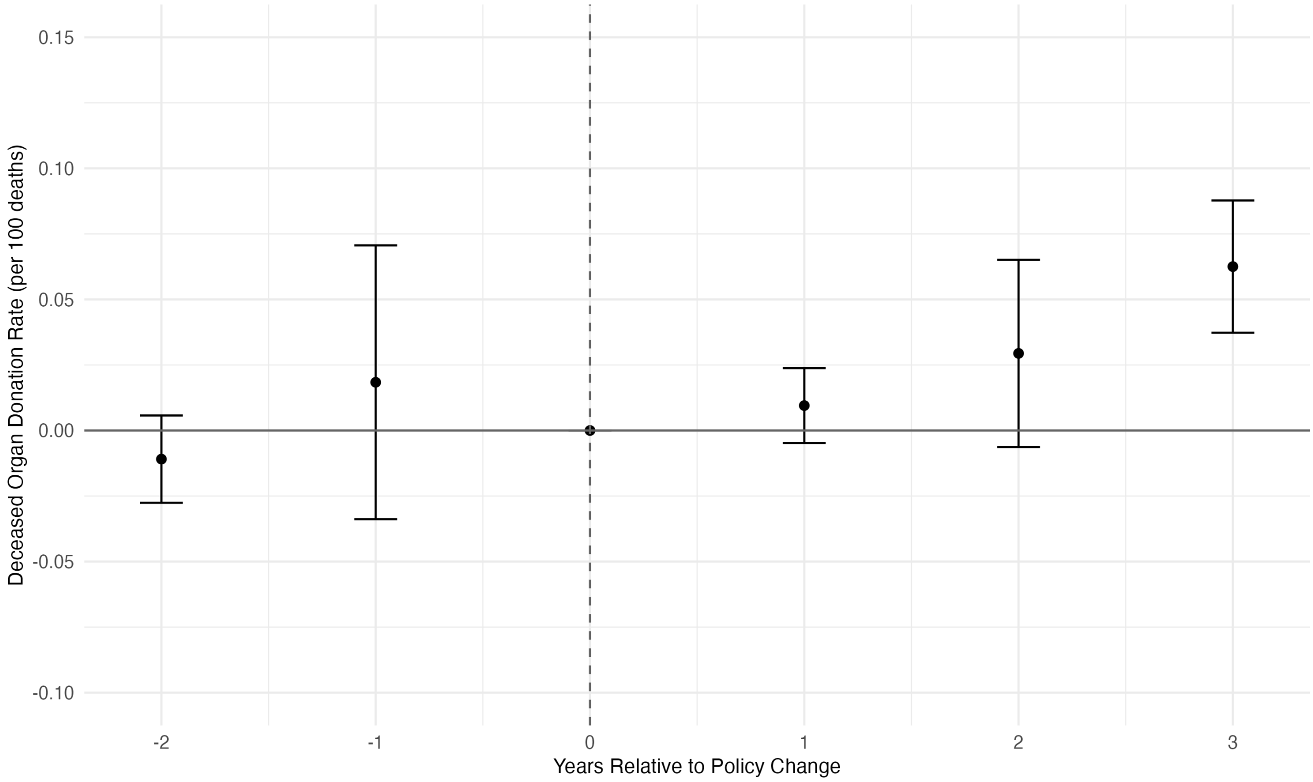
Figure A14: Event Study Graph for All Countries (Borusyak, Jaravel & Spiess)



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 3 control countries (countries in the same continent) with data that extend at least 2 years before and 3 years after the event. The sample includes Austria, Luxembourg* (1980-1985), Belgium* (1984-1989), Finland* (1983-1988), Norway, Sweden (1981-1989), Germany, Netherlands, and UK (1980-1989). The sample also includes Italy* (1997-2002), Sweden* (1994-1999), Greece (1995-2002), Austria, Belgium, Croatia, Czechia, Denmark, Finland, France, Germany, Hungary, Ireland, Luxembourg, Netherlands, Norway, Poland, Portugal, Slovak Republic, Slovenia, Spain, Switzerland, UK (1994-2002), and Chile* (2008-2013), Uruguay* (2011-2016), Bolivia (2008, 2010-2016), Ecuador (2009-2016), Argentina, Brazil, Colombia, Cuba, Dominican Republic, Panama, Paraguay (2008-2016). Points show estimated coefficients; Countries marked with an asterisk * changed policy nationally from opt-in to opt-out; error bars indicate 95% confidence intervals.*

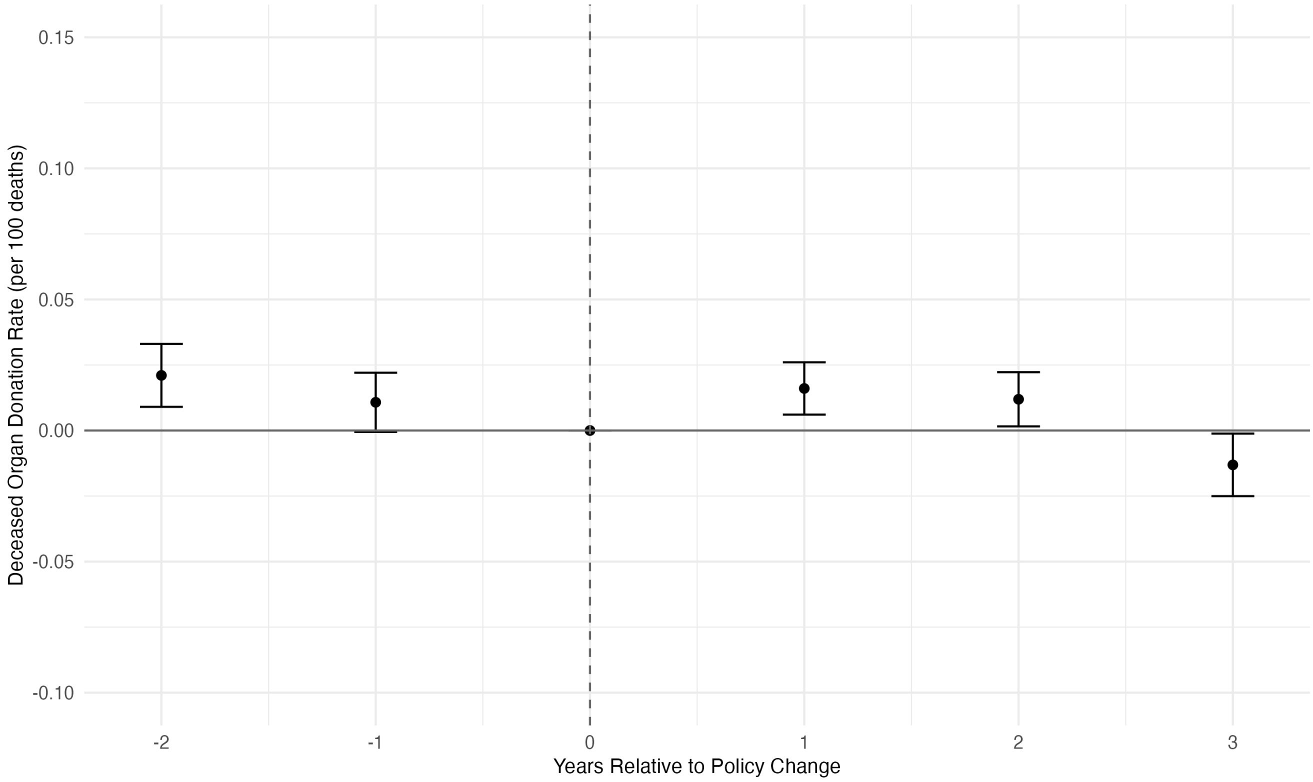
A.1.8 Robustness Check: Chaisemartin & D'Haultfœuille

Figure A15: Event Study Graph for Strict Opt Out Countries (Chaisemartin & D'Haultfœuille)



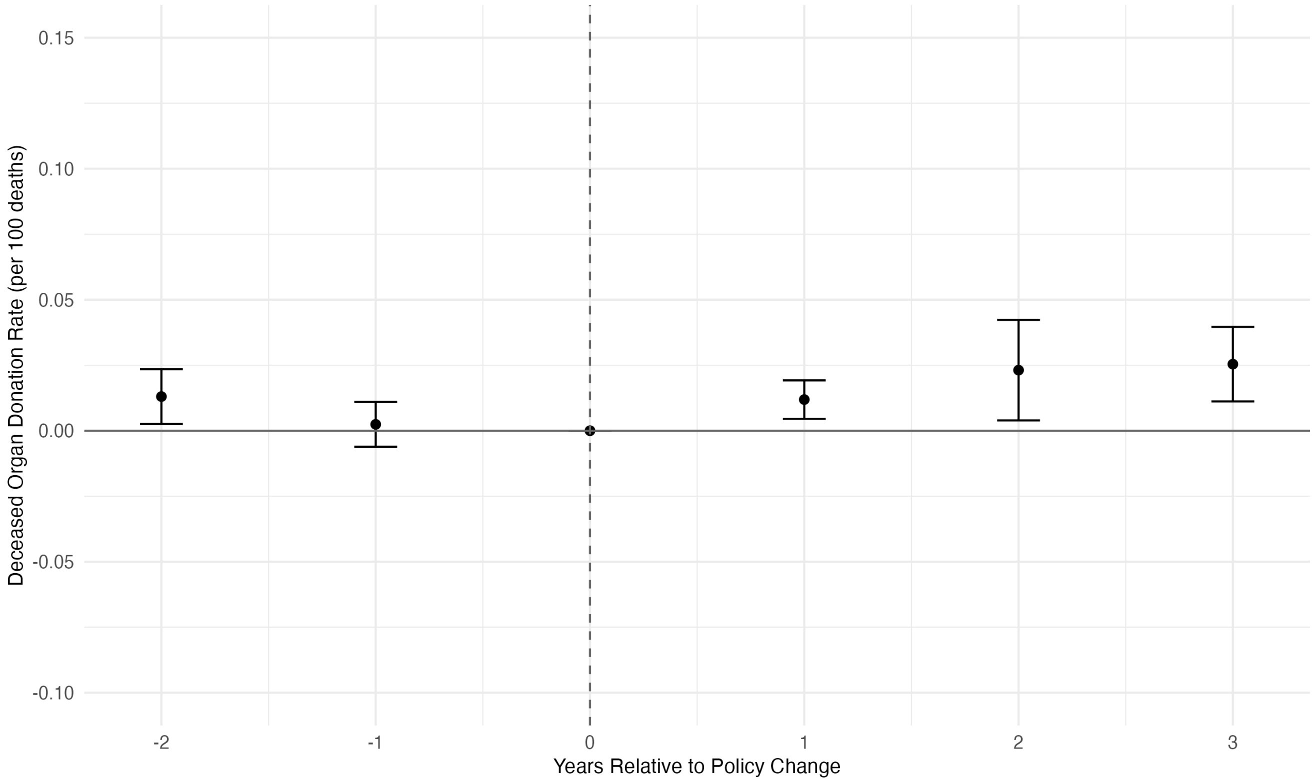
Notes: Estimated based on Equation 1 including panel data on all strict opt out countries that changed policy nationally from opt-in to opt-out which has at least 3 control countries (countries in the same continent) with data that extend at least 2 years before and 3 years after the event. The sample includes Austria, Luxembourg* (1980-1985), Belgium* (1984-1989), Norway, Sweden (1981-1989), Germany, Netherlands, and UK (1980-1989). Points show estimated coefficients; Countries marked with an asterisk * changed policy nationally from opt-in to opt-out; error bars indicate 95% confidence intervals*

Figure A16: Event Study Graph for Weak Opt Out Countries (Chaisemartin & D'Haultfœuille)



Notes: Estimated based on Equation 1 including panel data on all weak opt out countries that changed policy nationally from opt-in to opt-out which has at least 5 control countries (countries in the same continent) with data that extend at least 2 years before and 3 years after the event. The sample includes Finland, Germany, Netherlands, Norway, Sweden, and UK (1983-1988). The sample also includes Italy* (1997-2002), Sweden* (1994-1999), Greece (1995-2002), Austria, Belgium, Croatia, Czechia, Denmark, Finland, France, Germany, Hungary, Ireland, Luxembourg, Netherlands, Norway, Poland, Portugal, Slovak Republic, Slovenia, Spain, Switzerland, UK (1994-2002), and Chile* (2008-2013), Uruguay* (2011-2016), Bolivia (2008, 2010-2016), Ecuador (2009-2016), Argentina, Brazil, Colombia, Cuba, Dominican Republic, Panama, Paraguay (2008-2016). Points show estimated coefficients; Countries marked with an asterisk * changed policy nationally from opt-in to opt-out; error bars indicate 95% confidence intervals*

Figure A17: Event Study Graph for All Countries (Chaisemartin & D'Haultfœuille)



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 3 control countries (countries in the same continent) with data that extend at least 2 years before and 3 years after the event. The sample includes Austria, Luxembourg* (1980-1985), Belgium* (1984-1989), Finland* (1983-1988), Norway, Sweden (1981-1989), Germany, Netherlands, and UK (1980-1989). The sample also includes Italy* (1997-2002), Sweden* (1994-1999), Greece (1995-2002), Austria, Belgium, Croatia, Czechia, Denmark, Finland, France, Germany, Hungary, Ireland, Luxembourg, Netherlands, Norway, Poland, Portugal, Slovak Republic, Slovenia, Spain, Switzerland, UK (1994-2002), and Chile* (2008-2013), Uruguay* (2011-2016), Bolivia (2008, 2010-2016), Ecuador (2009-2016), Argentina, Brazil, Colombia, Cuba, Dominican Republic, Panama, Paraguay (2008-2016). Points show estimated coefficients; Countries marked with an asterisk * changed policy nationally from opt-in to opt-out; error bars indicate 95% confidence intervals.*

A.2 Experiment Details

In this Section, we describe the design of our experiment in detail. The full experiment is made available as a qsf file as part of the replication package.

A.2.1 Overview of Experiment

After the participation consent screen (See Figure A18, A19, A20, A21), the participants are shown the instruction screen (See Figure A22).

Figure A18: Experiment Consent Form Part 1

Study Title: Opt in and Opt out
Researcher: Alex Chan
Version Date: 9/01/24

Key Information

The following is a short summary of this study to help you decide whether to be a part of this study. More detailed information is listed later in this form.

Why am I being invited to take part in a research study?

We invite you to take part in a research study because you are a Prolific participant who meets our eligibility criteria.

What should I know about a research study?

- The instructions will explain this research study to you.
- Whether or not you take part is up to you.
- Your participation is completely voluntary.
- You can choose not to take part.
- You can agree to take part and later change your mind.
- Your decision will not be held against you.
- Your refusal to participate will not result in any consequences or any loss of benefits that you are otherwise entitled to receive.

Why is this research being done?

The purpose of this research is to understand how individuals use information when making estimations as an individual and on behalf of others. You will also be asked some demographic questions about yourself. Your participation in this research has the potential to improve our understanding of decision-making.

Figure A19: Experiment Consent Form Part 2

How long will the research last and what will I need to do?

We expect that you will be in this research study for 18 minutes. You will be asked to read instructions, learn about different options, and make assessments of those options. You will learn about decisions you can make on behalf of yourself, and about decisions you can make on behalf of another anonymous player randomly matched with you, You will also be asked some demographic questions about yourself. There are understanding questions that you must answer correctly in order to complete the study. If you fail to answer the understanding questions correctly, you may be dismissed from the study without pay. You will receive your full baseline completion payment of $5.00 if you read the instructions and completed the 3 parts of the survey. Besides your baseline completion payment, you will start with a default bonus of $0.94, and can win additional earnings through the decisions on behalf of yourself and on behalf of others (from $0.50 to $1.00) and this could allow you to earn up to $6.94 in total. You can potentially lose some of the default bonus but the deductions will not exceed $0.94, so that you are guaranteed $5.00 for completing the study.

You may not be told everything

As part of this research design, you may not be told everything about the purpose of this study. In addition, while you will have complete and truthful information about the procedures of the version of the study that you are participating in, there may be other versions of the study with different procedures. You will not be told about these other versions. These other versions have no impact on your payments.

Is there any way being in this study could be bad for me?

We think this study poses no more than minimal risk. Some participants may feel discomfort or anxiety from being asked to have discussions and/or make decisions with other participants. There is a small chance of breach of confidentiality.

Will being in this study help me in any way?

There are no benefits to you from your taking part in this research. We cannot promise any benefits to others from your taking part in this research. However, possible benefits to others include greater understanding of decision-making processes.

Figure A20: Experiment Consent Form Part 3

Detailed Information

The following is more detailed information about this study in addition to the information listed above.

What happens if I say yes, but I change my mind later?

You can leave the research at any time; it will not be held against you and no further action is required on your behalf.

If I take part in this research, how will my privacy be protected? What happens to the information you collect?

Efforts will be made to limit the use and disclosure of your Personal Information, including research study records, to people who have a need to review this information. We cannot promise complete secrecy. Organizations that may inspect and copy your information include the IRB and other representatives of this organization.

If identifiers are removed from the data that are collected during this research, that data could be used for future research studies or distributed to another investigator for future research studies without your additional informed consent.

What else do I need to know?

If you agree to take part in this research study, we will pay you at least $5.00 for completing the study. This payment will be made to you via Prolific within 48 hours of your participation. Besides your baseline completion payment, you will win additional earnings through your decisions. Some of your decisions can impact how much another participant can earn in this study.

Who can I talk to?

If you have questions, concerns, or complaints, or think the research has hurt you, talk to the research team at Alex Chan, Harvard Business School, (617) 495-8674 or achan@hbs.edu .
This research has been reviewed and approved by the Harvard University Area Institutional Review Board ("IRB"). You may talk to them at (617) 496-2847 or cuhs@harvard.edu if:

- Your questions, concerns, or complaints are not being answered by the research team.
- You cannot reach the research team.
- You want to talk to someone besides the research team.
- You have questions about your rights as a research subject.
- You want to get information or provide input about this research.

Figure A21: Experiment Consent Form Part 4

Yes, I would like to take part in this study, and confirm that I LIVE IN THE U.S., and I am 18 or older.

No, I would not like to participate.

I'm not a robot

reCAPTCHA

Privacy - Terms

Please copy and paste your Prolific ID here:

Please note that this response should auto-fill with the correct ID

66d8c99d1b509f8ff529e3

→

Figure A22: Experiment Page 1

INSTRUCTIONS

This is an experiment in decision-making. The amount of money you earn will depend upon the decisions you make and, on the decisions other people make. Your earnings are given in tokens. This experiment has 3 parts and involves multiple participants. Your total earnings will be the sum of your payoffs from each part and your default bonus. At the end of the experiment, you will be paid in US dollars based on the exchange rate

$1 = 100 tokens.

In addition, you will be paid $5.00 for participation. Everyone will be paid in private, and you are under no obligation to tell others how much you earn.

→

We let this Section of the Appendix provide additional details about the actual experience of this experiment as participants play it on Prolific.

A.2.2 Experiment Part 1

After the instruction screen, participants will go through seven screens before Figure VII. These seven screens serve to explain (Figure A23) and group all subjects anonymously into two "families" based on their preferred paintings by Klee or Kandinsky (Figure A24, A25, A26, A27, A28, A29).

Figure A23: Experiment Page 2

In Part 1 everyone will be shown 5 pairs of paintings by two artists. You will be asked to choose which painting in each pair you prefer. You will then be classified into one of two groups, based on which artist you prefer.

The participants you are grouped into the same family with will be the same for the rest of the experiment.

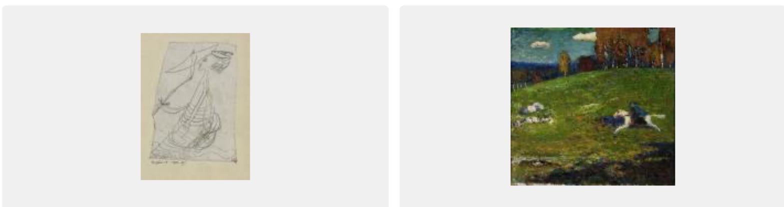
After Part 1 has finished, we will give you instructions for the next part of the experiment.

→

Figure A24: Experiment Page 3

Now please choose which painting you prefer by clicking on either A or B from each pair. After everyone submits answers, you will be privately informed of which group you are in.

- Pair #1



→

Figure A25: Experiment Page 4

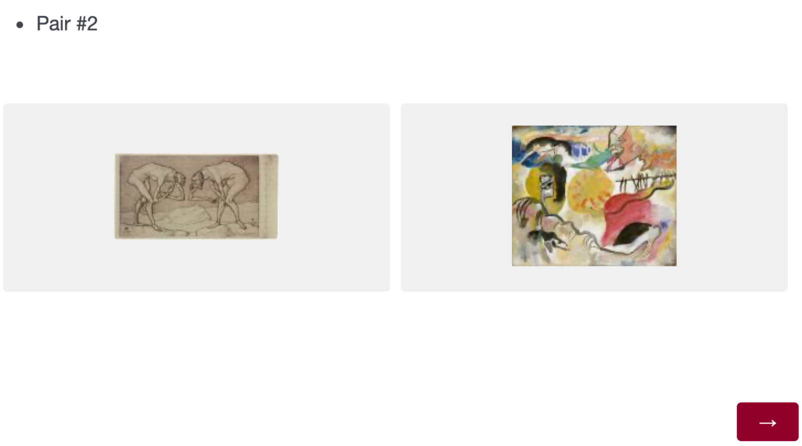


Figure A26: Experiment Page 5

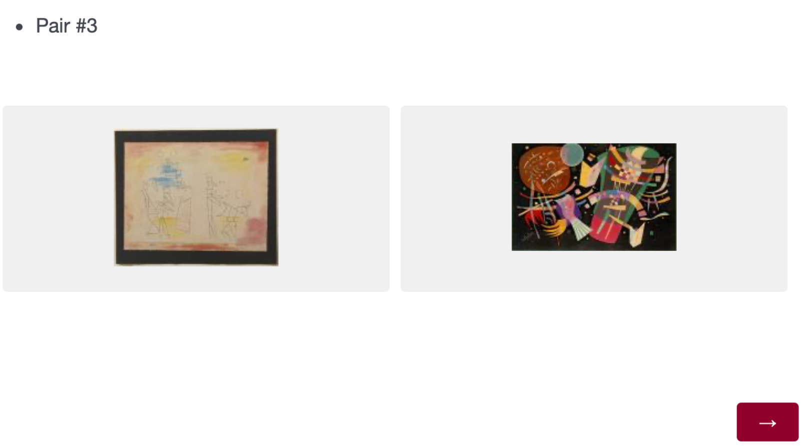


Figure A27: Experiment Page 6

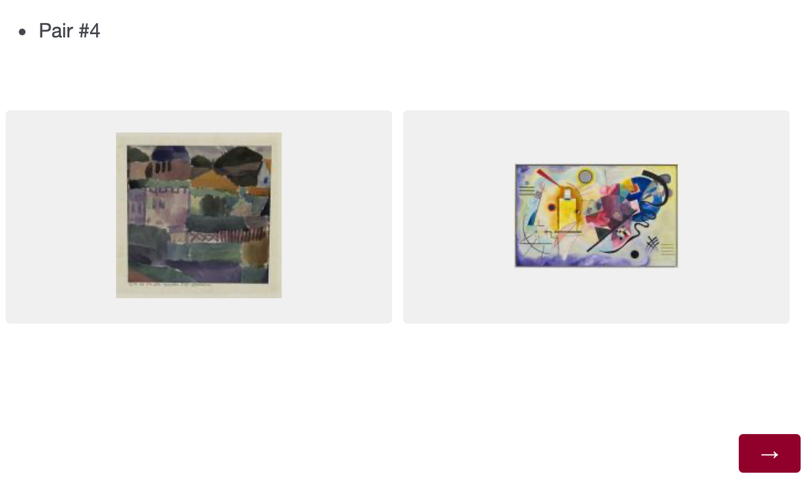


Figure A28: Experiment Page 7

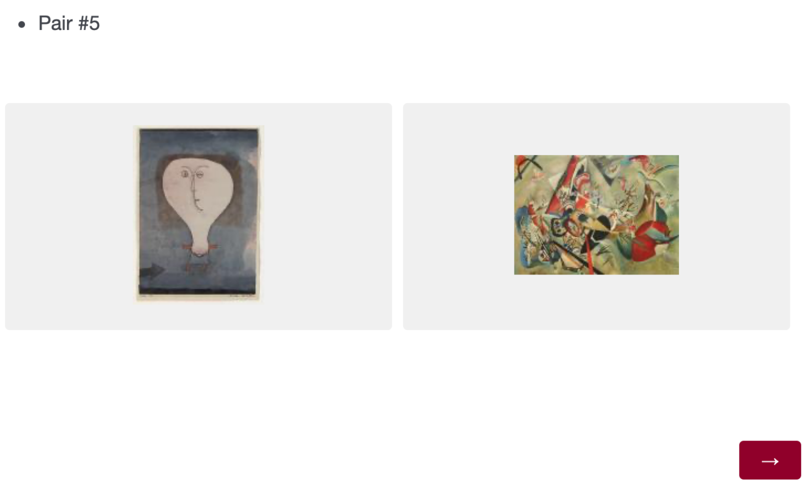


Figure A29: Experiment Page 8

Based on your choices, you prefer the paintings by Klee. You are assigned to the Klee family.

→

Notes: Whether participants are assigned to Klee or Kandinsky family depends on their choices.

A.2.3 Experiment Part 2

Once the participants move to Part 2, they will see two screens that give the overview of Part 2 and Part 3, as shown in Figure A30 and A31. Then, participants will learn the default setting (opt-in vs. opt-out), signal cost (\$0.75 vs. \$0.25), and cost to decision proxy of overturning defaults or signals (\$0.19 vs. \$0.01) (See Figure A32 as an example). All participants will further learn their randomly assigned roles (donor vs. non-donor) (See Figure A33 as an example) after they answer three comprehension questions (See Figure A48, A49, and A50)

Figure A30: Experiment Page 9

In Part 2 we want you to make some decisions that will affect whether your wug is donated in Part 3 after Part 2 concludes and after your wug has finished earning you additional tokens. At the start of Part 3, the next part of the experiment, your wug will be of no more use to you.

You will matched with another participant, your “decision proxy”, who:

1. Just like you, is also from the Klee family;
2. Will decide to either donate your wug on your behalf OR not donate your wug; and
3. Will get a bonus if their decision to donate your wug matches your wishes

Wug owners cannot choose to donate or not donate directly. Only decision proxies can make a donation decision on behalf of wug owners.

Note that in Part 3, you will get a chance to be some participant’s decision proxy as well.

Notes: Whether participants are assigned to Klee or Kandinsky family depends on their choices.

Figure A31: Experiment Page 10

In Part 2, you (wug owner) will:

- Learn whether you are a:
  - Wug **donor**, who earns 50 bonus tokens if your wug is donated, 0 bonus tokens if not donated; or
  - Wug **non-donor**, who earns 50 bonus tokens if your wug is NOT donated, 0 bonus tokens if donated
- NOT be able to make a decision about donation yourself, but
- Have a chance to buy a signal with tokens that you can send to your "decision proxy" before they decide whether or not to donate your wug on your behalf

In Part 3, decision proxies will:

- Gain 50 tokens if they donated on behalf of a wug **donor** OR if they did not donate on behalf of a wug **non-donor**, and 0 token otherwise
- Pay 10 tokens to donate a wug on behalf of the wug owner
- Observe the signal that the wug owner sent (if the wug owner sent one);
- Will know that the wug owner are drawn and matched with them from a pool of participants, who like themselves, are from the Klee family;
- NOT be able to know exactly whether the wug owner will earn the 50-token bonus from donation or from NOT donating
- BUT decision proxies will know how many people from the pool of participants are wug **donors** and how many are wug **non-donors**; and

Figure A32: Experiment Treatment Assignment Screen

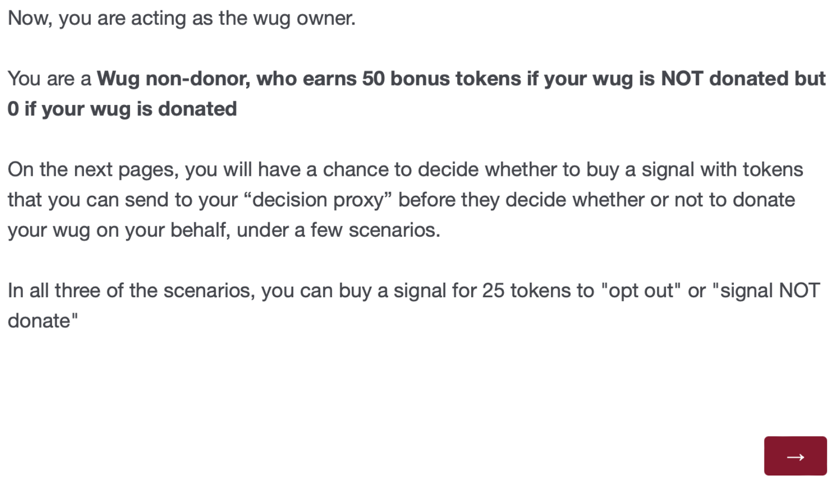
The **default** setting for this experiment is for **wugs to be donated**.
Which means that:

- *You:* You can only buy a signal for 25 tokens to "opt out" or "signal NOT donate" but no signals are available to signal your decision proxy that you want to donate
- *Your decision proxy:* Unless you sent a signal to "opt out", your decision proxy will have to pay 19 tokens to overturn the default and get your wug not donated

→

Notes: Participants are randomly assigned to default regime (opt-in vs. opt-out), signal cost (\$0.75 vs. \$0.25), and cost to decision proxy of overturning defaults or signals (\$0.19 vs. \$0.01)

Figure A33: Experiment Wug Role Assigenment Screen



Notes: Participants are randomly assigned to wug donor or wug non-donor.

Next, all participants complete four additional comprehension questions (Figure A51, A52, A53, A54, A55). They are then presented in randomized order with three decision screens, in which they must decide whether to send signals under three informational conditions, reflecting different priors (10%, 50%, 90%) that the decision proxy believes the wug owner is a donor. Figure A34, A35, and A36 provide one example of the signal decision screen shown to participants. The text and payoffs vary depending on the default status (opt-in vs. opt-out), the signal cost ($0.25 vs. $0.75), and the participant's assigned role (wug donor vs. wug non-donor). For illustration, the following three figures display the case where the default is donated, the signal cost is $0.25, and the role is wug non-donor. Equivalent screens are shown for the other parameter combinations.

Figure A34: Decision for Sending Signal Screen 1

Note: The default status is donated. You can only "opt out" or "signal NOT donate". If the decision proxy donated your wug, you will "lose 50 tokens" and your cost of signal is "25 tokens".

- If you signaled AND decision proxy donated, you get **-25 tokens** **(You will lose tokens)**
- If you signaled AND decision proxy did NOT donated, you gain **25 tokens**
- If you did NOT signal AND decision proxy donated, you gain 0 token
- If you did NOT signal AND decision proxy did NOT donated, you gain **50 tokens**

Suppose that your decision proxy knows you are matched to them from a pool of participants from the same Klee family and that there is a **90% chance** that you are a wug **donor** and a **10% chance** that you are a wug **non-donor**: Will you pay 25 tokens to buy the signal **to "opt out" or "signal NOT donate"**?

Yes, signal

No, do NOT signal

→

Figure A35: Decision for Sending Signal Screen 2

Note: The default status is donated. You can only "opt out" or "signal NOT donate". If the decision proxy donated your wug, you will "lose 50 tokens" and your cost of signal is "25 tokens".

- If you signaled AND decision proxy donated, you get **-25 tokens (You will lose tokens)**
- If you signaled AND decision proxy did NOT donated, you gain **25 tokens**
- If you did NOT signal AND decision proxy donated, you gain 0 token
- If you did NOT signal AND decision proxy did NOT donated, you gain **50 tokens**

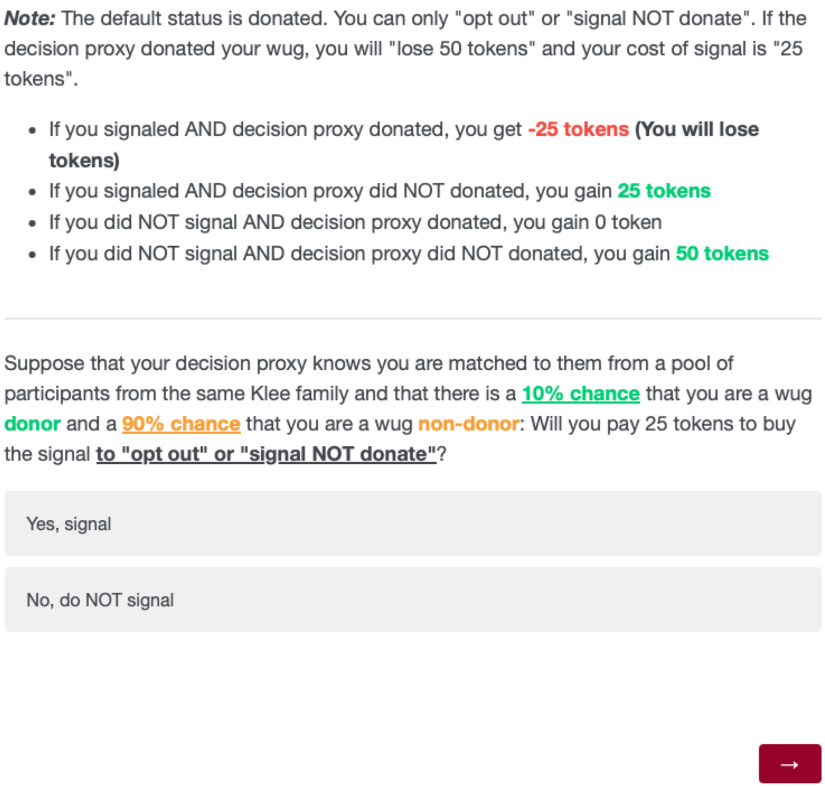
Suppose that your decision proxy knows you are matched to them from a pool of participants from the same Klee family and that there is a **50% chance** that you are a wug **donor** and a **50% chance** that you are a wug **non-donor**: Will you pay 25 tokens to buy the signal **to "opt out" or "signal NOT donate"**?

No, do NOT signal

Yes, signal

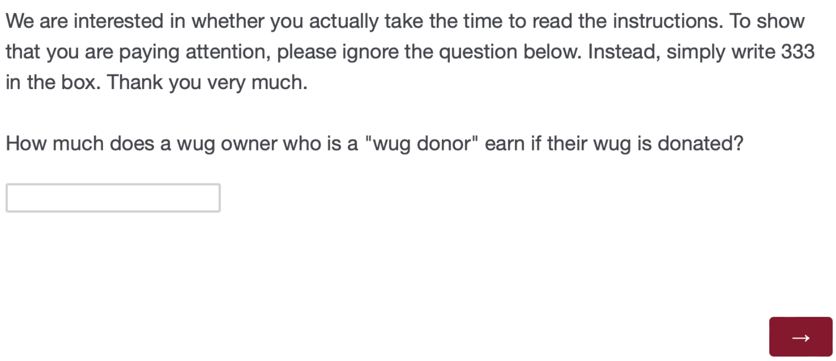
→

Figure A36: Decision for Sending Signal Screen 3



At the end of Part 2, before proceeding to Part 3, participants have to finish one attention check question (Figure A37).

Figure A37: Attention Check Question 1



A.2.4 Experiment Part 3

At the start of Part 3, participants learn that they will switch roles from a wug owner to a decision proxy, who will make a decision to donate or not for another wug owner (Figure A38, A39, A40). Note that the parameters like being in an "opt out" treatment will be held the same while participants acted as Player 1 and Player 2. Then, they complete three additional comprehension questions (Figure A56, A57, A58, A59, A60).

Figure A38: Roles Switching Screen 1

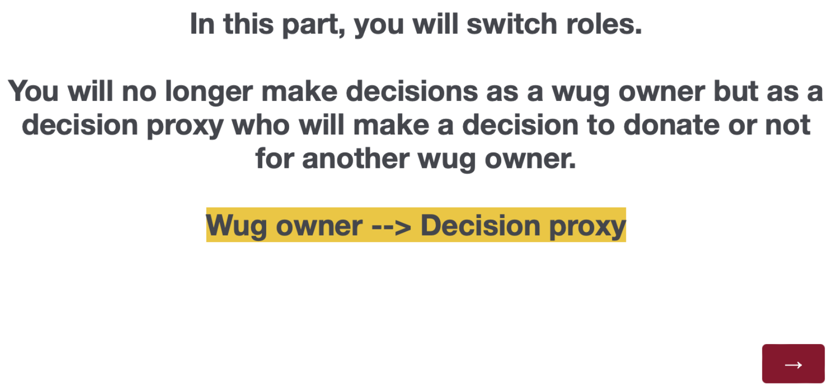


Figure A39: Roles Switching Screen 2

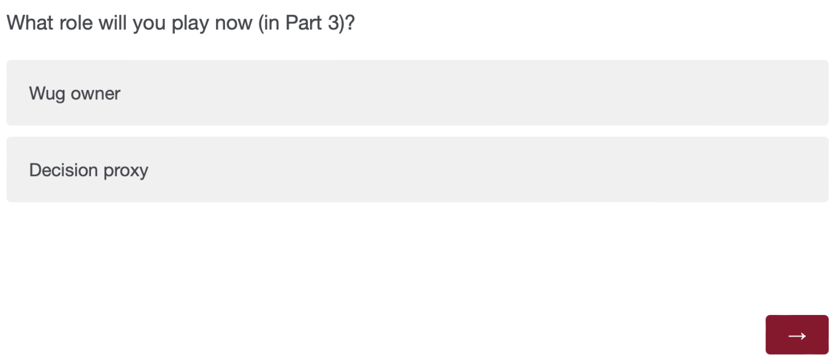
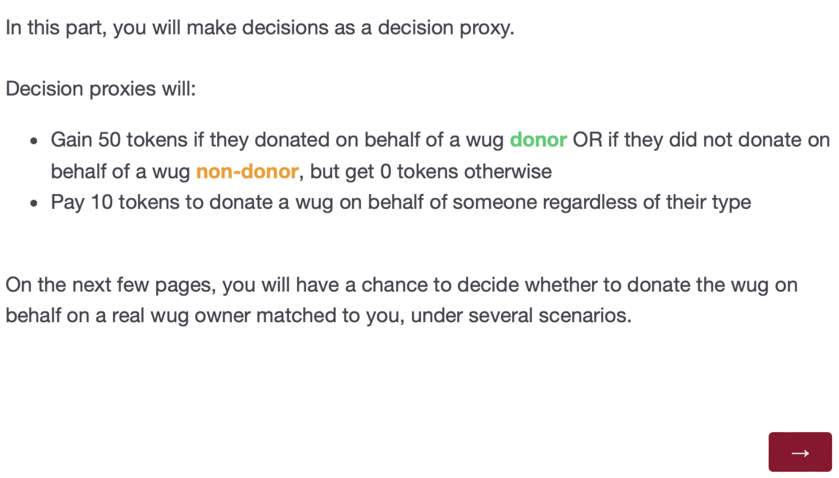


Figure A40: Roles Switching Screen 3



Next, all participants are presented in randomized order with six decision screens, in which they must decide whether to donate for another wug owner under six informational conditions: three different priors (10%, 50%, 90%) that the decision proxy believes the wug owner is a donor and two signal states (owner sent a signal vs. owner sent no signal). Figure A41, A42, A43, A44, A45, and A46 provide one example of the donation decision screen shown to participants. The text and payoffs vary depending on the default status (opt-in vs. opt-out), the signal cost ($0.25 vs. $0.75), cost of overturning defaults or signals ($0.19 vs. $0.01). For illustration, the following six figures display the case where the default is donated, the signal cost is $0.25, and the cost of overturning defaults or signals is $0.19. Equivalent screens are shown for the other parameter combinations.

Figure A41: Donation Decision Screen 1

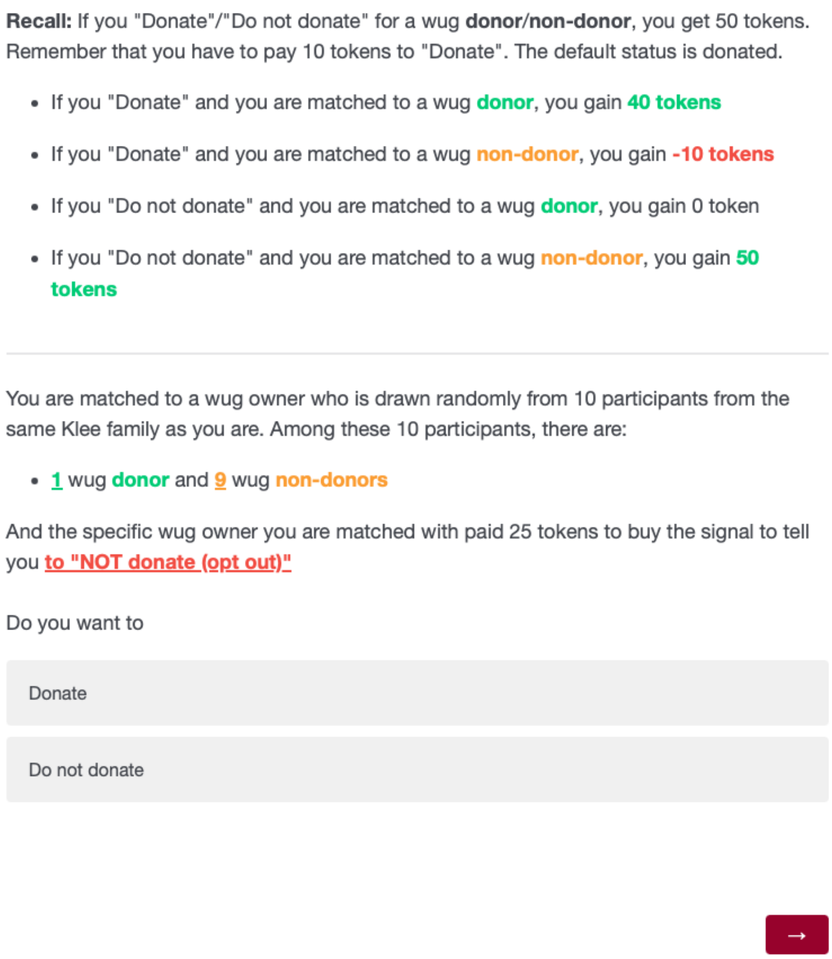


Figure A42: Donation Decision Screen 2

Recall: If you "Donate"/"Do not donate" for a wug **donor/non-donor**, you get 50 tokens. Remember that you have to pay 10 tokens to "Donate". The default status is donated.

- If you "Donate" and you are matched to a wug **donor**, you gain **40 tokens**
- If you "Donate" and you are matched to a wug **non-donor**, you gain **-10 tokens**
- If you "Do not donate" and you are matched to a wug **donor**, you gain **-19 tokens**
- If you "Do not donate" and you are matched to a wug **non-donor**, you gain **31 tokens**

You are matched to a wug owner who is drawn randomly from 10 participants from the same Klee family as you are. Among these 10 participants, there are:

- 1 wug **donor** and 9 wug **non-donors**

There is **no record of** the specific wug owner you are matched with buying a signal **(NO SIGNAL)**

Do you want to

Do not donate, and pay 19 tokens to overturn the default

Donate

→

Figure A43: Donation Decision Screen 3

Recall: If you "Donate"/"Do not donate" for a wug **donor/non-donor**, you get 50 tokens. Remember that you have to pay 10 tokens to "Donate". The default status is donated.

- If you "Donate" and you are matched to a wug **donor**, you gain **40 tokens**
- If you "Donate" and you are matched to a wug **non-donor**, you gain **-10 tokens**
- If you "Do not donate" and you are matched to a wug **donor**, you gain 0 token
- If you "Do not donate" and you are matched to a wug **non-donor**, you gain **50 tokens**

You are matched to a wug owner who is drawn randomly from 10 participants from the same Klee family as you are. Among these 10 participants, there are:

- 5 wug **donor** and 5 wug **non-donors**

And the specific wug owner you are matched with paid 25 tokens to buy the signal to tell you **to "NOT donate (opt out)"**

Do you want to

Donate

Do not donate

→

Figure A44: Donation Decision Screen 4

Recall: If you "Donate"/"Do not donate" for a wug **donor/non-donor**, you get 50 tokens. Remember that you have to pay 10 tokens to "Donate". The default status is donated.

- If you "Donate" and you are matched to a wug **donor**, you gain **40 tokens**
- If you "Donate" and you are matched to a wug **non-donor**, you gain **-10 tokens**
- If you "Do not donate" and you are matched to a wug **donor**, you gain **-19 tokens**
- If you "Do not donate" and you are matched to a wug **non-donor**, you gain **31 tokens**

You are matched to a wug owner who is drawn randomly from 10 participants from the same Klee family as you are. Among these 10 participants, there are:

- 5 wug **donor** and 5 wug **non-donors**

There is **no record of** the specific wug owner you are matched with buying a signal **(NO SIGNAL)**

Do you want to

Donate

Do not donate, and pay 19 tokens to overturn the default

→

Figure A45: Donation Decision Screen 5

Recall: If you "Donate"/"Do not donate" for a wug **donor/non-donor**, you get 50 tokens. Remember that you have to pay 10 tokens to "Donate". The default status is donated.

- If you "Donate" and you are matched to a wug **donor**, you gain **40 tokens**
- If you "Donate" and you are matched to a wug **non-donor**, you gain **-10 tokens**
- If you "Do not donate" and you are matched to a wug **donor**, you gain 0 token
- If you "Do not donate" and you are matched to a wug **non-donor**, you gain **50 tokens**

You are matched to a wug owner who is drawn randomly from 10 participants from the same Klee family as you are. Among these 10 participants, there are:

- **9** wug **donor** and **1** wug **non-donors**

And the specific wug owner you are matched with paid 25 tokens to buy the signal to tell you **to "NOT donate (opt out)"**

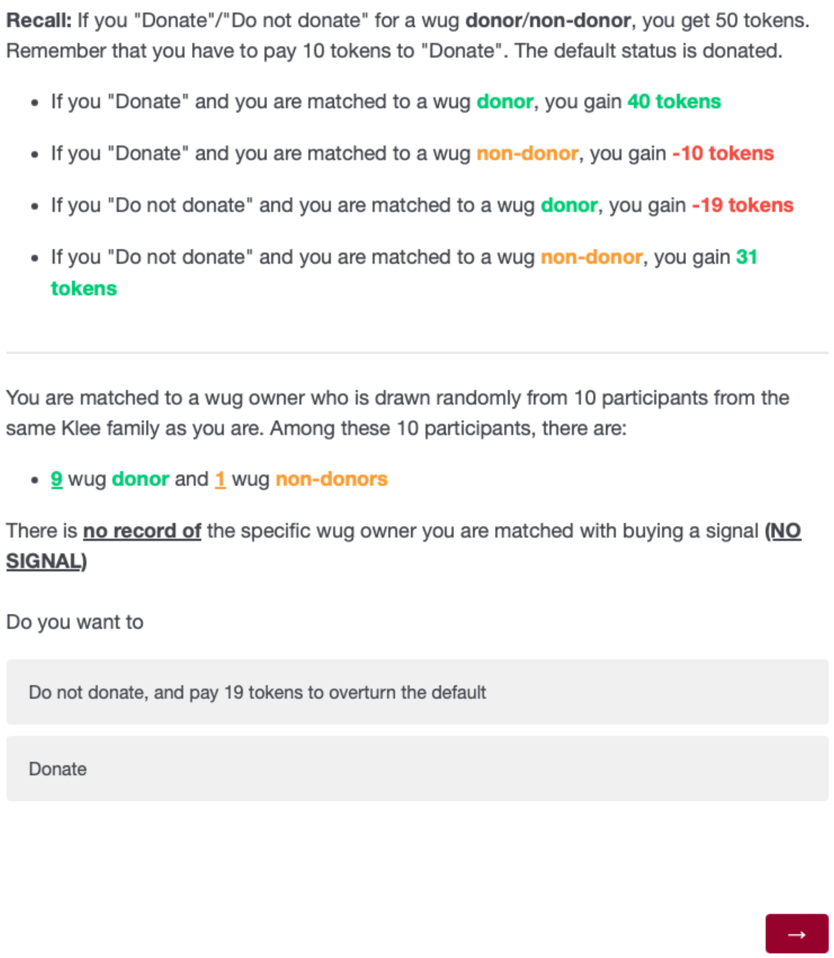
Do you want to

Donate

Do not donate

→

Figure A46: Donation Decision Screen 6


Recall: If you "Donate"/"Do not donate" for a wug **donor/non-donor**, you get 50 tokens. Remember that you have to pay 10 tokens to "Donate". The default status is donated.

- If you "Donate" and you are matched to a wug **donor**, you gain **40 tokens**
- If you "Donate" and you are matched to a wug **non-donor**, you gain **-10 tokens**
- If you "Do not donate" and you are matched to a wug **donor**, you gain **-19 tokens**
- If you "Do not donate" and you are matched to a wug **non-donor**, you gain **31 tokens**

You are matched to a wug owner who is drawn randomly from 10 participants from the same Klee family as you are. Among these 10 participants, there are:

- 9 wug **donor** and 1 wug **non-donors**

There is **no record of** the specific wug owner you are matched with buying a signal **(NO SIGNAL)**

Do you want to

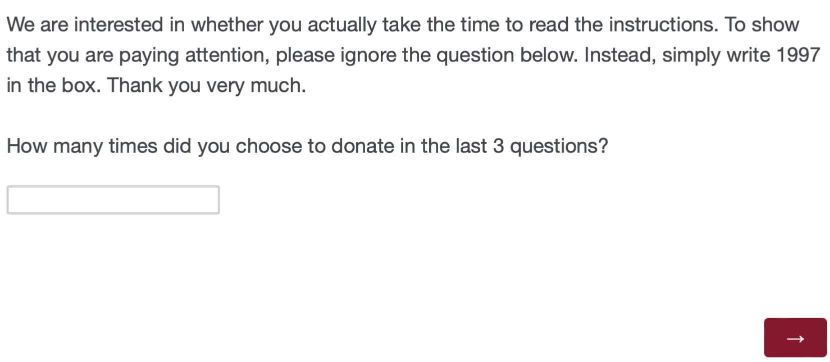
Do not donate, and pay 19 tokens to overturn the default

Donate

→

In the end of Part 3, we let all participants finish one more attention check question (Figure A47). Then, they are directed to value-related and demographic questions, as shown in Online Appendix A.2.6.

Figure A47: Attention Check Question 2


We are interested in whether you actually take the time to read the instructions. To show that you are paying attention, please ignore the question below. Instead, simply write 1997 in the box. Thank you very much.

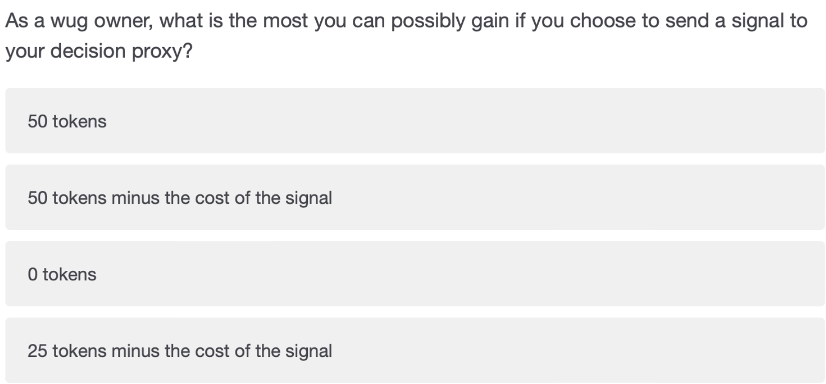
How many times did you choose to donate in the last 3 questions?

→

A.2.5 Comprehension Quiz

To ensure and reinforce comprehension of the rules of the experiment, we add three comprehension questions (Figure A48, A49, and A50) after participants learn the default regime (opt-in vs. opt-out), signal cost (\$0.75 vs. \$0.25), and cost to decision proxy of overturning defaults or signals (\$0.19 vs. \$0.01) from the overview of Part 2 and Part 3. Then after participants learn whether they are donors or non-donors, they will be shown another four comprehension questions (Figure A51, A52, A53, A54, A55). Moreover, we also add four comprehension questions after Part 3 instructions. If participants get a question wrong, a text box will pop up to explain why their choices are wrong. They must answer these questions correctly to proceed to the next section. The questions are shown in the figures below.

Figure A48: Comprehension Question 1



If the question shown in Figure A49 is not answered correctly, the following explanation will be shown for all treatment conditions:

- "Consider that the decision proxy is indifferent between donating or not if there is no cost to donate someone's wug. However, donating someone's cost you 10 tokens (something that can break the tie)."

Figure A49: Comprehension Question 2

Take the perspective of the decision proxy: Assume that there is no default regime and you have received no signals and do not know if the wug owner had sent a signal or not, if you think that the wug owner is equally likely (50%-50%) to be a wug **donor** or a wug **non-donor**, will you (the decision proxy) donate on behalf of the wug owner when trying to maximize expected tokens earned?

- Yes, donate
- Depends
- No, do NOT donate

If the question shown in Figure A50 is not answered correctly, the following explanation will be shown for all treatment conditions:

- "Given the beliefs of the decision proxy, it is almost certain that they will donate the wug on behalf of the wug owner anyway so it might not be worth it for the wug owner to incur a cost to signal."

Figure A50: Comprehension Question 3

If both the decision proxy and the wug owner who is a wug **donor** know that the decision proxy thinks that there is a very high chance, say close to 100% chance, that the wug owner is wug **donor** (someone who gains if their wug is donated for them), how likely will the wug owner send a signal?

- Very unlikely
- Very likely
- Unclear
- 50% chance

If the question shown in Figure A51 is not answered correctly, the following explanation will be shown depending on the treatment condition:

- For default status is donated and the participant is a wug donor: "The default status is donated, so you can ONLY send the signal to opt out. However, you're a wug donor, which means you would not want to send a signal to tell the decision proxy to Not Donate. (donating is best for you!)"

- For default status is not donated and the participant is a wug non-donor: “The default status is not donated, so you can ONLY send the signal to opt in. However, you’re a wug nondonor, which means you would not want to send a signal to tell the decision proxy to Donate. (not donating is best for you!)”

- For default status is donated, the participant is a wug non-donor and the signal cost is \$75 tokens: “Even if your role is consistent with the decision proxy’s choice, you’ll only get a maximum of 50 tokens, but sending the signal will cost you 75 tokens (which is more than 50 tokens!)”

- For default status is not donated, the participant is a wug donor and the signal cost is \$75 tokens: “Even if your role is consistent with the decision proxy’s choice, you’ll only get a maximum of 50 tokens, but sending the signal will cost you 75 tokens (which is more than 50 tokens!)”

- For default status is donated, the participant is a wug non-donor and the signal cost is \$25 tokens: “The default status is donated, and you’re a wug non-donor. If it’s more likely that the decision proxy thinks that you’re a wug donor, the more likely they will Donate on your behalf, the more you might want to do something to change that (i.e. send a signal).”

- For default status is not donated, the participant is a wug donor and the signal cost is \$25 tokens: “The default status is not donated, and you’re a wug donor. If it’s less likely that the decision proxy thinks that you’re a wug donor, the less likely they will Donate on your behalf, the more you might want to send signal to tell the proxy that you want to opt in.”

Figure A51: Comprehension Question 4

What approach for signaling is consistent with players who are maximizing expected number of tokens?

- Always send the signal regardless of how likely the decision proxy thinks you're a wug **donor**
- More likely to send the signal if it's more likely for the decision proxy thinks that you're a wug **donor**
- More likely to send the signal if it's less likely for the decision proxy thinks that you're a wug **donor**
- Never send the signal regardless of how likely the decision proxy thinks you're a wug **donor**

If the question shown in Figure A52 is not answered correctly, the following explanation will be shown for all treatment conditions:

- "Consider that the most wug owners can earn is 50 tokens if the proxy made the "right decision", the wug owner cannot possibly earn any additional tokens by sending a signal if the signals cost 50 or more tokens."

Figure A52: Comprehension Question 5

What is the maximum cost for a signal, among the options below, when it would still be possible the wug owner (in Part 2) to even get a chance to gain any additional earnings (and not lose earnings) by sending a signal?

- 9 tokens
- 29 tokens
- 49 tokens
- 79 tokens

If the question shown in Figure A53 is not answered correctly, the following explanation will be shown for all treatment conditions:

- "Consider that the most wug owners can earn is 50 tokens if the proxy made the "right decision", the wug owner cannot possibly earn any additional tokens by sending a signal if the signals cost 50 or more tokens."

Figure A53: Comprehension Question 6

Above what "signal cost" (in Part 2) would decision proxies expect a wug owner who is maximizing expected returns to not signal (in other words, that they would see "NO Signal"), regardless of whether that wug owner is a wug **donor** or a wug **non-donor**?

- 21 tokens
- 31 tokens
- 41 tokens
- 51 tokens

Only when the participants are wug donors can they see the question shown in Figure A54. And if it is not answered correctly, the following explanation will be shown:

- “You’re a wug donor, so if the proxy donate your wug, you can get 50 tokens (instead of 0)”

Figure A54: Comprehension Question 7 for Wug Donor

If the wug proxy donate your wug, will you lose or make money?

- Make money
- Lose money

Only when the participants are wug non-donors can they see the question shown in Figure A55. And if it is not answered correctly, the following explanation will be shown:

- “You’re a wug non-donor, so if the proxy doesn’t donate your wug, you’ll get 50 tokens (instead of 0)”

Figure A55: Comprehension Question 7 for Wug Non-Donor

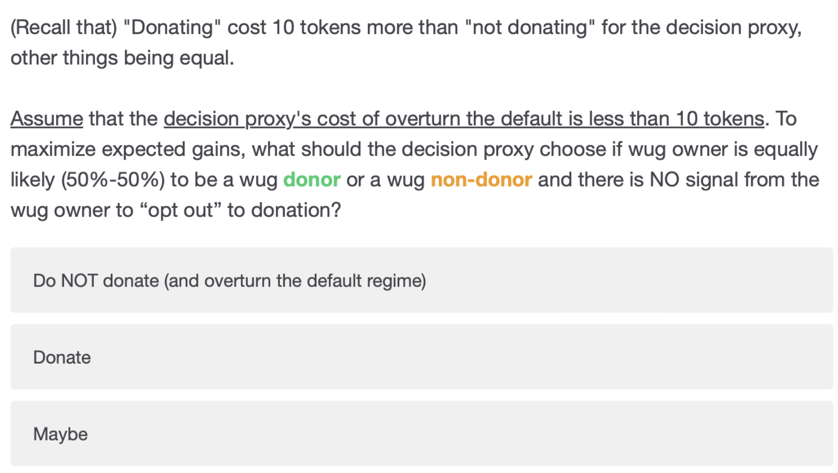
If the wug proxy doesn't donate your wug, will you lose or make money?

- Make Money
- Lose Money

Only when the default status is donated can the participants see the question shown in Figure A56. And if it is not answered correctly, the following explanation will be shown:

- "Given the 50-50, the decision proxy can gain an expected 25 for not donating but an expected 25 minus 10 for donating, therefore, if the cost of overturning is less than the difference, which is 10, the decision proxy might get higher expected tokens by overturning. But if the cost of overturning is too high, they might not want to overturn."

Figure A56: Comprehension Question 8


(Recall that) "Donating" cost 10 tokens more than "not donating" for the decision proxy, other things being equal.

Assume that the decision proxy's cost of overturn the default is less than 10 tokens. To maximize expected gains, what should the decision proxy choose if wug owner is equally likely (50%-50%) to be a wug **donor** or a wug **non-donor** and there is NO signal from the wug owner to "opt out" to donation?

Do NOT donate (and overturn the default regime)

Donate

Maybe

Only when the default status is not donated can the participants see the question shown in Figure A57. And if it is not answered correctly, the following explanation will be shown:

- "Consider that the most wug owners can earn is 50 tokens if the proxy made the "right decision", the wug owner cannot possibly earn any additional tokens by sending a signal if the signals cost 50 or more tokens."

Figure A57: Comprehension Question 9

To maximize expected gains, should the decision proxy donate if (1) wug owner is equally likely (50%-50%) to be a wug **donor** or a wug **non-donor** and (2) there is a signal from the wug owner to “opt in” to donation?

- Yes
- No
- Maybe

If the question shown in Figure A58 is not answered correctly, the following explanation will be shown depending on the treatment condition:

- For default status is not donated: “The only signal that can be send is “donate”, so signals are useful to send if the wug owner is trying to “CHANGE THE MIND” of the decision proxy who given the information they have might choose a decision that contradicts what the wug owner wants.”
- For default status is donated: “The only signal that can be send is “not donate”, so signals are useful to send if the wug owner is trying to “CHANGE THE MIND” of the decision proxy who given the information they have might choose a decision that contradicts what the wug owner wants.”

Figure A58: Comprehension Question 10

If signals are not free but very cheap to send, when is it most likely that an expected returns maximizing wug owner who is a **wug donor** send a signal?

- When it is likely that the decision proxy thinks that the wug owner is a wug donor
- When it is not likely that the decision proxy thinks that the wug owner is a wug donor
- Never

If the question shown in Figure A59 is not answered correctly, the following explanation will be shown depending on the treatment condition:

- For default status is not donated: “The only signal that can be send is “donate”, so signals are useful to send if the wug owner is trying to "CHANGE THE MIND" of the decision proxy who given the information they have might choose a decision that contradicts what the wug owner wants.”

- For default status is donated: “The only signal that can be send is “not donate”, so signals are useful to send if the wug owner is trying to "CHANGE THE MIND" of the decision proxy who given the information they have might choose a decision that contradicts what the wug owner wants.”

Figure A59: Comprehension Question 11

If signals are not free but very cheap to send, when is it most likely that an expected returns maximizing wug owner who is a **wug non-donor** send a signal?

When it is likely that the decision proxy thinks that the wug owner is a wug donor

When it is not likely that the decision proxy thinks that the wug owner is a wug donor

Never

If the question shown in Figure A60 is not answered correctly, the following explanation will be shown for all treatment conditions:

- “Consider that the decision proxies are aware that the signals are costly for wug owners to send.”

Figure A60: Comprehension Question 12

Can a wug owner expect to gain tokens by sending a signal that contradicts their true status as a wug **donor** or wug **non-donor**?

Yes

No

Unclear

A.2.6 Collection of Value-related and Demographic Information

We used Qualtrics software to collect value-related and demographic information from customers who clicked the URL and chose to participate in the experiment on Prolific.

For value-related questions (presented in randomized order), participants are asked to evaluate the importance of various values as guiding principles in their lives (Figure A61). Each value is rated on a scale from −1 to 7, with higher scores indicating greater personal importance. As shown in the following, the values include pragmatism (Figure A62), purity (Figure A63), justice (Figure A64), social recognition (Figure A65), pleasure (Figure A66), compassion (Figure A67), spirituality (Figure A68), equality (Figure A69), giving (Figure A70), freedom (Figure A71), and respect for tradition (Figure A72).

Figure A61: Instruction of Value-related Questions

The purpose of the next section is to identify your **dominant values**.

In this questionnaire you are to ask yourself: "What values are important to ME as guiding principles in MY life, and what values are less important to me?" In the parentheses following each value is an explanation that may help you to understand its meaning.

Please use the rating scale below:

- 0 means the value is not at all important, it is not relevant as a guiding principle for you
- 3 means the value is important
- 6 means the value is very important
- -1 is for rating any values opposed to the principles that guide you
- 7 is for rating a value of supreme importance as a guiding principle in your life; *ordinarily there are no more than two such values*

For each value, select the number (-1,0,1,2,3,4,5,6,7) that indicates the importance of that value for you, personally.

Figure A62: Survey Question on the Importance of Pragmatism

PRAGMATISM (acting to achieve practical results, as opposed to adhering to abstract principles).

As a guiding principle in my life, this value is...

-1 opposed to my values

0 not important

1

2

3 important

4

5

6 very important

7 of supreme importance

Figure A63: Survey Question on the Importance of Purity

PURITY (avoiding doing things that are disgusting, even if no one is harmed).

As a guiding principle in my life, this value is...

- -1 opposed to my values
- 0 not important
- 1
- 2
- 3 important
- 4
- 5
- 6 very important
- 7 of supreme importance

Figure A64: Survey Question on the Importance of Justice

JUSTICE (conforming to principles of impartiality and fairness).

As a guiding principle in my life, this value is...

- -1 opposed to my values
- 0 not important
- 1
- 2
- 3 important
- 4
- 5
- 6 very important
- 7 of supreme importance

Figure A65: Survey Question on the Importance of Social Recognition

SOCIAL RECOGNITION (respect, approval by others).

As a guiding principle in my life, this value is...

-1 opposed to my values

0 not important

1

2

3 important

4

5

6 very important

7 of supreme importance

Figure A66: Survey Question on the Importance of Pleasure

PLEASURE (gratification of desires).

As a guiding principle in my life, this value is...

-1 opposed to my values

0 not important

1

2

3 important

4

5

6 very important

7 of supreme importance

Figure A67: Survey Question on the Importance of Compassion

COMPASSION (concern for those who are suffering).

As a guiding principle in my life, this value is...

- -1 opposed to my values
- 0 not important
- 1
- 2
- 3 important
- 4
- 5
- 6 very important
- 7 of supreme importance

Figure A68: Survey Question on the Importance of Spirituality

SPIRITUALITY (emphasis on spiritual, not material matters).

As a guiding principle in my life, this value is...

- -1 opposed to my values
- 0 not important
- 1
- 2
- 3 important
- 4
- 5
- 6 very important
- 7 of supreme importance

Figure A69: Survey Question on the Importance of Equality

EQUALITY (equal opportunity for all).

As a guiding principle in my life, this value is...

-1 opposed to my values

0 not important

1

2

3 important

4

5

6 very important

7 of supreme importance

Figure A70: Survey Question on the Importance of Giving

GIVING (being charitable, selfless; helping the needy).

As a guiding principle in my life, this value is...

-1 opposed to my values

0 not important

1

2

3 important

4

5

6 very important

7 of supreme importance

Figure A71: Survey Question on the Importance of Freedom

FREEDOM (freedom of action and thought).

As a guiding principle in my life, this value is...

- -1 opposed to my values
- 0 not important
- 1
- 2
- 3 important
- 4
- 5
- 6 very important
- 7 of supreme importance

Figure A72: Survey Question on the Importance of Respect for Tradition

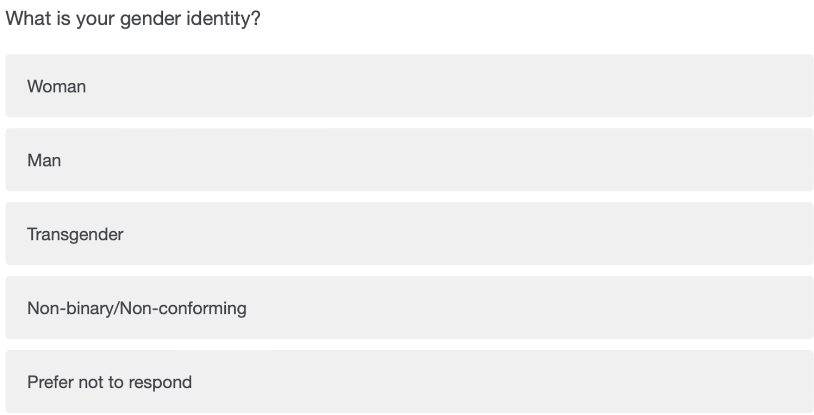
RESPECT FOR TRADITION (preservation of time-honored customs).

As a guiding principle in my life, this value is...

- -1 opposed to my values
- 0 not important
- 1
- 2
- 3 important
- 4
- 5
- 6 very important
- 7 of supreme importance

In the final section of the experiment, the participants are asked a number of questions (in the order of appearance) about their gender identity (Figure A73), race and ethnicity (Figure A74), sexual orientation (Figure A75), disability and chronic condition (Figure A76), zip code (Figure A77), highest education level (Figure A78), high school type and location (Figure A79, A80), marital status (Figure A81), number of children (Figure A82), employment status (Figure A83), occupation type (Figure A84), present religion and importance in their lives(Figure A85, A86), life satisfaction (Figure A87), health insurance (Figure A88), social class (Figure A89), political affiliation (Figure A90), favorability toward the democratic or republican parties (Figure A91, A92), and health status (Figure A93).

Figure A73: Survey Question about Participant's Gender Identity


What is your gender identity?

Woman

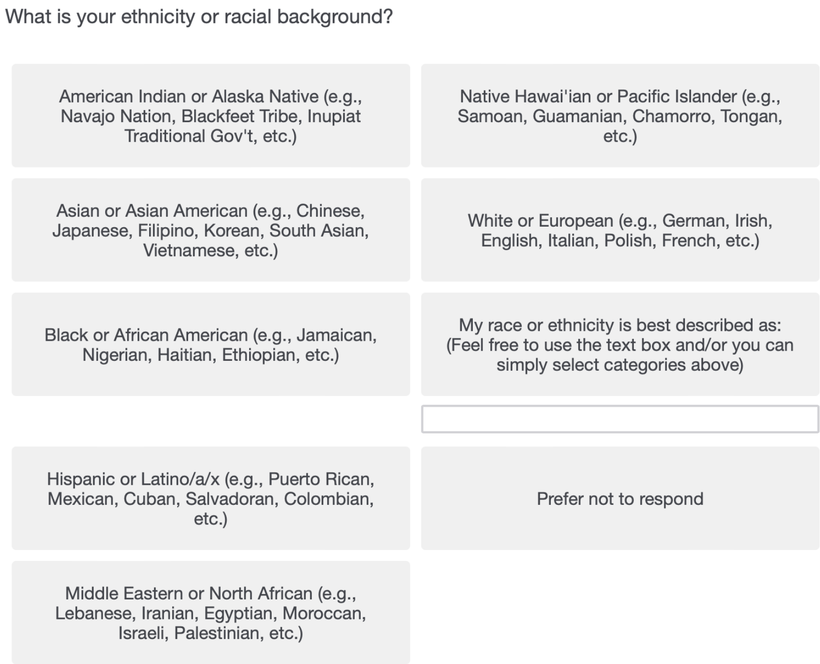
Man

Transgender

Non-binary/Non-conforming

Prefer not to respond

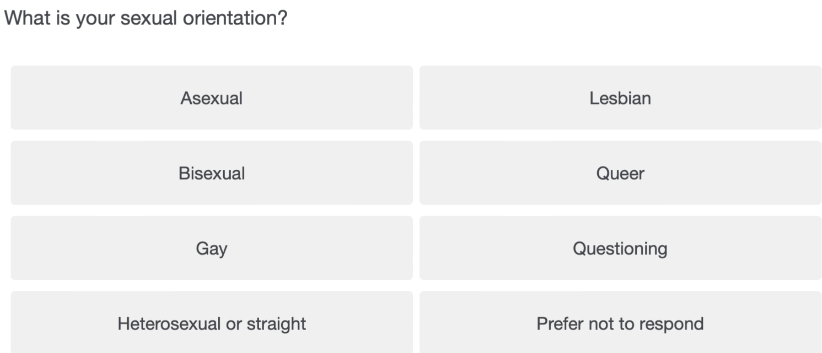
Figure A74: Survey Question about Participant’s Race and Ethnicity



What is your ethnicity or racial background?

- American Indian or Alaska Native (e.g., Navajo Nation, Blackfeet Tribe, Inupiat Traditional Gov't, etc.)
- Native Hawai'ian or Pacific Islander (e.g., Samoan, Guamanian, Chamorro, Tongan, etc.)
- Asian or Asian American (e.g., Chinese, Japanese, Filipino, Korean, South Asian, Vietnamese, etc.)
- White or European (e.g., German, Irish, English, Italian, Polish, French, etc.)
- Black or African American (e.g., Jamaican, Nigerian, Haitian, Ethiopian, etc.)
- My race or ethnicity is best described as: (Feel free to use the text box and/or you can simply select categories above)
- Hispanic or Latino/a/x (e.g., Puerto Rican, Mexican, Cuban, Salvadoran, Colombian, etc.)
- Prefer not to respond
- Middle Eastern or North African (e.g., Lebanese, Iranian, Egyptian, Moroccan, Israeli, Palestinian, etc.)

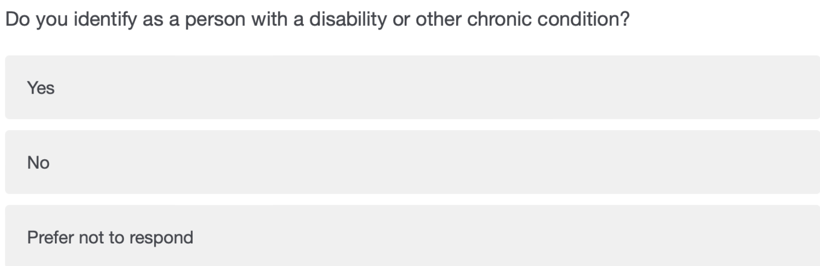
Figure A75: Survey Question about Participant’s Sexual Orientation



What is your sexual orientation?

- Asexual
- Lesbian
- Bisexual
- Queer
- Gay
- Questioning
- Heterosexual or straight
- Prefer not to respond

Figure A76: Survey Question about Participant’s Disability and Chronic Condition



Do you identify as a person with a disability or other chronic condition?

- Yes
- No
- Prefer not to respond

Figure A77: Survey Question about Participant's Zip Code

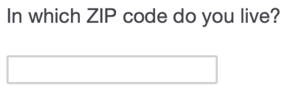


Figure A78: Survey Question about Participant's Highest Education Level

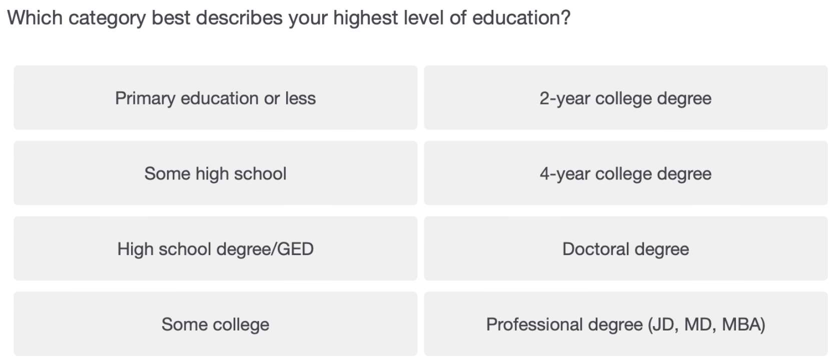


Figure A79: Survey Question about Participant's High School Type

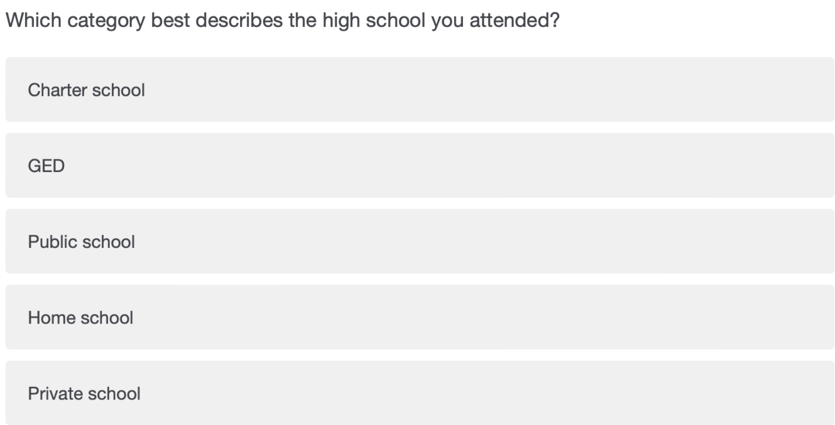


Figure A80: Survey Question about Participant's High School Location

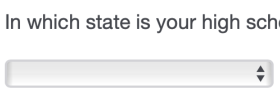


Figure A81: Survey Question about Participant's Marital Status

Please indicate your marital status.

- Never Married
- Married
- Legally Separated or Divorced
- Widowed

Figure A82: Survey Question about Participant's Number of Children

How many children do you have?

0	4	8
1	5	9
2	6	10 or more
3	7	

Figure A83: Survey Question about Participant's Employment Status

What is your current employment status?

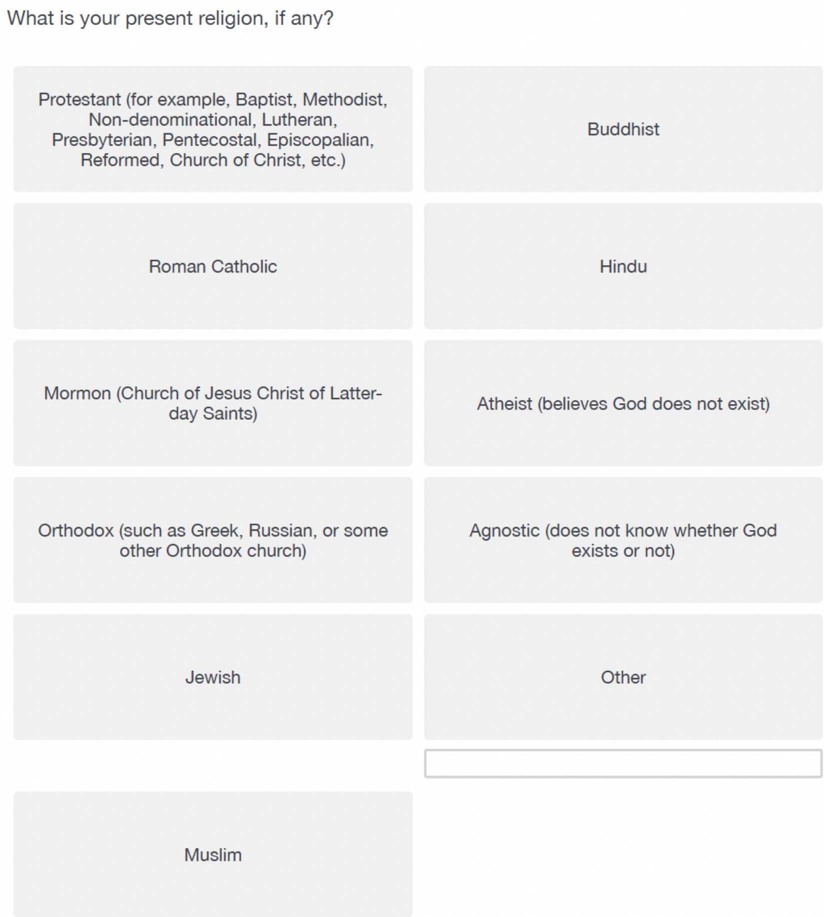
- Full-time employee
- Part-time employee
- Self-employed or small business owner
- Unemployed and looking for work
- Unemployed and not looking for work (including student)

Figure A84: Survey Question about Participant's Occupation Type

Which category best describes your occupation?

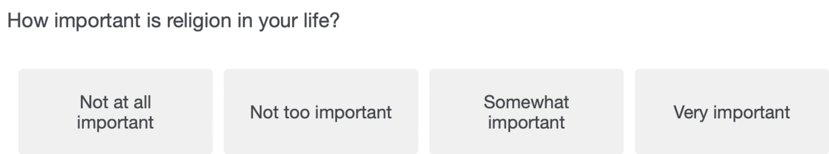
Farmer or agricultural laborer, rancher, fisher	Protective service worker (e.g., police, fire)
Manual laborer (e.g., factory worker, miner)	Educational service worker (e.g., teacher, professor)
Tradesperson (e.g., mechanic, welder, painter, railroad worker, plumber, tailor)	Public servant (e.g., bureaucrat, politician, military)
Service worker (e.g., driver, waiter, cook, retail worker, cashier, barber, janitor, housekeeper)	Homemaker/stay-at-home parent
Clerical worker (e.g., secretary, bookkeper, receptionist, telephone operator)	Self-employed/small business owner (excluding farm owners)
White-collar worker (e.g., manager, executive, businessperson, salesperson, accountant, banker)	Other (please specify)
Professional (e.g., doctor, lawyer, engineer, IT/computer programmer)	Don't know
Medical or social worker (e.g., nurse, EMT, pharmacist)	

Figure A85: Survey Question about Participant's Present Religion


What is your present religion, if any?

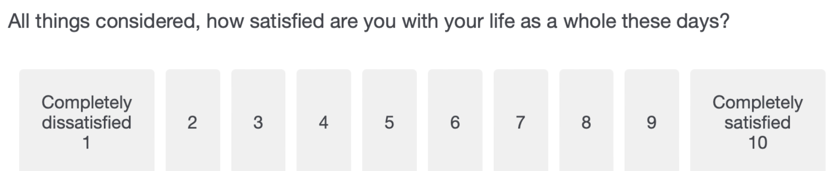
- Protestant (for example, Baptist, Methodist, Non-denominational, Lutheran, Presbyterian, Pentecostal, Episcopalian, Reformed, Church of Christ, etc.)
- Buddhist
- Roman Catholic
- Hindu
- Mormon (Church of Jesus Christ of Latter-day Saints)
- Atheist (believes God does not exist)
- Orthodox (such as Greek, Russian, or some other Orthodox church)
- Agnostic (does not know whether God exists or not)
- Jewish
- Other
- Muslim

Figure A86: Survey Question on Religion's Importance in Participants' Lives


How important is religion in your life?

- Not at all important
- Not too important
- Somewhat important
- Very important

Figure A87: Survey Question about Participants' Life Satisfaction


All things considered, how satisfied are you with your life as a whole these days?

- Completely dissatisfied 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- Completely satisfied 10

Figure A88: Survey Question about Participants' Health Insurance

Are you covered by Medicare, Medical Assistance, or Medicaid?

- Yes
- No
- Prefer not to respond

Figure A89: Survey Question about Participants' Social Class

If you had to use one of these five commonly used names to describe your social class, which one would it be?

- Lower Class or Poor
- Working Class
- Middle Class
- Upper-middle Class
- Upper Class

Figure A90: Survey Question about Participants' Political Affiliation

In politics, as of today, do you consider yourself a Republican, a Democrat, or an Independent?

- Strong Democrat
- Moderate Democrat
- Independent
- Moderate Republican
- Strong Republican
- Other

Figure A91: Survey Question on Participants' Favorability Toward the Democratic Party

Please rate how you feel about the **Democratic Party** using a scale of 0 to 100. The higher the number, the more favorable you feel toward the **Democratic Party**.

Extremely unfavorable	Moderately unfavorable	Slightly unfavorable	Neither unfavorable nor favorable	Slightly favorable	Moderately favorable	Extremely favorable

0 10 20 30 40 50 60 70 80 90 100

Figure A92: Survey Question on Participants' Favorability Toward the Republican Party

Please rate how you feel about the **Republican Party** using a scale of 0 to 100. The higher the number, the more favorable you feel toward the **Republican Party**.

Extremely unfavorable	Moderately unfavorable	Slightly unfavorable	Neither unfavorable nor favorable	Slightly favorable	Moderately favorable	Extremely favorable

0 10 20 30 40 50 60 70 80 90 100

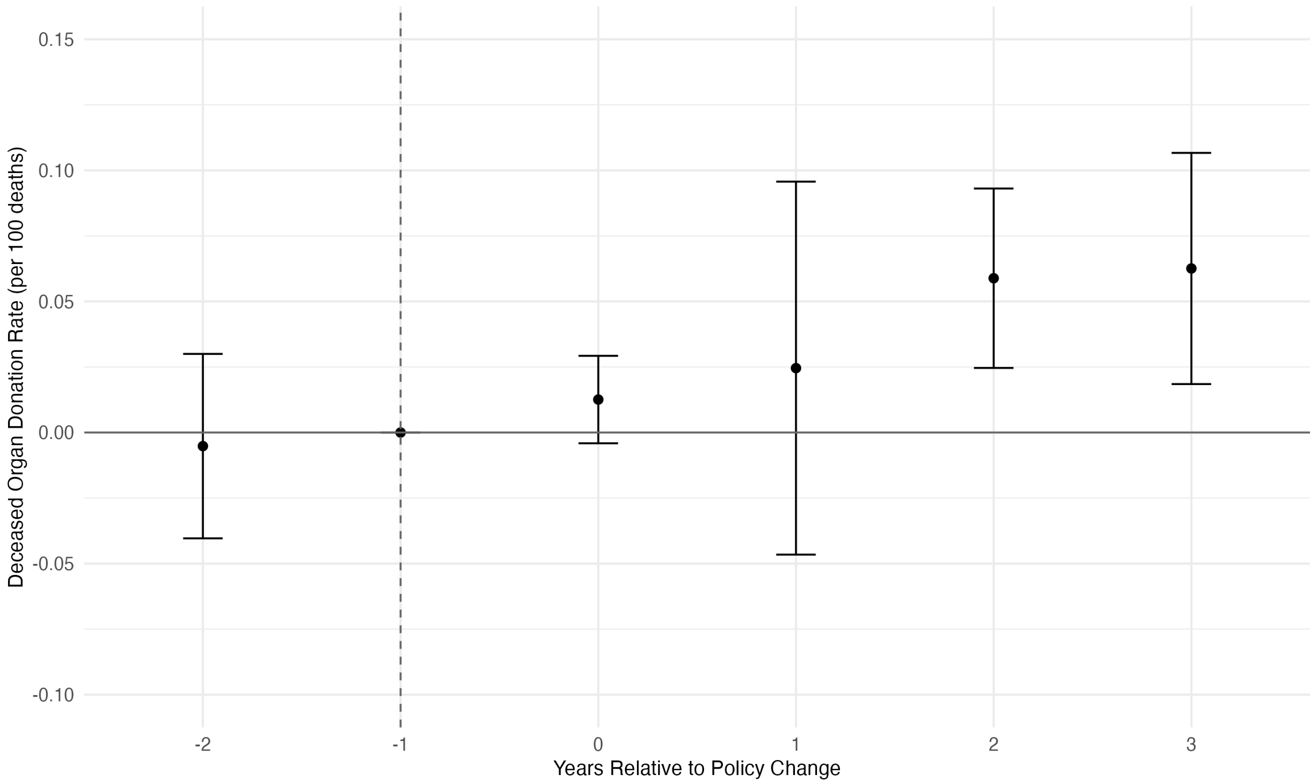
Figure A93: Survey Question about Participants' Health Status

In general, would you say your health is:

- Excellent
- Very Good
- Good
- Fair
- Poor

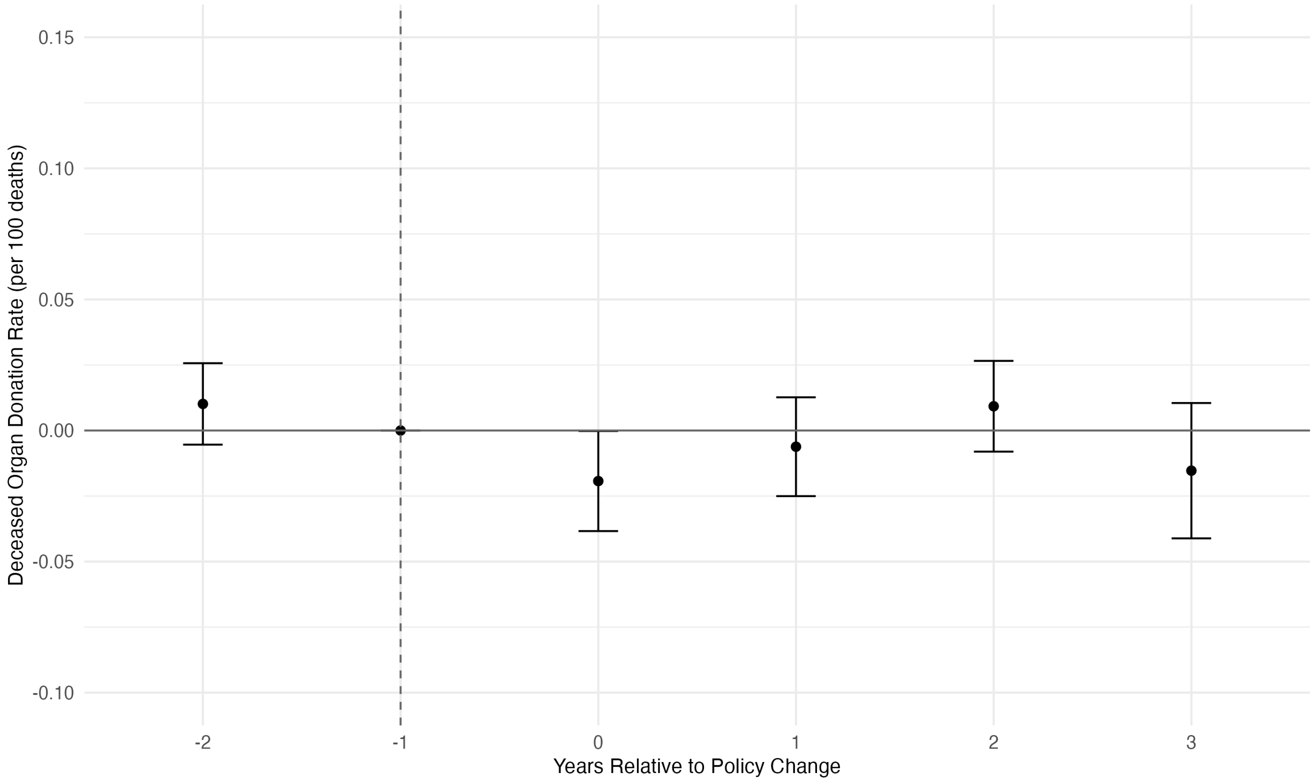
A.3 Supplementary Figures

Figure A94: Event Study Graph for Strict Opt Out Countries within Median Quartiles (Average year-0-donation-per-100-deaths = 0.11)



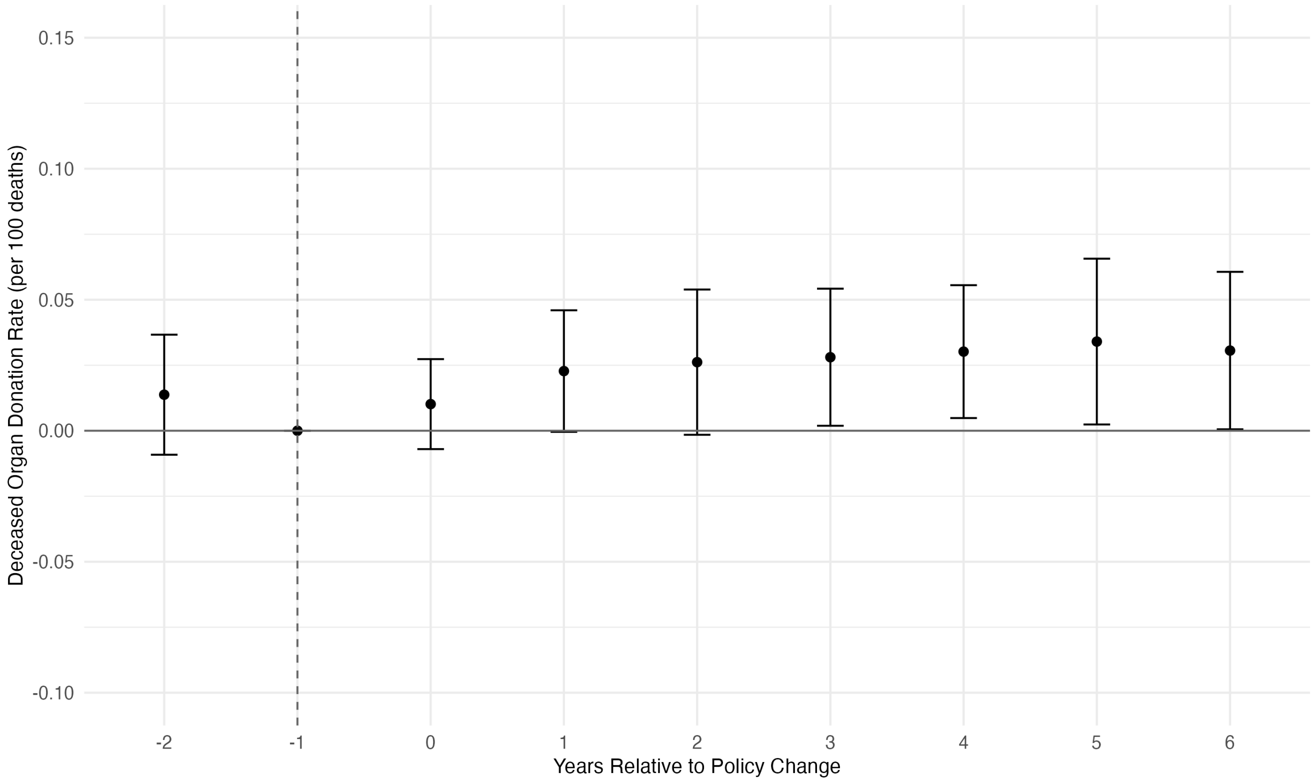
Notes: Estimated based on Equation 1 including panel data on all strict opt out countries that changed policy nationally from opt-in to opt-out which has at least 3 control countries (countries in the same continent) with data that extend at least 2 years before and 3 years after the event. The sample includes Austria (1980-1985), Belgium* (1984-1989), Norway, Sweden (1981-1989), Germany, Netherlands, and UK (1980-1989). Points show estimated coefficients; Countries marked with an asterisk * changed policy nationally from opt-in to opt-out; error bars indicate 95% confidence intervals*

Figure A95: Event Study Graph for Weak Opt Out Countries within Median Quartiles (Average year-0-donation-per-100-deaths = 0.10)



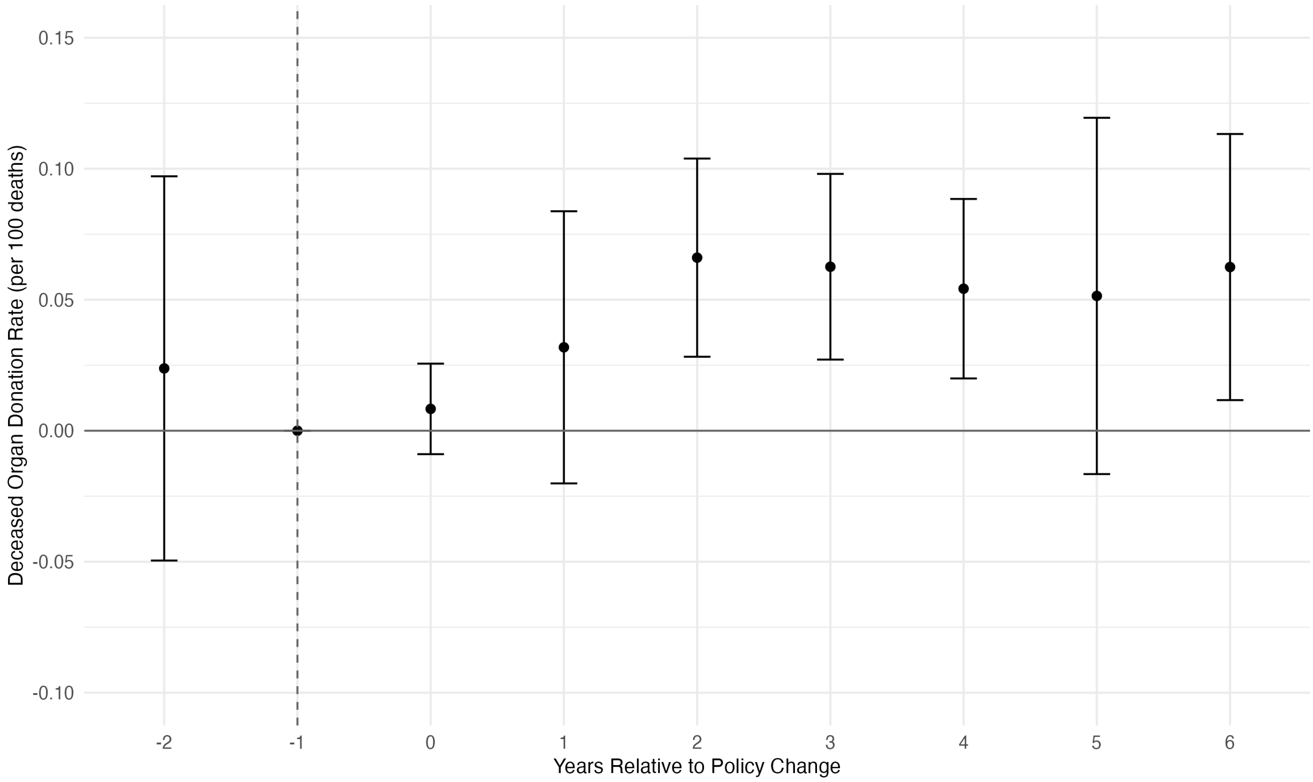
Notes: Estimated based on Equation 1 including panel data on Chile and Sweden that changed policy nationally from opt-in to opt-out which has at least 8 control countries (countries in the same continent) with data that extend at least 2 years before and 3 years after the event. The sample includes Sweden (1994-1999), Greece (1995-1999), Austria, Belgium, Croatia, Czechia, Denmark, Finland, France, Germany, Hungary, Ireland, Luxembourg, Netherlands, Norway, Poland, Portugal, Slovak Republic, Slovenia, Spain, Switzerland, UK (1994-1999), and Chile* (2008-2013), Bolivia (2008, 2010-2013), Ecuador (2009-2013), Argentina, Brazil, Colombia, Cuba, Dominican Republic, Panama, Paraguay (2008-2013). Points show estimated coefficients; Countries marked with an asterisk * changed policy nationally from opt-in to opt-out; error bars indicate 95% confidence intervals*

Figure A96: Event Study Graph for All Countries (6 post years)



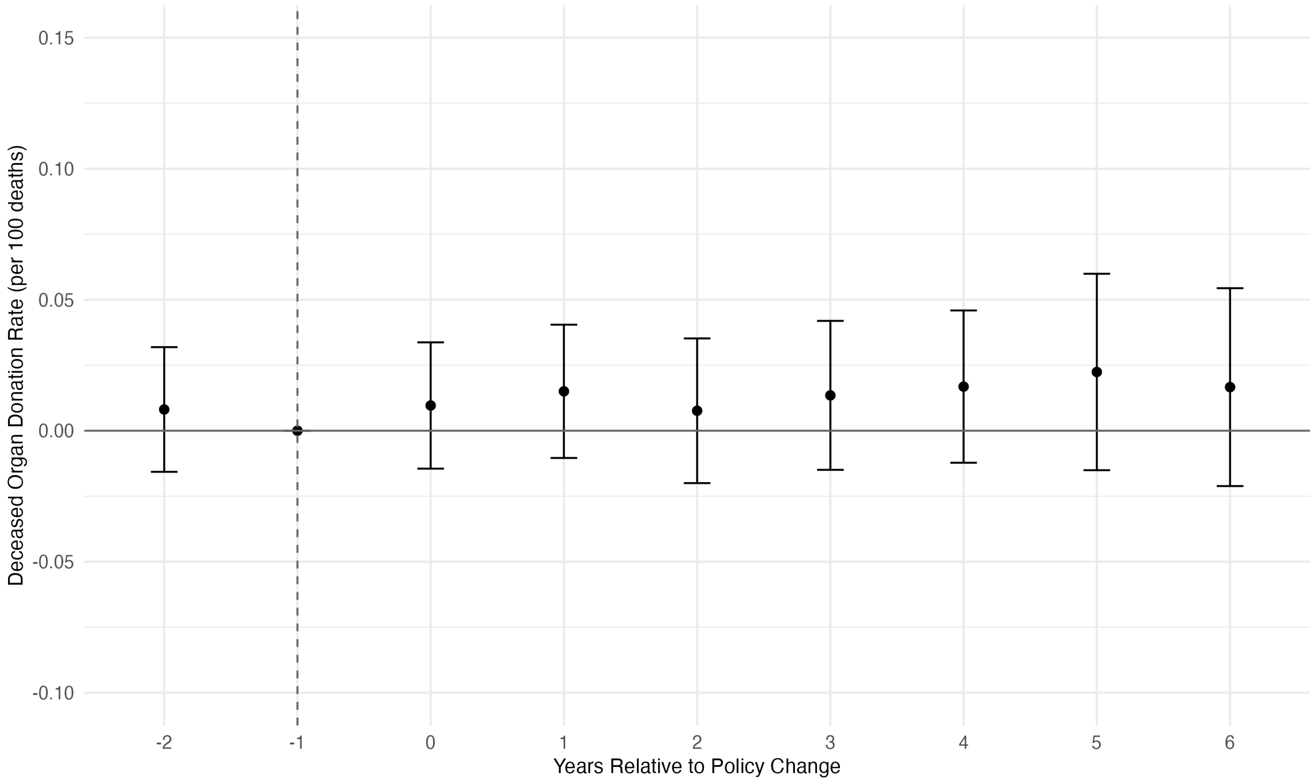
Notes: Estimated based on Equation 1 including panel data on all countries that changed policy nationally from opt-in to opt-out which has at least 3 control countries (countries in the same continent) with data that extend at least 2 years before and 6 years after the event. The sample includes Austria, Luxembourg* (1980-1988), Belgium* (1984-1992), Finland* (1983-1991), Norway, Sweden (1981-1992), Germany, Netherlands, and UK (1980-1992). The sample also includes Italy* (1997-2005), Sweden* (1994-2002), Greece (1995-2005), Austria, Belgium, Croatia, Czechia, Denmark, Finland, France, Germany, Hungary, Ireland, Luxembourg, Netherlands, Norway, Poland, Portugal, Slovak Republic, Slovenia, Spain, Switzerland, UK (1994-2005), and Chile* (2008-2016), Uruguay* (2011-2019), Bolivia (2008, 2010-2019), Ecuador (2009-2019), Argentina, Brazil, Colombia, Cuba, Dominican Republic, Panama, Paraguay (2008-2019). Points show estimated coefficients; Countries marked with an asterisk * changed policy nationally from opt-in to opt-out; error bars indicate 95% confidence intervals.*

Figure A97: Event Study Graph for Strict Opt Out Countries (6 post years)



Notes: Estimated based on Equation 1 including panel data on all strict opt out countries that changed policy nationally from opt-in to opt-out which has at least 3 control countries (countries in the same continent) with data that extend at least 2 years before and 6 years after the event. The sample includes Austria, Luxembourg* (1980-1988), Belgium* (1984-1992), Norway, Sweden (1981-1992), Germany, Netherlands, and UK (1980-1992). Points show estimated coefficients; Countries marked with an asterisk * changed policy nationally from opt-in to opt-out; error bars indicate 95% confidence intervals.*

Figure A98: Event Study Graph for Weak Opt Out Countries (6 post years)



Notes: Estimated based on Equation 1 including panel data on all weak opt out countries that changed policy nationally from opt-in to opt-out which has at least 5 control countries (countries in the same continent) with data that extend at least 2 years before and 6 years after the event. The sample includes Finland, Germany, Netherlands, Norway, Sweden, and UK (1983-1991). The sample also includes Italy* (1997-2005), Sweden* (1994-2002), Greece (1995-2005), Austria, Belgium, Croatia, Czechia, Denmark, Finland, France, Germany, Hungary, Ireland, Luxembourg, Netherlands, Norway, Poland, Portugal, Slovak Republic, Slovenia, Spain, Switzerland, UK (1994-2005), and Chile* (2008-2016), Uruguay* (2011-2019), Bolivia (2008, 2010-2019), Ecuador (2009-2019), Argentina, Brazil, Colombia, Cuba, Dominican Republic, Panama, Paraguay (2008-2019). Points show estimated coefficients; Countries marked with an asterisk * changed policy nationally from opt-in to opt-out; error bars indicate 95% confidence intervals.*

A.4 Supplementary Tables

We conducted a more systematic replication and robustness assessment of the treatment-effect estimates reported in Abadie and Gay (2006) and in Johnson and Goldstein (2003). Our analysis began by reproducing their baseline results using comparable observation windows, shifting the temporal frame slightly (three years forward), and employing the identical set of countries used in the original studies along with a largely similar empirical specification. We then broadened the sample to include all countries with available data for the relevant time periods, and we evaluated the sensitivity of the estimates to minor specification changes, such as the inclusion of overall death rates as an additional control. The findings reported by Abadie and Gay (2006) prove largely robust across these exercises. The principal result in Johnson and Goldstein (2003) (page 1339)— significant at the 2 percent level—loses statistical significance at all conventional levels when the regression sample is expanded beyond the 17 countries chosen in the original study. Moreover, in a resampling exercise in which we repeatedly draw 17 countries at random from the full set of countries with available data (for $1,000$ times), the originally reported 2 percent significance level is recovered in only about one-quarter of replications, and significance at the 5 percent level appears in roughly one-third of them. Finally, while adding the death rate control (since the outcome variable is donation after death per population) leaves the Abadie and Gay (2006) findings essentially unchanged, it renders the Johnson and Goldstein (2003) estimate non-significant at all conventional levels.

Table V: The effect of presumed consent legislation on cadaveric organ donation (pooled OLS, 1994-2005)

	Dependent variable: Log cadaveric organ donors per million population										
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Presumed consent	0.161	0.106	0.285**	0.379***	0.250*	0.208	0.340***	0.271**	0.205	0.290**	0.238**
	(0.133)	(0.127)	(0.130)	(0.119)	(0.127)	(0.127)	(0.115)	(0.105)	(0.127)	(0.115)	(0.109)
Log GDP per capita			0.238*		0.289*	0.335**	0.264*	0.296***	0.353***	0.337**	0.345***
			(0.126)		(0.140)	(0.144)	(0.143)	(0.116)	(0.150)	(0.138)	(0.123)
Log of health expenditures per capita				0.161**							
				(0.070)							
Catholic country					0.199	0.221			0.196		
					(0.175)	(0.164)			(0.166)		
Common law					0.087	0.147	0.168	0.197	0.135	0.125	0.168
					(0.114)	(0.124)	(0.133)	(0.134)	(0.119)	(0.142)	(0.135)
Log of MVA and CVD deaths (per 1000 population)						0.245	0.176	0.292*			
						(0.175)	(0.202)	(0.167)			
Log of MVA deaths (per 1000 population)									0.098	0.219	0.169
									(0.217)	(0.206)	(0.203)
Log of CVD deaths (per 1000 population)									0.213	0.174	0.268*
									(0.156)	(0.163)	(0.135)
Include Spain	Yes	No	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	No
Num. Obs.	263	251	263	132	263	257	257	245	257	257	245
R^2	0.073	0.055	0.164	0.323	0.211	0.222	0.174	0.198	0.223	0.192	0.208

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

Note: This table reports OLS estimates of the effect of presumed consent legislation on cadaveric organ donation. The estimating equation is $Donation_{ct} = \alpha + \beta\,\mathrm{OptOut}_{ct} + \mathbf{X}'_{ct}\theta + \delta_t + \varepsilon_{ct}$, where $Donation_{ct}$ is the log of cadaveric organ donors per million population in country c and year t, OptOut_{ct} is an indicator for whether presumed consent is in effect, $\mathbf{X}_{ct}$ includes time-varying controls such as GDP per capita, health expenditures, mortality rate from motor vehicle accidents (MVA) and cerebro-vascular disease (CVD) and country-level characteristics (Catholic, Common law), and δ_t are year fixed effects. Standard errors are clustered at the country level.