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Obeying *vs*. resisting unfair laws.
A structural analysis of the internalization of collective preferences on redistribution using classification trees and random forests

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Abstract

In this paper, we study whether individual normative preferences are affected by the knowledge of collective normative preferences. In a questionnaire-experimental framework, we study whether respondents obey, resist or are indifferent to a very unfair but legal distribution of an inheritance between a minimum wage-earner and a millionaire. In addition to regressions, we use classification trees and random forests to provide a full picture of how asymmetric combinations of self-interest and ideological factors may lead to identical individual redistributive preferences and law internalization attitudes. We find that sensitivity to procedural fairness and responsibility cut opinions are good predictors of individual redistributive preferences. We also find that law internalization is associated with the support of core normative values, but not with the support of fairness as procedures. This echoes Cooter's hypothesis of 'meta preferences' triggering an expressive vs. backlash effects of laws. Lastly, we find that, among the law-sensitive, the social 'losers' tend to submit to the unfair but legal collective preference while the social 'winners' tend to either be indifferent of voice their disagreement.

Highlights

- Identical normative preferences are driven by asymmetric combinations of self-interest & ideology
- Responsibility cut opinions & proceduralism are key factors of redistributive preferences
- Knowing about collective preferences on redistribution affects individual normative preferences
- Backlash vs. expressive attitudes are triggered by higher-order normative values
- Decision trees and random forests are useful tools that complete regression results

Keywords: redistribution, law expressivity, self-interest, ideology, classification trees, random forests

JEL Codes: C45, C88, D63, H30, K10, Z13

1. Introduction

In a democratic framework, voting systems aggregate individual preferences on redistribution to generate collective social outcomes. These outcomes are not necessary unanimous (Meltzer and Richard, 1981; Piketty, 1995; Bénabou and Ok, 2001): instead, people have to conform to collective rules that may conflict with their own views of a fair redistribution.

The purpose of this article is to understand how people's normative preferences are affected by knowing about collective normative preferences. Do they internalize collective preferences, even if they are blatantly unfair from their point of view? Do they merely ignore them? Or does knowing about collective preferences cause a radicalization of their beliefs against the collective rule?

The aim of this paper is to provide empirical insights on whether people support of not the principle of political obligation by studying whether they do internalize collective social preferences or are, rather, either indifferent or defiant in the face of a conspicuously unfair Social Contract.

To do so, we rely on an original questionnaire-experimental survey where first year students enrolled in Economics and Law at the Paris Nanterre University were presented with a law that proposed a blatantly unfair redistribution of a 10,000 euro inheritance between a millionaire and a minimum-wage earner. The point was to record whether opinions on the fair distribution of the inheritance were affected by knowing about the law.

Our study is built on and contributes to 3 strands of the literature that, to our knowledge, have never been combined so far.

First, the economic analysis of law questions the expressive effects of legal norms on individual behaviour, showing that people are not only more willing to support laws that are consistent with their own private preferences, but also tend to align their morality with law (see, for example, Tyler, 2000; Cooter, 1998, 2000; Posner, 1998, 2000; McAdams, 1997, 2000; Licht, 2008; Bénabou and Tirole, 2012; Carbonara et al., 2012). Most of the expressive law and economics literature focuses on the behavioural effects of the internalization of the values conveyed in norms. Upstream from behaviours, our focus here is on the expressive vs. backlash effects of collective normative preferences on individual normative preferences.

> [H1]. The first intuition questioned in this paper is that, as postulated by Cooter (1998, 2000), core normative values or 'meta-preferences' are key factors of law internalization attitudes.

Second, we focus on a particular strand of normative preferences: preferences on redistribution. This framing was chosen because of its echo with actual economic public policies, because of the potentially stark tensions between individual and collective preferences, and because the flourishing literature on individual preferences on redistribution has highlighted, opposed to mere self-interest (income, origin, expected social trajectory…) the importance of ideological issues (position on the responsibility cut, political opinions…) as key factors of individual preferences (see, for example, Fong, 2001; Alesina and La Ferrara, 2005; Clark and D'Angelo, 2013; Costa-Fond and Cowell, 2015)

[H2]. The second intuition tested in the paper is that ideological opinions are at least as important as self-interest to understand individual normative attitudes.

Third, among the latter, drawing on the empirical social choice literature, we account for support of proceduralism vs. consequentialism, since converging evidence shows that people give intrinsic value to the support of procedural fairness, sometimes against their own self-interest (see, for example, Anand, 2001; Frohlich et al., 2004; Wailoo and Anand, 2005; Dolan et al, 2007; Cappelen et al., 2007; Shayo and Harel, 2012; Mertins et al., 2013; Ku and Salmon, 2013).

[H3]. The third intuition tested in the paper is that support of social justice as fair procedures vs. fair consequences is a key determinant of law expressivity attitudes.

This article also proposes a contribution from a methodological point of view.

In order to disentangle the complex interplay of self-interest and ideological variables, beside the classical regressions used in many studies, we rely on classification trees and random forests (Breiman et al., 1984, Breiman, 2001), recently introduced in the public economics literature by the seminal paper of Keely and Tan (2008). This methodology is particularly interesting because it gives insights on the 'structural mapping' of the respondents' normative preferences. To our knowledge, besides the founding paper of Keely and Tan (2008), it has never been used in the economics of redistribution literature, in law economics or in empirical social choice.

[H4]. The fourth intuition tested in this article is that identical normative preferences on redistribution and law internalization attitudes may be driven by starkly different combinations of variables. Beyond opposing the self-interest and ideological dimensions, normative preferences are the result of complex, asymmetric and path-dependent interactions between perceived personal perspectives and ideological factors.

This matter of whether political obligation exists or not (i.e. whether citizens should be morally bound to internalize and submit to legitimately produced social preferences) and whether civil disobedience is legitimate or not in the face of an illegitimate social organization has received widely diverse theoretical answers throughout History (see Dagger and Lefkowitz, 2014, and Brownlee, 2016, for a review).

In *Crito*, Plato exemplifies Socrates' compliance with his own sentencing to death to advocate that private persons should abide by their city's legal judgments, on pain of the city '*being turned upside down*' (Plato, 360 B.C.E).

Absolutists, following Hobbes, claim that in order to escape from a natural state where mankind is trapped in a war of all against all, citizens must engage in a one-sided Social Contract with an absolute ruler, who will guarantee their security in exchange to complete submission. As a result, individual preferences over social choices should not be allowed, since any discussion of the ruler's legitimacy on the grounds of one's own conscience would undermine the social contract and provoke a return of the state of nature (Hobbes, 1651).

By contrast, liberals, following Locke, advocate that people engage freely in the Social Contract and that their compliance with the general will is conditional to institutional safeguards such as the separation of powers and the majority rule. It follows that people have the right to legitimately rebel against treacherous rulers who, instead of ruling according to the collective, unbiased will, take sides or rule for their own benefit. In this framework, political obligation is relative and civil disobedience is a virtue: individual preferences on social choice should bow to legitimate but overrule illegitimate collective preferences (Locke, 1689).

A distinct answer is proposed by Rousseau, for whom the Social Contract should result from a direct, un-mediated union of all citizens who alienate their individual wills to a collective Sovereign. Since it relies on direct democracy and equal participation of all citizens, the Sovereign's choices can only pursue the common good and do necessarily focus on general, collective issues. For Rousseau, political obligation is absolute and individuals should internalize collective preferences: if one's beliefs about the common good differ from the Sovereign's, it is one's preferences that are necessarily mistaken and should be re-aligned on the collective preferences. Dissenters should be, if needed, '*forced to be free*' (Rousseau, 1762).

More recently, Rawls takes a more nuanced stance on political obligation. In Rawls' view, political obligation derives from a liberal principle of legitimacy, and is limited to a stable "*overlapping political consensus*" on the basic normative elements shared by free, equal and reasonable citizens who understand and respect the diversity of individual views on social choices (Rawls, 1993 [1971], p.137). There is no general political obligation to obey the law, except for, *noblesse oblige*, those who assume public office (Rawls, 1999, p.98). On the contrary, civil disobedience and conscientious refusal are illegal but necessary stabilizing devices in a constitutional system: "*By resisting injustice within the limits of fidelity to law, it serves to inhibit departures from justice and to correct them when they occur*" (Rawls, 1999, p.336).

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The article is organized as follows. Section 2 presents a synthesis of the main findings of the literature on (2.1) law internalization, (2.2) the debate of the relative importance of self-interest vs. ideology in individual redistributive preferences, and (2.3) support of proceduralism. Section 3 presents the survey and the empirical strategy, emphasizing the interest of classification trees and random forests as complements to regressions. Section 4 presents and discusses the results. Section 5 concludes.

2. Literature review

2.1. Law Internalization

Since Becker (1968), the law & economics literature traditionally holds that legal norms can affect behaviours via a system of incentives and sanctions, which deters individuals from engaging in illegal activities and encourages prosocial behaviours without affecting their values and personal preferences. Recent evidence has also shown that laws can also influence behaviours by affecting people's perceptions of what others will do: if the lawmakers' announcements are credible, the expression of a law will have an effect on people's behaviours (for recent experimental evidence of the signal effect of sanctions, see Galbiati et al., 2013).

Irrespectively of incentives and sanctions (Sunshine and Tyler, 2003), the expressive effects literature, rooted in social psychology (Tyler, 1990), claims that the law can trigger compliance through the internalization of the values it conveys (Sunstein, 1996; Cooter, 1998, 2000; Posner, 1998, 2000; McAdams, 1997, 2000; Licht, 2008[1]).

Cooter (1998) explains that the expressive effect of the law derives from two mutually enforcing mechanisms: citizens support laws that align with their own morality, and, conversely, people align their morality with new laws. In a dynamic setting, "(…) *a just state achieves stability by generating its own support among reflective citizens*" (Cooter, 1998, p.22). Of course, if the normative distance between the law and societal norms is too high, laws are confronted to 'sticky norms' which may lead to backlash, and not expressive, effects with people's view shifting *away* from the values embodied in the law. To be more efficient, the law should therefore provide 'gentle nudges' instead of 'hard shoves' (Kahan, 2000).

A particular feature of Cooter's framework is worth noting. Following Lancaster (1958), he postulates the existence of different levels of preferences, from the particular to the abstract higher order meta-preferences. He postulates that people can rationally accept to change a particular preference to align with the law if a 'Pareto-self-improvement' rule is respected, *i.e.* as long as their new preference is compatible with a higher level of preferences, which leaves the decision-maker better off with respect to their original preferences (Cooter, 2000, p.602). Hence, if Cooter's rule is true, citizens will be more likely to conform to the collective preference if both the law and their individual preference on redistribution are either aligned or can be related to a same common meta-preference. Conversely, agents will rationally refuse to abide by laws that they perceive as unfair, inasmuch as they clash with their particular or higher-order preferences.

A rapidly growing theoretical and empirical literature explores how taking into account expressive effects is relevant for the economic efficiency of law.

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1 See McAdams and Rasmusen (2007) for a survey.

Bénabou and Tirole (2012) model the complex interactions of individual preferences (values), social sanctions or rewards (norms) and incentives (laws) and explicit the trade-offs between the incentive and expressive effects of the law. Carbonara *et al*. (2012) also develop a theoretical framework to understand the dynamic effects of generating rules that do not reflect the values of the underlying population.

Empirically speaking, there is converging evidence of the expressive effects of a variety of legal norms (political regimes, laws, lab instructions) on behaviours, and on the trade-offs between incentive and expressive effects. Cadsby *et al*. (2006) show that tax evasion can be reduced by informing the players of a lab experiment of the compliance demanded by the experimental authority. By contrast, in a public good provision experiment, Tyran and Feld (2006) give evidence of expressive effects only if the law is perceived as legitimate, *i.e.* is self-imposed by the participants to the experiment. According to Alesina and Fuchs-Schündeln (2007), political regimes have an effect on people's preferences on redistribution, on market capitalism, and on public provision of social goods. Funk (2007) provides field results that show that, to promote electoral turnout, sanction-less laws targeting at a civic duty might have a bigger impact on behaviours than monetary incentives. Bowles (2008) shows that policies focused on incentives may trigger unwanted effects in moral citizens. Wittlin (2011) finds that seatbelt laws in the US have expressive effects, irrespectively of their deterrence components. She also provides evidence of geographical spillovers of these effects.

In an experimental setting, Kube and Traxler (2011) analyze the substitution effects of legal and social norms and show that an effective combination to enforce compliance in the provision of a public good is a mix of mild laws and strong social sanctions. Filippin et al. (2013) show that tax enforcement affects tax compliance through an effect on tax morale. Romaniuc (2016) shows that long-lasting group cooperation is increased when monetary incentives are inexpressive, i.e. framed in a way that minimizes exposing potential conflicts between people's normative expectations and the actual behaviour of others. By contrast, in a public good games experiment, Galbiati and Vertova (2014) show expressive effects of formal obligations on cooperative behaviours, incentives notwithstanding. Using lab experiments on tax avoidance and evasion, Blaufus et al. (2016) show that the qualification of tax minimization as illegal vs. legal has expressive effects on tax minimization. However, they also provide some mitigating evidence: if potential negative consequences are introduced, moral priming is necessary to find expressive effects.

On the factors that explain the relative amplitude of expressive vs. backlash effects, Costa and Kahn (2013) underline the role of group ideology. Kotsadam and Jakobsson (2011) put forward the social proximity to and visibility of the social problem addressed by the law while, in an experimental setting, Chen and Yeh (2014) show that the mildness of the law can affect its deterrence by changing perceptions of the prevalence of the behaviour targeted by the law. Blaufus et al. (2016) highlight the role of moral priming.

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In this article, we aim to provide empirical evidence on the expressive effects of laws, not on behaviours but, upstream, on normative preferences. To do so, we use an experimental-survey that relies on a vignette technique designed to collect the respondent's normative preferences. Also, in this framework Cooter's hypothesis on the importance of 'meta-values' may be particularly relevant. Our aim is to test its validity.

2.2. Self-interest, Ideology and Preferences on Redistribution

An extensive literature studies the determinants of individual preferences on redistribution (see Clark and d'Ambrosio, 2015, for a comprehensive review).

Self-interest (i.e. income and expected social mobility) is the first key determinant of individual redistributive preferences.

From a theoretical standpoint, the canonical model of Meltzer and Richard (1981) shows how income is inversely correlated with individual preferences for redistribution: all individuals whose income is lower than the income of the decisive voter (i.e. the voter with median income under a majority rule) should vote for more redistribution while the voters whose income is greater than the decisive voter should vote for less redistribution. Beyond income, the 'prospect of upward mobility' (POUM) hypothesis formalized by Bénabou and Ok (2001) echoes with the 'dynastic income mobility' model of Piketty (1995) and shows that the poor may rationally support low levels of redistribution if they expect favourable social positions in terms of future incomes.

Consistent empirical evidence supports the idea that present and expected social positions are good predictors of support for redistribution, as Ravallion and Lokshin (2000) first established on Russian data. Many papers using US, European, and international data find that those who are wealthy, not risk averse, who experienced an upward social mobility, and who believe their standard of living will improve are less likely to be favourable to redistribution. In addition, individual characteristics that inform on social positions are also consistently found to be significant determinants of redistributive preferences: younger individuals, less educated individuals, married individuals, individuals with children, women, and African Americans are generally more supportive of redistributive policies (Alesina and La Ferrara 2005; Keely and Tan, 2008; Alesina and Giuliano, 2010; Clark and D'Angelo, 2013; Guillaud, 2013; Pittau et al., 2016; Cojocaru, 2014).

Experimental economics works also show that self-interest is an important determinant of individual preferences for redistribution. For example, Rodriguez-Lara and Moreno-Garrido (2012) show in a dictator game framework that dictators do employ justice principles in self-serving ways and choose in each context the justice principle that maximizes their financial payoffs. Durante et al. (2014) find that, on 16 experimental sessions in each of which 21 subjects were confronted with an array of earnings mirroring the US pretax income distribution, self-interest stands out as the dominant motive of redistribution. Ubeda (2014) observes that in 20 one-shot distribution games, a slight and consistent majority of participants choose allocations that further their self-interest. Deffains et al. (2016) show evidence of a self-serving bias on the view on redistribution: under a veil of ignorance, subjects with a low productivity are more likely to redistribute from the rich to the poor than high-

productivity subjects, and also tend to have a stronger preference for egalitarianism (vs. the social-liberal system).

However, beyond self-interest, ideological beliefs and values are also important predictors of individual redistributive preferences.

Tyran and Sausgruber (2006) show how a refined theoretical definitions of individual rationality can to a theoretical understanding of selfless redistribution preferences.

In experimental economics, following Cappelen et al. (2010), Lefgren et al. (2016) show that beliefs on laziness matter, and that voters are willing to vote contrary to their self-interest in favour of groups that exert proportionately more effort. In an experimental game that nests a voluntary contributions mechanism in a broad spectrum of incentive schemes, Balafoutas et al. (2013) show that, besides self-interest, subjects' voting is influenced by egalitarian and equity concerns. Schildberg-Hörisch (2010) shows that under a veil of ignorance subjects choose more equal distributions, many of them because of an impartial social preference for equality.

Research in empirical economics confirms these results. For example, Fong (2001) finds in a seminal paper that controlling for political beliefs (being right-wing vs. left-wing) and beliefs on outcome determination overcomes the relative importance of income as a predictor of redistributive preferences. Pittau et al. (2016) also find that political opinions are key determinants: people who self-report rightist political views (being right-wing in Europe, being a Republican in the USA) are more adverse to redistribution that left-wing or Democrat people.

Above all, many papers show that attitudes relative to the responsibility cut issue (i.e., the extent to which one believes that people should be held accountable of their situation) are strong predictors of preferences for redistribution (for a survey, see Roemer and Trannoy, 2014). Fleurbaey (1995) explicitly develops a theory of fair redistribution that takes into account the responsibility of people in their situation: believing that success is determined by factors that are under one's control (such as effort or education) is associated with a preference for low levels of income redistribution, while believing that effort is not an important factor of success is associated with preferences for higher levels of redistribution.

Along this line, many empirical papers show that preferences for redistribution are correlated with opinions on the importance of effort and hard work on one's success and with the belief that the poor are lazy (Corneo and Gruner, 2002; Isaksson and Lindskog, 2009; Tóth and Keller, 2011; Luttens and Valford, 2012). Using a questionnaire experiment, Schokkaert and Devooght (2003) find similar results: respondents are found to be willing to compensate low-productive workers for differences in outcomes that they believe are beyond people's responsibility (effort, family, acquired skills, innate intelligence). In an experimental setting, Cappelen et al. (2010) show that participants hold people responsible for their choice of working time and productivity. On French data, Boarini and Le Clainche (2009) also find that social beliefs and interactions between reciprocity norms and beliefs in the causes of poverty are an important determinant of redistributive preferences.

Other ideological elements are also found to be key determinants of redistributive preferences.

For example, in Europe, religious people seem to prefer lower levels of redistribution than secular people (Pittau et al., 2016). Further, the nature of religious affiliation has a very limited influence on individual preferences for redistribution (Alesina and La Ferrara, 2005, on US data). Also exploring the relationship between religion and social preferences, Tan (2006) shows, using laboratory experimentation, that religiosity as a whole yields no significant influence on social preferences, because independent religiosity dimensions produce counterworking effects that cancel out.

Finally, identity issues also matter. Costa-Fond and Cowell (2015) underline the identity dimension of the endogeneity of social preferences: they intuit that when people fail to identify with members of a group, they might support a lesser redistribution and be less altruistic toward this group. In a related way, Pittau et al. (2016) find, after Finseraas (2009), that people who feel they belong to a group that is discriminated against tend to be more supportive of redistribution.

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In this article, we contribute the literature by exploring, classically, the relative importance of self-interest and ideological variables first on individual normative attitudes and also, originally, on the internalization of collective preferences on redistribution.

The literature often opposes ideological and self-interest variables. Our intuition is that normative preferences can better be understood by studying the interactions of these two dimensions. This is why we chose to grow classification trees and random forests for redistributive preferences and law internalization attitudes. Using these tools in complement to standard regressions is a way to disclosing the full extent of all the possible significant and asymmetric interactions between these two essential dimensions.

2.3. Proceduralism in Empirical Social Choice

Proceduralism (the belief that social justice stems from fair procedures and institutions above fair consequences) has received increased attention in economics.

Reflecting the Rawlsian notion of perfect procedural justice (Wailoo and Anand, 2005), procedural fairness has an instrumental role in leading to better outcomes. Anand (2001) lists five arguments for why procedural fairness matters from a consequentialist view: (1) when exclusive outcome-based solutions are not always available nor possible, (2) when uncertainty makes procedures easier to monitor and control than outcomes, (3) when fair processes are instrumental to reach efficient outcomes, (4) to prevent decision-makers from benefitting from information asymmetry and (5) when agency and fair treatment are components of people's utility.

Procedural fairness may also hold an intrinsic value, in line with the Rawlsian notion of pure procedural justice (Wailoo and Anand, 2005) and Sen's thoughts on procedures and agency as a valuable component of well-being (Sen, 1985, 1993, 2000).

In social psychology, since the seminal papers of Folger (1977) and Thibaut and Walker (1975, 1978), it is a well-established fact that people value procedural fairness for itself, independently of the outcomes of the procedure. Recently, Sondak and Tyler (2007) showed that the most important characteristic shaping the desirability of a number of allocation procedures, including markets, was the extent to which they are perceived to be fair. Sunshine and Tyler (2003) also showed that procedural justice had a key role in establishing the legitimacy of rules and in shaping public support for policing. In political science, Doherty and Wolak (2012) show that when a procedure is unambiguously fair or unfair, people are not biased in their evaluation of the fairness of procedures, and that the fairness of a procedure prevails over its outcome.

In economics, theoretic papers account for procedural preferences when modelling rational choice (White, 2004; Gaertner and Xu, 2004) or the preferences for redistribution (Krawczyk, 2011).

Building on the early contributions of Kahneman et al. (1986), Bies et al. (1993), Frey and Pommerehne (1993) and Frey et al. (1996), experimental economists show that judgments of procedural fairness do affect people's utility and behaviours. For example, Shayo and Harel (2012) propose an experiment to assess to what extent voters' preferences over actions are induced by their preferences over outcomes or by non-consequentialist motivations (concerns on the electoral process itself). They find that when the probability of being pivotal (i.e., of impacting outcomes) is lower, test subjects deviate from the selfish alternative toward the moral alternative. Mertins et al. (2013) find that respondents are willing to accept a harmful allocation decision if the decision-maker was selected by a procedure that they individually consider as 'fair' or 'right to use'. Following studies such as Konow (2000), Frohlich et al. (2004) and Cappelen et al. (2007), Ku and Salmon (2013) design an experiment where income inequalities are determined by different procedures (randomness, meritocracy, arbitrariness and the reward of an opportunistic behaviour), and show that compared to the situation where the initial allocation mechanism is random, disadvantaged players are more averse to inequality when the initial allocation mechanism is either meritocratic, or arbitrary or based on the reward of uncooperative behaviour.

In the empirical social choice literature (see Gaertner and Schokkaert, 2012, for a handbook), recent papers show that procedural issues are relevant in the formation of social choice preferences. Even if most people's conceptions of social justice are consistent with consequentialist visions of social justice (Johansson-Stenman, 2012), Wailoo and Anand (2005) and Dolan et al. (2007) show that people also display a procedural vision of social justice. Further, Anand (2001) argues that while fair procedures might be important to people for consequentialist reasons, they also matter because of intrinsic values such as respect and agency. "[S]imply put, some people are willing to impose a cost – both on self and others – to resist procedures that they deem to be biased against them" (Bolton et al., 2005).

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In this article, we are interested in knowing whether believing in social justice as fair procedures and institutions is a relevant factor of the internalization of collective preferences. If not, it would mean

that the actual values conveyed by the law are more important than any a priori support of the law per se.

3. Questionnaire and Empirical Strategy

3.1. The survey and the data

3.1.1. The Survey

Information on redistributive preferences is collected using a questionnaire experimental methodology commonly used in Empirical Social Choice[2].

The questionnaire consists in a series of short and simple 'vignettes' that depict social justice dilemmas. The point is, straightforwardly, to collect the respondents' "judgments of justice" (Yaari and Bar-Hillel, 1984) on abstract dilemmas, i.e. their beliefs on what ought to be done for a given situation to be just. By asking respondents their preferred solution to each dilemma, the objective is to elicit their normative framework, i.e. their support to alternative abstract social justice principles with as little cognitive effort as possible. This 'vignette' methodology is relevant when, as it is the case here, 1) explicitly asking the respondents to choose between fully and precisely phrased normative concepts would be too time-consuming and cognitively tiresome for them and 2) the aim is to collect stated preferences and not to study behaviours.

In October, 2014, a total of 719 freshmen students of the University of Paris Nanterre took part in the survey. Student surveys are very common in the Empirical Social Choice literature. Very few studies in Empirical Social Choice rely on surveys of representative samples of the population, with notable exceptions such as Lindholm et al. (1997), Anand and Wailoo (2000) and Johansson-Stenman (2012). In this survey 255 of the respondents were enrolled in Economics and 506 were enrolled in Law. Participation was voluntary and there was no show-up fee paid. The anonymous paper surveys were distributed in controlled sessions during magisterial lectures. The total time for completing the questionnaire (instructions included) varied between 35 and 45 minutes, due to differences on class sizes.

483 students (67.2% of all respondents) provided information on all the variables of interest described below. Among them, 174 were enrolled in economics (68.2% of the economists in the raw sample) and 309 were enrolled in law studies (66.6% of the law students of the raw sample).

2 See Gaertner and Schokkaert (2012) for a handbook on Empirical Social Choice, complete with a methodological discussion of the vignette technique.

3.1.2. Variables and descriptive statistics

The survey was designed to collect information on individual redistributive preferences, self-interest, ideological opinions, and support of proceduralism (see Appendix 1 for the precise phrasing of each survey question).

(1) The individual redistributive preferences of the respondent (variable REDISTRIBUTION) are collected asking about how a 10.000 euros inheritance should be shared between two heirs who are respectively a millionaire and a minimum-wage earner (see Table 1). The use of an 'inheritance' framing is classical in Empirical Social Choice since Yaari and Bar-Hillel's seminal paper (1984).

The aim of this article is not focused on the responsibility cut issue. We therefore explicitly state that both heirs are identical in all possible meaningful ways: age, personality, talent, effort, preferences and merit. To diffuse as much as possible any interpretation of the relative poverty of the poorer heir as being due to his laziness, we explicitly present him as a worker who earns the minimum wage. The point is to know if respondents support the principle of a compensation of the less-advantaged heir (giving a greater share of the inheritance to the poor heir, REDISTRIBUTION = COMPENSATION, 49.5% of the sample) or believe in the general principle of an equal treatment of identical respondents (therefore giving an equal share of the inheritance to both heirs, REDISTRIBUTION = EQUAL, 50.5% of the sample).

The respondents were then informed that the law (reflecting the collective, legitimate preferences) provides that the millionaire receive 99% of the inheritance. We then asked the respondents again about their opinion on how the inheritance should be shared between the heirs. The point was to see whether respondents internalize collective preferences (variable LAW INTERNALIZATION) by either reducing (LAW INTERNALIZATION = COMPLIANT, 25.4% of the sample) or raising (LAW INTERNALIZATION = DEFIANT, 16.7% of the sample) the amount they previously chose to give to the poorer heir, or whether they are indifferent to collective preferences and do not modify their initial choice (LAW INTERNALIZATION = INDIFFERENT, 58.0% of the sample). We presented the respondents with an outrageously unfair redistributive rule that was sure to clash with both the compensation and the equal distribution principles. By doing so, the objective was to magnify their reaction to a collective preference that conflicted with their individual preference on redistribution.

Variables	Description	Categories	Statistics
Redistribution	In the 'Inheritance' vignette, whether the respondent believes that it is fair or not to give a greater share of the inheritance to the poorer heir.	Equal distribution Compensation	209 (50.5%) 205 (49.5%)
Law internalization	In the 'Inheritance' vignette, whether after knowing about the unfair redistribution stated by the law, the respondent believes that she should give more to the poorer heir (defiance), less to the poorer heir (compliance) or does not change her opinion on how the inheritance should he shared (indifference).	Compliant Indifferent Defiant	105 (25.4%) 240 (58.0%) 69 (16.7%)

Table 1. Descriptive statistics for the variables of interest.

We also collected information on the main determinants of redistributive preferences discussed in the literature: self-interest, ideological beliefs, valorisation of procedural fairness, and some additional socio-demographic characteristics.

(2) Self-interest was measured in several ways (see Table 2 for descriptive statistics). First, we focused on the declared current income of the respondent's household (variable INCOME). The University Paris Nanterre's catchment area encompasses some of the wealthiest areas of Western Paris as well as classically under-privileged suburbs. We asked the respondents if they believed that their family was among the top 33% richest families in France (INCOME = RICH, 29.2% of the sample) or not (INCOME = NOT RICH, 70.8% of the sample). To measure self-interest with respect to the redistributive vignette described above, we focused on the 'rich' end of the income spectrum in order to know which respondents would identify more with the millionaire heir in the inheritance vignette.

Variables	Description	Categories	Statistics
Origin	Both parents of French nationality or not	French	281 (67.9%)
		Foreign	133 (32.1%)
Income	Whether the respondent believes that her family belongs to the top third of the richest families or not	Yes = rich	121 (29.2%)
		No = not rich	293 (70.8%)
Risk aversion	In the 'Box' vignette, whether the respondent will need a greater amount than the median to be placed in the riskier box to choose it	Yes = high	90 (21.7%)
		No = not high	324 (78.3%)
Optimism	Whether in 10 years' time the respondent believes she will earn a top third income or not	Yes = high	172 (41.5%)
		No = not high	242 (58.5%)
Effort	Whether the respondent believes that less than half of her fellow students provides more effort than her in her studies or not	Yes = high	199 (48.1%)
		No = not high	215 (51.9%)

Table 2. Descriptive statistics for the self-interest variables

Second, the literature also suggests that belonging to a minority or a group that is discriminated against affects people's redistributive preferences. We therefore also collected information on the origin of the respondents (variable ORIGIN) in the form of the nationality of their parents, and differentiated the respondents with at least one parent with a foreign nationality (origin = FOREIGN, 32.1% of the sample) and the respondents whose two parents are French (ORIGIN = FRENCH, 67.9% of the sample).

Beyond current self-interest, we also collected data on the respondents' optimism, risk aversion and declared effort in order to depict their expected trajectories. The variable OPTIMISM is built by asking

the respondents about their expected income in 10 years' time. Optimistic respondents (OPTIMISM = HIGH, 41.5% of the sample) believed that they would be among the top 33% income earners.

The variable RISK AVERSION is constructed by asking the respondents to imagine that they took part in a game where they were asked to choose between two boxes A and B. They knew there are 100 euros in Box A, and that there was a 50 % chance that Box B was empty, and a 50% chance that it contained X euros. They were asked about the minimum amount X that would have encouraged them to choose Box B. Respondents whose amount was lower than the median amount (i.e., 200 euros) were tagged to have low risk-aversion (RISK AVERSION = NOT HIGH, 78.3% of the sample) while those who chose an amount equal or superior to 200 euros were tagged to be highly risk adverse (RISK AVERSION = HIGH, 21.7% of the sample).

The variable EFFORT was recorded by asking the respondents how many of their peers produced more effort than them in their studies. The variable EFFORT was coded NOT HIGH (51.9% of the sample) for the respondents who answered that about 50% or more of their peers were more effortful than them and HIGH (48.1% of the sample) for the respondents who answered that they produced more effort than half of their peers.

(3) Ideological opinions encompassed political and religious beliefs, support of equality vs. freedom, and the position of the respondent on the responsibility issue (see Table 3 for descriptive statistics).

Variables	Description	Categories	Statistics
Belief	Whether the respondent discloses being religious (whatever her degree of practice) or not	Yes = religion No = no religion	231 (55.8%) 183 (44.2%)
Political opinion	Preference between left and right	Right Left	254 (61.4%) 160 (38.6%)
Effort matters	In the 'Gold Rush' vignette, whether the respondents believes that it is fair or not to give less to the less productive worker after knowing that his low productivity is due to his being lazy	Punish lazy Neutral	227 (54.8%) 187 (45.2%)

Table 3. Descriptive statistics for the ideological variables

To know about the political affiliation of the respondents (variable POLITICAL), we asked if they were left- or right-wing (POLITICAL = LEFT, 38.6% of the sample, and POLITICAL = RIGHT, 61.4% of the sample).

The variable religious belief distinguished between the respondents who were atheist or agnostic (BELIEF = NO RELIGION, 44.2% of the sample) and the respondents who had a religious belief (BELIEF = RELIGION, 55.8% of the sample).

The position of the respondents in the responsibility issue was coded by the EFFORT MATTERS variable. To build this variable, we presented the respondents with a vignette where they were asked to share the joint production of two Gold Rush miners who displayed unequal productivity levels. In a first framing the respondents were not provided with any information on the causes of the inequality in

productivities while in a second framing they were informed that the low-productivity miner did not want to tire himself working on the mine. Respondents who decreased the share of the joint production given to the low-productivity worker in the 'laziness' setting were coded as believing that effort matters and that laziness should be punished (EFFORT MATTERS = PUNISH, 54.8% of the sample) while respondents who did not change their initial repartition were coded to be neutral on the responsibility issue (EFFORT MATTERS = NEUTRAL, 45.2% of the sample).

(4) Procedural fairness was assessed by focusing on support of proceduralism as a general justice principle (variable PROCEDURALISM).

Variable	Description	Categories	Statistics
Proceduralism	Preference between a procedural and a consequentialist society in the 'Countries' vignette	Procedural	231 (55.8%)
		Consequentialist	183 (44.2%)

Table 4. Descriptive statistics for the proceduralism variable

Our intuition was that proceduralism may play a role in the internalization of law, as more procedural individuals may be expected to be more willing to internalize collective preferences that are endorsed in law (legitimate rules) than less procedural people. An immediate, simple way of knowing if proceduralism is supported notwithstanding potential consequentialist outcomes was to ask respondents to explicitly choose between a procedural country, "*where the rules that define how society is organized are fair, but they do not necessarily lead to a fair distribution of wealth and income among the citizens*", and a consequentialist country, "*where wealth and income are fairly distributed among the citizens, but the rules that define how society is organized are not necessarily fair*". The alternative was represented using a 6-tick scale (ticks 1 to 3 for proceduralism, ticks 4 to 6 for consequentialism).

(5) Additional socio-demographic questions (see Table 5 for descriptive statistics) provided information on the gender the respondents primarily identify with (variable GENDER, coded MALE or FEMALE) as well as their University major (variable SUBJECT, coded LAW or ECONOMICS).

Variables	Description	Categories	Statistics
Subject	Major of the respondent	Economics	151 (38.9%)
		Law	237 (61.1%)
Gender	Gender of the respondent	Male	139 (33.6%)
		Female	275 (66.5%)
Altruism	In the 'Ten Dollar Game' vignette, whether the respondents gives less than the median of the respondents to a fictitious counterpart in a dictator game	Yes = low	203 (49.0%)
		No = not low	211 (51.0%)

Table 5. Descriptive statistics for the additional socio-demographic variables

We also built a proxy for the respondents' altruistic tendencies (variable ALTRUISM) by presenting them with dictator gave against a fictitious counterpart, where they were asked to imagine that they were anonymously taking part in a game. In the game, they were given 10 euros and were asked how much of this amount they were willing to give to another anonymous player. Respondents who gave more than the median of the sample were classified as altruistic (ALTRUISM = HIGH, 51.0% of the sample) while those who gave the median amount or less were coded as not altruistic (ALTRUISM = LOW, 49.0% of the sample).

3.1.3. Sample selection

From the raw dataset of the 483 students who completed all the survey questions, we dropped 13 respondents who deliberately refused to choose between proceduralism and consequentialism (variable PROCEDURALISM) by ticking between ticks 3 and 4 on the form. Albeit such an opinion is very interesting, they form a too small category to provide tractable input in the statistical analysis.

In the same manner, we also dropped 24 respondents who refused to choose between right and left-wing political opinions (variable POLITICAL). The survey was conducted in 2014, when the right-wing / left-wing division was still a major structuring element of the French political field. We chose to exclude the respondents who ticked between left and right because we have no way of knowing whether they adhered to a philosophy close to Ms Le Pen's, whose motto at the time was '*Neither right nor left, we are National*' or to a centrist conception of politics, embodied at the time by M. Bayrou (who stepped aside in favour of M. Macron in the recent presidential election).

We also dropped 9 respondents who chose to give more to the richer heir in the INHERITANCE variable, since we have no way of knowing whether this choice was due to poor attention to the survey of resulted from a deliberate normative preference. For the same reasons, we decided to drop 19 respondents who decided to reward the lazy worker in the EFFORT MATTERS variable.

Lastly, coding errors in the variables BELIEF and GENDER resulted in dropping respectively 1 and 5 respondents.

As a result, our final database consists of 414 final respondents (57.6% of the 719 raw respondents). Along the final respondents, 155 (37.4%) were enrolled in economics and 259 (62.6%) in law.

Alternative samples reversing the above selection choices were also built for robustness checks purposes (see Appendix 3). Alternative results are presented in Appendix 4.

3.2. Empirical Strategy

In the article, we use two complementary empirical methodologies: (3.2.1.) regressions and (3.2.2.) classification trees and random forests.

3.2.1. Regressions

We start, classically, by using logit regressions to understand how the main factors discussed in the article are associated with the normative preferences of the respondents in their individual redistributive preferences and internalization of collective preferences.

Individual redistributive preferences

To understand which factors are significantly associated with individual redistributive preferences, we run a binomial logistic regression on the variable REDISTRIBUTION.

$$\text{redistribution}_i = \begin{cases} 1 \text{ for equal distribution} \\ 0 \text{ for compensation} \end{cases} \quad (1)$$

The binomial logit model is:

$$ln\frac{p(1|X_i)}{p(0|X_i)} = Z_i = \beta_0 + \sum_{k=1}^{7}\beta_k \,\text{Self interest}_{ik} + \sum_{k=8}^{14}\beta_k \,\text{Trajectories}_{ik} + \sum_{k=15}^{19}\beta_k \,\text{Ideology}_{ik} \quad (2)$$

with $p(1|X_i)$the probability that a respondent with a vector of characteristics X_i chooses equal distribution over compensation.

and Self interest_i, $\text{Trajectories}_i$and $\text{Ideology}_i$are respectively vectors of 7 socio-economic variables, 7 trajectory variables, and 5 ideological variables.

$$\text{Self interest}_i = (\text{gender}_i, \text{subject}_i, \text{income}_i, \text{origin}_i, \text{effort}_i, \text{optimism}_i, \text{risk aversion}_i) \quad (3)$$

$$\text{Trajectories}_i = \begin{pmatrix} \text{income} \times \text{effort}_i, \text{income} \times \text{optimism}_i, \text{income} \times \text{riskaversion}_i, \\ \text{origin} \times \text{effort}_i, \text{origin} \times \text{optimism}_i, \text{origin} \times \text{riskaversion}_i, \\ \text{income} \times \text{origin}_i, \text{optimism} \times \text{effort}_i \end{pmatrix} \quad (4)$$

$$\text{Ideology}_i = (\text{efformatters}_i, \text{religion}_i, \text{freequal}_i, \text{political}_i, \text{proceduralism}_i) \quad (5)$$

Trajectories are appreciated, following Fong (2001), through the interaction of the two main social position identifiers (income and origin) and the variables optimism, risk aversion and effort.

To perform the regression, we use the R function (glm) of the package {stat}. Results are presented in Table 6.

Internalization of collective preferences

To understand which factors are significantly associated with law internalization attitudes, we run a multinomial logistic on the variable LAW INTERNALIZATION, which has three categories: compliance, defiance, and indifference.

$$\text{law internalization}_i = \begin{cases} 0 \text{ for compliance} \\ 1 \text{ for defiance} \\ 2 \text{ for indifference} \end{cases} \quad (6)$$

Setting 'compliance' as the reference category, the log odds of choosing 'defiance' over 'compliance' and 'indifference' over 'compliance' are:

$$ln\frac{p(\text{defiance}|X_i)}{p(\text{compliance}|X_i)} = ln\frac{p(1|X_i)}{p(0|X_i)} = W_{\text{defiance},i} \quad (7)$$

$$ln\frac{p(\text{indifference}|X_i)}{p(\text{compliance}|X_i)} = ln\frac{p(2|X_i)}{p(0|X_i)} = W_{\text{indifference},i} \quad (8)$$

We are also interested in comparing the odds of choosing 'defiance' over 'indifference'.

Setting 'defiance' as the reference category, the log odds of choosing 'indifference' over 'defiance' is:

$$ln\frac{p(\text{indifference}|X_i)}{p(\text{defiance}|X_i)} = ln\frac{p(2|X_i)}{p(1|X_i)} = W_{\text{indifference},i} \quad (9)$$

The explanatory variables are the same as before, except that the variable redistribution is included as an additional ideological variable.

For category $m = (\text{compliance,defiance,indifference})$, we have

$$W_{mi} = \beta_{m0} + \sum_{k=1}^{7}\beta_{mk}\,\text{Self interest}_{ik} + \sum_{k=8}^{14}\beta_{mk}\,\text{Trajectories}_{ik} + \sum_{k=15}^{20}\beta_{mk}\,\text{Ideology new}_{ik} \quad (10)$$

with

$$\text{Self interest}_i = (\text{gender}_i, \text{subject}_i, \text{income}_i, \text{origin}_i, \text{effort}_i, \text{optimism}_i, \text{risk aversion}_i) \quad (11)$$

$$\text{Trajectories}_i = \begin{pmatrix} \text{income} \times \text{effort}_i, \text{income} \times \text{optimism}_i, \text{income} \times \text{riskaversion}_i, \\ \text{origin} \times \text{effort}_i, \text{origin} \times \text{optimism}_i, \text{origin} \times \text{riskaversion}_i, \\ \text{income} \times \text{origin}_i, \text{optimism} \times \text{effort}_i \end{pmatrix} \quad (12)$$

$$\text{Ideology new}_i = \begin{pmatrix} \text{efformatters}_i, \text{religion}_i, \text{freequal}_i, \text{proceduralism}_i, \\ \text{political}_i, redistribution_i \end{pmatrix} \quad (13)$$

To perform the regression, we use the R (vglm) function of the package {VGAM} (Yee, 2010).

Results are presented in Table 7.

3.2.2. Classification Trees and Random Forests

To depict the full structure of the combinations of self-interest and ideological variables that lead to redistributive preferences and attitudes on law internalization we also use classification trees and random forests[3].

In doing so, we follow the seminal paper of Keely and Tan (2008), who for the first time introduced this methodology in empirical public economics, by applying the CART methodology on several General Social Survey questions, with a large set of control variables (age, race, gender, initial birth place, religious upbringing, and socio-demographic background).

Classification Trees

Classification (for categorical response variables) and regression (for continuous response variables) trees (CART®, Breiman et al., 1984) are non-parametric classification techniques. They rely on nonlinear learning algorithms that recursively partition the subset of respondents until they are fully classified into sub-groups (called 'leaves') who are determined by their choice of a category of the response variable (selection distribution vs. compensation for the variable redistribution; of compliance vs. indifference vs. defiance for the variable law internalization).

This procedure has two main steps. First, the partition algorithm starts with a root node that contains all the respondents.

It then searches for the variable that allows the best partition of the respondents into sub-groups that are as statistically 'pure' as possible in terms of the response variable categories. For variables that are continuous or have more than two categories, it also compares the performance of all its values and categories, for each variable. The splitter variable determines a node of the tree and the subsequent sub-groups characterize branches of the tree.

For any given variable, let $p(i|t)$be the fraction of respondents belonging to category i at a given node t. If for example, the variable has two categories, the distribution of the categories at any node of the tree can be written as $\big(p(i|0), p(i|1)\big)$, where $p(i|1) = 1 - p(i|0)$.

In this case, a node with class distributions $(0,1)$ has zero impurity, since 0% of the respondents associated with category i are found in the first branch that stems from the node, while they represent 100% of the population of the second branch. By contrast, a node with class distribution $(0.5,0.5)$ has maximum impurity, since the groups at each side of the node (in each child branch) regroup exaclty 50% of the respondents associated with category i.

3 See Tan et al. (2006) and Therneau et al. (2017) for a detailed presentation of the algorithm. In this non-technical presentation, we borrow their notations and explanations.

The CART algorithm implemented in {rpart} uses the generalized Gini index to measure the purity split allowed by all possible splitter variables. It selects the variable that maximizes the following index[4]:

$Gini(t) = 1 - \sum_{i=0}^{c-1}[p(i|t)]^2$ where c is the number of categories. (14)

Once the first splitter is selected, a first partition of the subset is created. Each of the two child groups ('branches' of the tree) are composed by groups of respondents with alternative categories for the splitter. For example, if the variable SUBJECT was the first splitter, the two branches would be constituted respectively by the sub-sample of students enrolled in Economics and the sub-sample of students enrolled in Law.

For each of the child branches, the algorithm then searches again for the next best splitting variable, and continues to do so separately for all subsequent child branches. At the end of the procedure, all respondents are assigned to a 'leave' of the tree. Leaves come in different 'colours' which correspond to the single categories of the response variable.

The branches of the tree that lead to the leaves therefore provide a structural pattern of how complex and potentially asymmetric interactions between variables lead to different outcomes in terms of the response variables. This is a very interesting feature since it provides, in a different way from regressions, a detailed perception of the data-driven, not necessary linear interactions between variables.

Since the resulting tree may be too large, with at an extreme all respondents distributed in single-person leaves, a cross-validation procedure is then most often implemented to select the optimal number of nodes and produce a pruned, 'reasonable' tree. Too large trees perfectly partition the subset but are difficult to interpret and may be prone to subset-dependence. Too small trees are easier to interpret in terms of structure but their leaves are less pure and may misrepresent the actual complexity of the interactions between the variables.

The second step of the procedure is therefore to choose a method for pruning the tree. Typically, this is done using a complexity parameter, which provides information on the trade-off between the 'cost' of pruning a child branch in terms of the probability of misclassifying a respondent (assigning her to a leaf associated with the wrong category of the response variable) and the gain in terms of size of the tree.

In this article, we use the (rpart) function of R package {rpart} (Therneau et al., 2017) to grow classification trees for the variables redistribution and law internalization. The resulting trees are presented in Figures 1 and 3 below. A discussion of the pruning decisions is presented in Appendix 2 (see also Therneau et al., 2017, for a technical presentation).

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4 Breiman et al. (1984) show that this index typically performs best, but other inequality indicators such as entropy measures could also be used.

The procedure can be followed by a third, predictive step, where the tree structure is used to predict the response variable category of a new individual for whom we know the vector of split variables. This explains why this technique is commonly used in biology and as a tool to help medical diagnostics. Indeed, in their seminal contribution, Breiman et al. (1984) used data on the survival rates of cardio-pulmonary reanimation of victims with heterogeneous characteristics (age, weight, gender, prior medical history) to show how trees could be used by first responders to treat more efficiently the victims of cardiac arrest.

In this article, our purpose is not predictive; we are interested in knowing about the normative preferences of our respondents. Another use of the predictive step is often to perform a robustness check of the tree, by 'training' it on a random sub-sample and monitoring how well it predicts the actual response variable of the rest of the sample. Here, the size of our sample (414 respondents) is too small to be used in this way.

To provide a robustness check of our trees, we therefore use another technique: the random forest procedure (Breiman, 2001).

Random Forests

Random forests are adaptive classification techniques which uses bootstrap aggregation ("bagging") to grow a great number of trees from randomly selected sub-samples of the full subset of respondents (see Breiman, 2001, and Strobl, et al., 2008, for more details).

For each tree in the forest, a measurement of the structural importance of each variable is recorded (the higher the variable in the tree, the more important the variable). The output of a forest is not an interpretable tree diagram, but an aggregated importance indicator which pools the information on the importance of each variable across all the trees of the forest.

In the article, we use using the (cforest) function of the R package {party} to grow random forests for the variables redistribution and law internalization. We chose this algorithm because of the reliance on unbiased trees and the availability of last-generation conditional importance indicators. The results presented in the article were computed for forests from 500 up to 5000 unbiased trees using the conditional importance indicator of Strobl, Hothorn and Zelieis (see Hothorn et al., 2006 and Strobl et al., 2007, 2008, 2009 for the details of the random forest algorithm and a technical presentation of the conditional importance indicator). Results are presented in Figures 2 and 4 below.

*

Classification trees and random forests have very interesting features that make them, in our opinion, a useful complement of more classical regression techniques.

First, classification trees provide a 'structural' and visual image of how asymmetric conjunctions of variables create paths that lead to identical categories of the response variable. Classification trees consider all possible interactions and are not concerned by non-linearities or heterogeneities among

some groups of respondents. By contrast, in regression techniques, interaction terms must be decided a priori and are in general limited to interactions between pairs of variables. By using classification trees, we are able to provide new hindsights on the traditional opposition of self-interest and ideological variables. The point is to understand how complex interactions between these dimensions can lead to distinct normative preferences (intuition [H4]) and to provide a vision of the relative structural importance of ideological vs. self-interest variables (intuition [H2]).

Regression coefficients, odds-ratios and marginal effects give information on the relative strength of the association between the dependent and explanatory variables. In a same way, classification trees also give information on the relative importance of the splitter variables: the closer to the root in the tree, the more crucial the factor in the 'mapping' of the normative preferences of the respondents. Using random forest conditional importance indicators offer a better estimation[5] of this 'structural importance' of the variables. We use this methodology as a manner of robustness check of structure unveiled by the classification trees.

Using random forests has a second purpose in the article since, following Cooter's hypothesis of 'meta preferences' triggering law internalization (Cooter 1998, 2000), we want to know which kind of variables can be identified as playing the role of structural 'meta factors' [intuition H1]. Conditional importance indicators can help identify the variables that feature in very 'high' positions in most trees of the forests, and that could be interpreted as 'meta-values' that overshadow other determinants.

4. Results and Discussion

We first identify the main predictors of individual preferences on redistribution and shed, using the decision tree methodology, some further light on the interplay of ideological and self-interest variables (section 4.1.). We then study the internalization of collective preferences on redistribution and find some evidence in support of the importance, beyond self-interest and ideological issues, of the alignment of the law and core normative 'meta-values' (section 4.2.).

4.1. What Drives Individual Preferences on Redistribution?

We find no clear-cut consensus on whether it is fair or not to compensate monetary inequalities between identical persons: almost half of the respondents support an equal treatment of the rich and the poor heirs (*** respondents; ***% of the sample) while the other half prefers the compensation of the poorer heir (*** respondents; ***% of the sample).

5 In this regard, our objectives are different from Keely and Tan's. Since their purpose was to compare the usefulness of the trees and forest methodology across multiple redistributive interest variables, their focus was more on the random forest conditional importance indicators and less on the individual decision trees. Since we are interested in structural patterns on a single subset, we focus more on the trees and use the forests as a robustness check methodology.

First, we run a classical regression to study the factors that are significantly associated with either compensation or equal redistribution (see Table 6 below for results)[6].

In line with the literature (Fong, 2001), we find that self-interest is a very poor predictor of redistributive beliefs. When controlling for other self-interest and ideological variables, neither INCOME nor ORIGIN are significantly associated with redistributive preferences.

Trajectory variables, represented in the regression by the interaction of INCOME, ORIGIN and EFFORT, OPTIMISM, and RISK AVERSION are not significant either.

By contrast, ideological variables are significant. As expected and consistently with the literature, we find that respondents who do not believe that effort should be taken into account in distributive issues (EFFORT MATTERS = NEUTRAL) tend to prefer the compensation of the poorer heir, while those who are sensitive to effort prefer an equal distribution of the inheritance between the heirs. A straightforward interpretation is that desert and incentives are key issues in the determination of redistributive preferences, and that those who are the most sensitive to this issues are more likely to refuse redistribution on principle.

We also find, following Fong (2001), that political opinions (variable POLITICAL) are significantly associated with redistributive preferences, right-wing respondents being more likely to prefer an equal distribution of the inheritance over the compensation of the poorer heir than left-wing respondents. This result makes sense since sensitivity to economical inequalities is one of the main structuring factors of the left- vs. right-wing political ideologies.

Contrary to Pittau et al. (2016) and following Tan (2006), we also find that religious opinions are not significantly associated with redistributive preferences (variable BELIEF).

Last, we find that support of PROCEDURALISM is significantly associated with an equal treatment of the heirs, while the CONSEQUENTIALISTS tend to favour the compensation of the poorer heir. It seems logical for those who focus on actual consequences to disregard the principle of an a priori equal treatment of unequal individuals, and choose to act in a way that will affect their actual situations. Conversely, it seems natural for procedural respondents to feel that the abstract, general principle of the identical treatment of identical persons should be enforced even in the face of extremely different economic circumstances[7].

*

[6] Robustness checks are presented in Appendix 4. Unless explicitly stated, the results presented here are robust across all alternative samples.

[7] This results is not fully robust across all alternative samples. The variable 'proceduralism' is not significant for alternative samples where respondents who refused to choose between right- and left-wing political opinions (variable political) are either assigned a random political opinion or kept as a distinct category, or for the sample where respondents who decided to reward the lazy in the 'Gold Rush' vignette (variable 'effort matters') are kept as a distinct category (see Appendix 4 for robustness checks).

	Odds-ratio	Coefficient (Std.)	P-value
(Intercept)	0.598	-0.513 (0.413)	0.214
Gender (ref = male)	1.235	0.211 (0.235)	0.369
Subject (ref = economics)	0.710	-0.343 (0.226)	0.129
Income (ref = rich)	0.976	-0.024 (0.468)	0.959
Origin (ref = both parents French)	0.856	-0.155 (0.565)	0.783
Optimism (ref = high)	1.651	0.502 (0.461)	0.277
Effort (ref = high)	0.970	-0.03 (0.437)	0.944
Effort matters (ref = neutral)	1.485	0.396* (0.215)	0.065
Risk aversion (ref = not high)	0.643	-0.442 (0.463)	0.340
Altruism (ref = low)	0.811	-0.209 (0.219)	0.340
Belief (ref = religion)	0.815	-0.205 (0.216)	0.342
Political opinion (ref = right-wing)	1.616	0.48** (0.226)	0.034
Proceduralism (ref = procedural)	1.455	0.375* (0.217)	0.084
Income X effort	1.639	0.494 (0.498)	0.321
Income X optimism	0.912	-0.092 (0.504)	0.855
Income X risk aversion	0.691	-0.37 (0.562)	0.511
Income X origin	1.524	0.421 (0.624)	0.500
Origin X effort	0.499	-0.695 (0.469)	0.138
Origin X optimism	1.472	0.387 (0.501)	0.440
Origin X risk aversion	2.332	0.847 (0.567)	0.135
Optimism X effort	0.663	-0.411 (0.45)	0.361

*** p-value < 0.01, ** p-value < 0.05, * p-value < 0.1. Number of observations = 414. AIC = 577.618. Mc Fadden R2 (p-value) = 0.0667. Hosmer-Lemeshow (p-value) = 0.3817. Computed using function (glm) of R package {stat}.

Table 6. Binomial logit regression of self-interest, ideological an trajectory variables on redistributive preferences (reference = equal distribution)

To further disentangle possible complex interplay between ideological, trajectory and self-interest variables, we grow the decision tree and associated random forest for the REDISTRIBUTION variable (see Figure 1 below).

A first notable result is that, in line with the literature (Fong, 2001), political opinions appear to be a key classifier for the respondents' redistributive preferences: the POLITICAL variable is the highest classifier in the classification tree and also has the higher random forest conditional importance indicator[8] (see Figure 2).

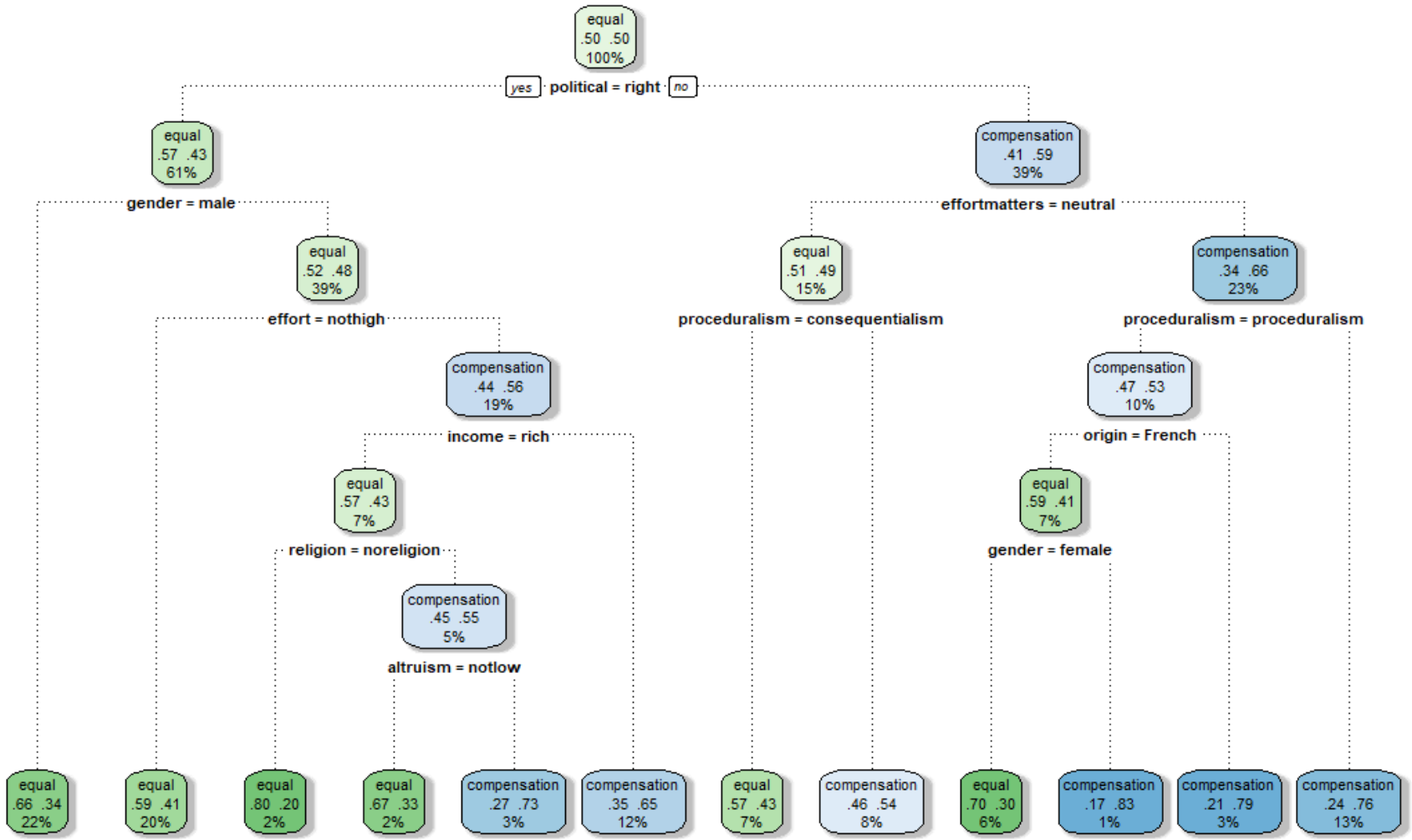
Quite intuitively, and consistently with the regression results presented above, we a majority (57%) of right-wing respondents globally tend to prefer an equal distribution of the inheritance while a majority (59%) of left-wing respondents lean towards the compensation of the poorer heir. Beyond, examining the structure of the tree shows that, within politically like-minded respondents, different combinations of ideological and self-interest variables lead to alternative redistributive preferences.

For the left-wing respondents, ideological variables are more structurally important than socio-demographic ones. In line with the literature (Fleurbaey, 1995, Cappelen et al., 2010; Balafoutas et al, 2013; Roemer and Trannoy, 2014; Lefgren et al, 2016), opinions on 'meritocracy' (i.e., should effort should be taken into account in redistributive issues?) are the second-ranking classifier of redistributive preferences, followed by proceduralism.

From a methodological point of view, the tree also shows how groups with opposed combinations of characteristics can have identical preferences. For instance, among left-wing respondents, those who do not support meritocracy (EFFORT MATTERS = NEUTRAL) and who also believe that social justice means fair rules as opposed to fair consequences (PROCEDURALISM = PROCEDURAL) support at 54% the compensation of the poorer heir. This opinion is shared (at 76%) by the opposite group, i.e. respondents who agree with both meritocracy (EFFORT MATTERS = PUNISH THE LAZY) and consequentialism (PROCEDURALISM = CONSEQUENTIALIST).

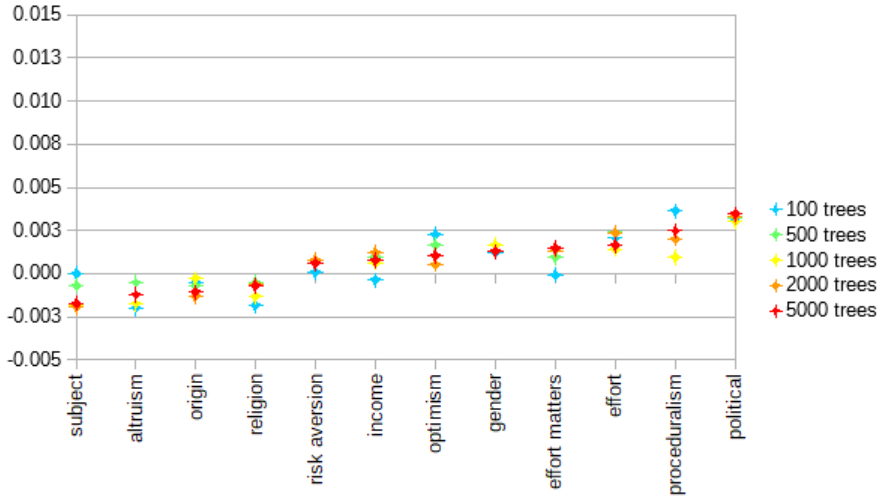
Since income is the only difference between the two heirs, meritocratic and consequentialist left-wing respondents may be willing to compensate the low wage-earner from what they might perceive as an insufficient payoff from his work, compared with the millionaire's income. Left-wing non meritocratic procedurals may come to the same conclusion from a different direction, caring more about the general fairness of compensating inequalities than having an interest in reversing the consequences of an actual situation unfair to a poor but equally deserving worker.

[8] This is also the case for alternative samples (see Appendix 4).



Note: The male right-wing respondents represent 22% of the sample. Among them, 34% choose to compensate the poorer heir and 66% choose an equal distribution of the inheritance. As a group, they favour equal distribution. The tree was grown using R function rpart() of {rpart} package (Therneau et al., 2015, 2017).

Figure 1. CART® classification tree of redistributive preferences



Note: computed using R function (varimp) of package {cforest} (see Strobl et al., 2008, for details).

Figure 2. Conditional random forest importance indicators for individual redistributive preferences

At a lower level in the tree, we find that identity markers (GENDER and ORIGIN) distinguish the redistributive preferences of the left-wingers who combine a belief in meritocracy and in procedural social fairness. 79% of the respondents with at least a foreign parent and 83% of the male native respondents are in favour of compensation, while 70% of the female natives prefer equal distribution.

For the right-wing respondents, self-interest (declared personal EFFORT instead of support of meritocracy, INCOME) and identity variables (GENDER and RELIGION) are more structurally important than ideological opinions.

Among the right-wingers, males as a group have less heterogeneous preferences than females. 66% of the males prefer equal compensation, with no subsequent split to further identify sub-groups with differentiated normative preferences.

Among the right-wing females, the situation is different and expected trajectories seems to be a good rationale for understanding their redistributive preferences: the low-effort right-wing females prefer equal distribution (at 59%) but the high-effort ones prefer compensation (at 56%). Interestingly, this proportion rises to 65% for the high-effort right-wing females who also declare not belonging to a privileged family.

An interpretation could be that right-wing, hard-working poor females are sensitive to the fact that due to poor social mobility and gendered labour market discrimination, they might not reap the benefits of their effort, making them more supportive of the low-wage worker than of the privileged heir.

Last, for the right-wing rich females, 55% of the believers in a religious higher power prefer compensation, while equal distribution is overwhelmingly preferred by 80% of the non-religious respondents who otherwise have the same profile.

Interestingly, the proportion of compensators rises to 73% for the religious right-wing rich females who also display low levels of altruism. Altruism is classically measured in the survey through a dictator game against a fictitious counterpart, and is generally interpreted as measuring the extent to which a person is willing to sacrifice some of its gains in order to care for others. Conversely – and more crudely – this variable can also be read as measuring the respondents' egoism. An interpretation could then be that since most religions preach charity, the religious respondents who are less altruistic – i.e. more concerned with their own salvation – may be more willing to support compensation against their ideological values and mundane self-interest.

*

All in all, we find that ideology is a key factor of the redistributive preferences of our respondents, which validates intuition [H2] and indicates that our findings are consistent with the literature: the normative framework of our respondents does not appear to be wildly singular.

Beyond, using a classification tree also shows that normative attitudes are better understood by examining the asymmetric conjunctions of ideological (POLITICAL OPINIONS, EFFORT MATTERS, PROCEDURALISM) and self-interest (GENDER, EFFORT, INCOME, ORIGIN) factors (intuition H4). Basically, we find that the redistributive preferences of left-wingers are shaped by their opinion on social fairness (meritocracy, proceduralism), while the preferences of right-wingers are more sensitive to the perception of their own social place and chances (effort, income, gender). This key result may imply that both sides of the ongoing self-interest/ideology debate may be right – depending on the political bias of the respondents.

4.2. Law Internalization: the Rebel, the Enforcer, and the Indifferent

Let's now focus on how the respondents' preferences are affected by being informed of a (blatantly unfair) collective distributional rule.

Here too, we find no universal attitudes: for a significant majority of the respondents (240 respondents over 414; 58.0% of the sample), knowing about the collective redistributive preference has no effect whatsoever on their preference on how the inheritance should be fairly distributed (see Table 7): these indifferent respondents do not feel bound by a political obligation to endorse collective preferences.

However, collective social norms do affect the individual preferences of 42.0% of the respondents, in opposite ways. About a quarter (105 respondents; 25.4%) actually behave as if they followed the political obligation rationale: in a Rousseauist way, these compliant individuals modify their own preference to conform to the collective preference – leading to an actual expressivity effect of the

law. Hence, they now answer that a lower share of the inheritance should be fairly given to the poorest heir than what they believed in the first place.

	Individual preferences on redistribution		
Internalization of collective preferences	Compensation	Equal treatment	Total
Compliance	73 (17.6%)	32 (7.7%)	105 (25.4%)
Defiance	36 (8.7%)	33 (8%)	69 (16.7%)
Indifference	96 (23.2%)	144 (34.8%)	240 (58.0%)
Total	205 (49.5%)	209 (50.5%)	141 (100%)

Note. Of the 209 respondents who chose an equal distribution of the inheritance, 32 respondents (7.7% of the sample) were compliant, i.e. lowered the amount they felt it was fair to give to the poor when informed of a law favouring the rich.

Table 7. Individual vs. collective preferences on redistribution

By contrast, after learning about a social norm that clashes with their own preferences, 16.7% of defiant respondents (69 over 414) now answer that it is fair to give more to the poorer heir than what they believed to be fair in the first place. In the Lockean and Rawlsian narratives where respondents are legitimate in expressing their dissent with an unfair collective rule, this reaction could be interpreted as a normative stance against political obligation – leading to a backlash effect in the law expressivity framework.

*

Running a multinomial logistic regression (see results in Table 8 below) shows how socio-demographic and ideological characteristics are associated with these divergent responses to collective social preferences.

Law students are less likely to be indifferent to collective preferences than students enrolled in Economics (variable SUBJECT). This result was quite predictable: as future lawyers and judges, Law students are more sensitive to the potentially conflictual relationship between norms and individual preferences than other respondents, whether to abide by the rule of law or rebel against it.

More interestingly, we also find that self-interest as trajectories is significantly associated with law internalization attitudes. The respondents with the best expected trajectories (high OPTIMISM and high declared EFFORT) tend to manifest more opposition to the law: they are significantly more

indifferent than compliant and more defiant than indifferent, and this key result is robust across all alternative samples[9].

Being rich and native (vs. being a poor newcomer) is also significantly associated with defying the law rather than being compliant towards it (interaction term of variables INCOME and ORIGIN). This result echoes Keely and Tan's (2008) result that race is an important factor in normative opinions[10].

All in all, it seems that the 'winners' of the socio-economic competition do not believe in political obligation.

Ideological preferences do also matter. Compared with indifferent respondents, compliant ones tend to have more left-wing POLITICAL OPINIONS, while defiant ones tend to declare right-wing opinions. An interpretation could be that left-wing citizens are more likely to agree with the principle of public intervention in redistributive issues. By contrast, right-wing citizens may be less likely to recognize public intervention as legitimate and therefore less willing to submit to collective preferences.

Last but not least, compared to both indifferent and defiant respondents, we find that compliant respondents are more likely to choose the compensation of the poorer heir over equal distribution (variable REDISTRIBUTION). At a first glance, this results is counter-intuitive, since they mean that those who support redistribution are also those who align the most with a collective preference that is blatantly unfair toward the poorer heir, at odds with their own preference. However, an interpretation could be that compliance with an unfair redistributive rule is easier for people who believe that redistribution is legitimate, and that economically unequal heirs should be treated differently – even if the actual redistribution clashes with their own preference.

By contrast, the indifferent and defiant respondents, who are more likely to believe that identical heirs should be treated equally and should therefore receive an identical share of the inheritance, are less likely to internalize a collective rule that favours one heir over the other. They are not swayed in their core beliefs once they are informed about the collective rule. These results echo Ubeda (2014) who shows that, throughout different experimental contexts, strict egalitarian participants are strongly consistent in their allocation choices. She interprets these results, which confirm previous experimental results (Güth, Huck and Müller, 2001), as due to the fact that in real life adhering to a strict equalitarian preference is easier than having to devise potentially ambiguous equity criteria.

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[9] See Appendix 4 for robustness checks.

[10] This results is not fully robust across all alternative samples. It is not significant for alternative samples where the maxi-compensators are randomly assigned a defiant or indifferent attitude, where the procedural agnostics are randomly assigned a procedural or consequentialist preference, and where the political agnostics are kept as a distinct category (see Appendix 4 for robustness checks).

	COMPLIANT (ref) vs DEFIANT			COMPLIANT (ref) vs INDIFFERENT		
	Odds	**Coeff. (Std.)**	**Odds**	**Coeff. (Std.)**	**Odds**	**Coeff. (Std.)**
Intercept	5.183	1.645*** (0.527)	0.240	-1.427* (0.82)	21.599	3.073*** (0.745)
Gender (ref = male)	1.777	0.575* (0.295)	2.309	0.837** (0.396)	0.770	-0.262 (0.354)
Subject (ref = economics)	0.264	-1.331*** (0.307)	0.753	-0.283 (0.407)	0.351	-1.048*** (0.344)
Income (ref = rich)	1.066	0.064 (0.566)	0.953	-0.048 (0.893)	1.119	0.112 (0.82)
Origin (ref = both parents French)	2.351	0.855 (0.749)	0.000	-15.375 (895.135)	11x10^6	16.22 (890.812)
Optimism (ref = high)	0.760	-0.274 (0.561)	1.488	0.398 (0.843)	0.511	-0.672 (0.774)
Effort (ref = high)	1.190	0.174 (0.54)	1.751	0.56 (0.808)	0.680	-0.386 (0.728)
Effort matters (ref = neutral)	1.202	0.184 (0.268)	1.313	0.272 (0.349)	0.915	-0.089 (0.315)
Risk aversion (ref = not high)	1.719	0.542 (0.606)	3.283	1.189 (0.843)	0.524	-0.647 (0.721)
Altruism (ref = low)	1.482	0.393 (0.27)	1.063	0.061 (0.344)	1.394	0.332 (0.311)
Belief (ref = religion)	1.305	0.267 (0.268)	1.329	0.285 (0.345)	0.982	-0.018 (0.309)
Political opinion (ref = right-wing)	0.779	-0.25 (0.281)	0.406	-0.902** (0.369)	1.920	0.652** (0.333)
Proceduralism (ref = procedural)	1.186	0.171 (0.269)	1.795	0.585* (0.344)	0.661	-0.414 (0.308)
Redistribution (ref = equal distribution)	0.249	-1.388*** (0.281)	0.380	-0.966*** (0.356)	0.656	-0.422 (0.308)
Income X effort	1.758	0.564 (0.625)	2.487	0.911 (0.961)	0.707	-0.347 (0.876)
Income X optimism	1.475	0.389 (0.622)	3.060	1.118 (0.961)	0.482	-0.73 (0.875)
Income X risk aversion	0.806	-0.216 (0.762)	0.293	-1.228 (1.065)	2.752	1.012 (0.91)
Income X origin	0.193	-1.643** (0.82)	1.9 x 10^6	14.47 (895.135)	0.000	-16.103 (890.812)
Origin X effort	0.809	-0.212 (0.589)	1.762	0.566 (0.754)	0.459	-0.778 (0.696)
Origin X optimism	1.270	0.239 (0.614)	2.212	0.794 (0.865)	0.574	-0.554 (0.794)
Origin X risk aversion	0.750	-0.288 (0.769)	2.610	0.959 (0.933)	0.287	-1.247 (0.834)
Optimism X effort	0.539	-0.618 (0.554)	0.152	-1.883** (0.795)	3.544	1.265* (0.723)

Notes. *** p-value < 0.01, ** p-value < 0.05, * p-value < 0.1.
Number of observations = 412. AIC = 776.05. McFadden pseudo-R2 = 0.1317. Log-likelihood (p-value = 3.219e-07).
Multinomial logistic regression performed using function (vglm) of R package {VGAM}.

Table 8. Multinomial logit regression of self-interest, ideological an trajectory variables on law internalization attitudes

These results suggest, following Skitka (2003), that one's support for collective social choices on redistribution has more to do with 'core' normative beliefs (on the treatment of identical but economically unequal persons, on consequentialism, on how institutions should interact with citizens…) than with beliefs on the intensity and even, as in this case, the direction of redistribution. This again echoes Cooter's idea (1998, 2000) of meta-preferences driving the internalization of collective preferences and validates our first intuition [H1].

By contrast, it is worthy to note that if PROCEDURALISM is significant in the regression, this result is not robust across all alternative samples (see Appendix 4 for robustness checks). This means that our third intuition [H3] is not substantiated by evidence. An interpretation would be that for our respondents law internalization is independent from any intrinsic taste for the law for itself, which again gives credit to Cooter's 'meta-values' hypothesis.

All in all, our results echo the Rawlsian liberal principle of legitimacy, where political obligation is limited to an 'overlapping political consensus' of the most general and abstract normative concepts upon which free and reasonable citizens can agree, but which does not encompass infra-issues such as the practical support of a particular distributive principles (Rawls, 1993, pp. 134-140).

*

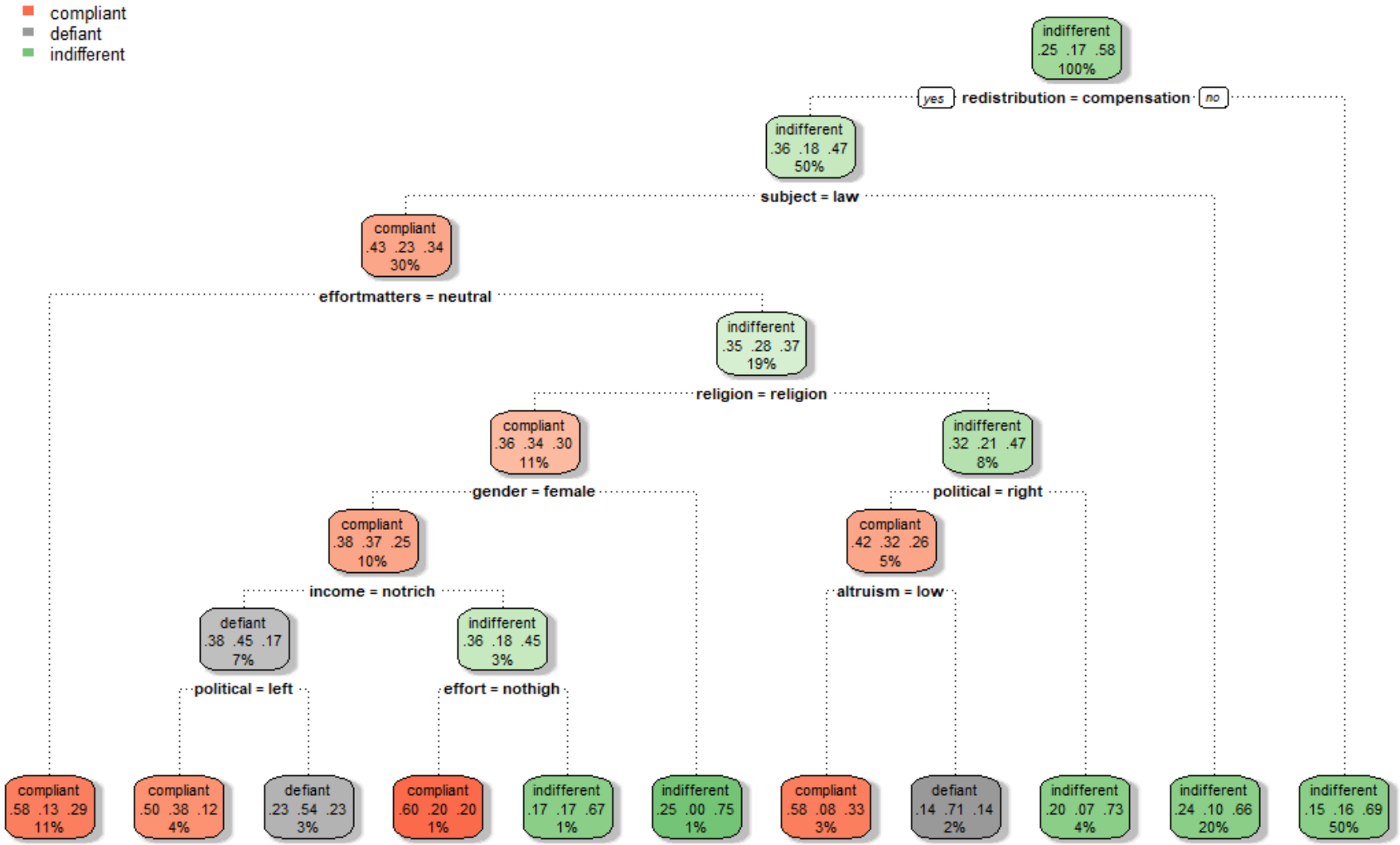
To try and further disentangle the self-interest and ideological dimension of law internalization attitudes, we grow the decision tree and associated random forests for the LAW INTERNALIZATION variable (see Figures 3 and 4).

Using this methodology confirms that individual preferences on redistribution are a key structural factor of the internalization of collective redistributive preferences. The random forest conditional importance of variable REDISTRIBUTION is overwhelmingly superior to all others (see Figure 4), and individual redistributive preferences are at the root of the decision tree (Figure 3).

The respondents who disagree with the principle of an unequal treatment of identical but economically unequal persons are significantly indifferent to the law: 69% are indifferent, and only 15% are compliant and 16% are defiant. The effect is so strong that no other variable further splits these respondents in sub-groups with different attitudes towards law internalization. By contrast, as found in the regression, those who were initially willing to treat the two heirs differently are more likely to be either compliant (36%) or defiant (18%).

This hints towards a validation of Cooter's 'meta-value' hypothesis. It also echoes a Lockean and Rawlsian perspective, where citizens are compelled to respect the social contract inasmuch its respects their most fundamental values, and contradicts the Platonician, Hobbesian and Rousseauist narratives of an absolute political obligation.

It is interesting to note that law internalization attitudes appear to be disentangled from the support of legality per se: PROCEDURALISM fails to appear in the decision tree and is among the lowest-ranking variables in terms of random forest conditional importance (see Figure 4).



Note. 20% of the respondents were economists who favoured compensation over equal distribution. Among these respondents, 66% were indifferent to unfair collective preferences, while 24% chose compliance and 10% chose defiance. As a group, they chose indifference towards the law. The tree was grown using R function (rpart) of package {rpart} (Therneau et al., 2015, 2017).

Figure 3. CART® classification tree of the internalization of collective preferences on redistribution

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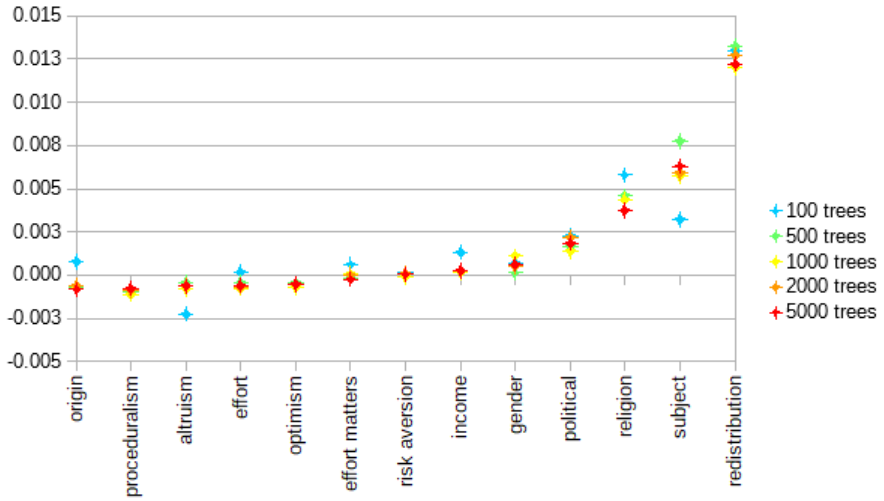

Note: computed using R function (varimp) of package {cforest} (see Strobl et al., 2008, for details).

Figure 4. Conditional random forest importance indicators for law internalization

Within the compensators, 36% of the respondents are compliant, 18% are defiant and 47% are indifferent. A complex interplay of variables structures their attitudes towards law internalization.

SUBJECT is a second-rank important classifier (see Figure 4 for its random forest conditional importance indicator). Among the compensators enrolled in economics (20% of the sample), 66% are indifferent to the collective rule (24% are compliant and only 10% are defiant). This means that both defiance and compliance are more likely to be selected by law students (30% of the sample), who appear to be, quite unsurprisingly, more sensitive to how the legal system works than economists – either to embrace it (43% of compliants) or to rebel against it (23% of defiant respondents).

This echoes previous results in the literature showing that economists and non-economists display different normative preferences on redistributive issues, although most compared economists with sociologists and other humanities students (see, among others, Maxwell and Ames, 1981; Carter and Irons, 1991; Franck et al., 1993; Yezer et al., 1996; Frey and Meier, 2003; Zsolnai, 2003; Faravelli, 2007; Hole, 2013). Among the law students, the higher-ranking splitter variables are ideological: meritocracy (variable EFFORT MATTERS) followed by the stated belief in a religious higher power (variable RELIGION) and, for the non-religious respondents, political opinions (variable POLITICAL).

Within the law student group, compliance with the unfair law is dominant for the respondents who are insensitive to meritocracy: 58% of the respondents choose to give less to the poorer heir (13% choose to give more and 29% are indifferent). By contrast, believing that effort should be taken into account in redistributive issues leads to more differentiated law internalization attitudes.

It is interesting to note that law internalization attitudes appear to be disentangled from the support of legality per se: PROCEDURALISM fails to appear in the decision tree and is among the lowest-ranking variables in terms of random forest conditional importance (see Figure 4). By contrast, another kind of belief in a deontological normative higher order, religion, features prominently both as a structuring node of the tree and as a high-level random forest indicator.

For law students, within the small group of a-religious political conservatives (sensitive to effort and with right-wing opinions, 8% of the sample), defiance vs. compliance boils down to displaying altruistic or selfish tendencies: 71% of the altruistic respondents are defiant and 14% are compliant, while among the non-altruistic respondents only 8% are defiant and 58% are compliant.

Among the 11% of meritocratic, religious and compensator law students, females are an overwhelming majority (10% of the sample, vs. 1% for the males).

Depending on the declared income of their family, self-interest and ideology to dictate their attitude towards law internalization.

For those who declare having a rich family, also declaring a low effort levels leads to compliance the law (at 60%) while declaring a high effort level leads towards indifference towards the law (at 67%), as if privileged and self-confident females were less inclined to let their normative preferences be shaped by information on collective preferences.

For those who do not declare having a rich family, it is political opinions that split the group between compliant respondents and defiant ones. Confirming the regression results presented in the previous

section, we find that left-wingers are more likely to be compliant (at 50%) while right-wingers are more likely to be defiant (at 54%).

5. Conclusion

The issue of how to aggregate individual normative preferences to coin collective preferences is at the heart of the social choice literature in public economics. In this article, we were interested in reversing the issue, and focused on how individual preferences are in return affected by knowledge of collective ones. This question of political obligation also echoes with the law expressivity literature which is gaining momentum in law & economics.

To shed some empirical light on the support of political obligation, we used an original questionnaire-experimental survey were we faced our respondents with an obviously extremely unfair redistributive collective rule.

The point was to study whether the respondents tended to submit to the general will as Plato, Hobbes or Rousseau would have advocated, or, rather, whether they were indifferent to it or, even, rebelled against the unfair law – à la Locke or Rawls. The literature on redistributive preferences classically discusses the relative importance of self-interest (whether defined through income and social position or expected trajectories) and 'pure' ideological factors – to which we added the added input of the Empirical Social Choice factor of support of proceduralism. To disentangle the conjoined effects of these factors, we used statistical tools which have been recently introduced in the empirical public economics literature (Keely and Tan, 2008) and have been scarcely used since. Decision trees allowed us to grasp the more 'structural' pattern of the interplay of self-interest and ideological variables.

There are four main results in this article.

First, in line with the literature, 'raw' self-interest is a poor predictor of redistributive preferences, contrary to self-interest as trajectories and ideological opinions (Fong, 2001; Alesina and La Ferrara, 2005; Clark and D'Angelo, 2013; Costa-Fond and Cowell, 2015). This has practical implications for redistributive public policies. Redistributive policies that rely exclusively on self-interest and incentives may thus be inefficient, contrary to policies promoting optimism and social mobility.

Second, counter-intuitively, we find that law internalization attitudes are not driven by the initial amount of redistribution the respondent considered fair, but on their alignment with a 'higher-level' principle of knowing whether two persons who are essentially identical but economically unequal should be treated differently in terms of economic redistribution. This strongly hints towards a validation of Cooter's hypothesis of 'meta preferences' triggering an expressive vs. backlash response to the law (Cooter 1998, 2000). Our respondents therefore echo the Lockeo-rawlsian vision of political obligation, where a Social Contract can be legitimately ignored by respondent who do not share its underlying values. Thanks to having included the support or proceduralism among the control variables, we also find that this result is disentangled with the support of legality for itself, above consequences.

In terms of public policy, this means that beyond a public policy practicalities and efficiency, it is important to carefully account for the aligning of its values with meta-preferences shared by a majority of the population.

Third, regression results show that the 'losers' and the 'winners' of the socio-economic competition have opposite attitudes regarding law internalization: respondents with unfavourable expected trajectories submit to unfair collective rules, while those who display high levels of optimism and declared effort tend to rebel more against the law.

The POUM hypothesis of Bénabou and Ok (2001) helped understand why the poor would fail to support redistributive policies if they believed in upward social mobility. This article furthers this thinking by showing, in a questionnaire-experimental setting, that expecting being a social loser vs. winner also affects the capacity to oppose to a detrimentally unfair rule imposed by the majority. The losers submit while the winners voice their disagreement; challenging of an unfair social contract is possible, but from a position of privilege.

Elster, Sen and Nussbaum (Elster, 1982; Sen, 1984, 1999; Nussbaum, 2000) put forward the hypothesis of adaptive preferences, which echoes the concept of rationalization associated with the reduction of cognitive dissonance in social psychology (Festinger, 1957). Our results hint toward a validation of this hypothesis for normative preferences as well. Our results can help understand why privileged activist 'progressives' with good socio-economic perspectives keep voicing their opposition to anti-redistributive policies – while those who are the actual losers of the socio-economic competition keep quiet or submit to unfair collective preferences.

Last, using decision trees and random forests allows us to show that ideological and self-interest values play an asymmetric role on individual preferences on redistribution and on the expressivity vs. backlash effect of collective preferences on redistribution. We find that while ideological variables tend to be structural factors of these normative preferences, self-interest and identity variables are also keenly associated with alternative normative choices – but they play different roles for different-minded respondents. For instance, the redistributive preferences of left-wing respondents seem to be governed by abstract, global opinions on social fairness, while for the right-wing respondents personal issues seem more structurally important.

In terms of public policies, this means that the normative rationale used to secure public support of redistributive policies need to be differentiated to take into account both the normative frameworks and the socio-economic positions of the citizens.

Our results pave the way for further research.

First, methodologically speaking, the use of decision trees and random forests was instrumental to glimpse beyond the stark opposition between self-interest and ideological opinions depicted by regressions. Following Keely and Tan's advice (2008), it would be very interesting to further use these tools on other samples and redistributive issues.

Second, the article uses data from a student survey. Even if our results are consistent with previous findings in the literature, the study could be reiterated on a larger sample of the population, and on respondents of more diverse national, social and cultural backgrounds.

Third, in this survey we tested the 'resistance' of the respondents to an outrageously unfair law, without specifying the institutional framework that led to its enunciation. It may thus be interesting to test other, less extreme, forms of collective rules, as well as, echoing Tyran and Feld (2006) to test the robustness of our findings across the degree of legitimacy of the law (opposing national vs. trans-national laws, opposition a law and a court of justice decision or custom decisions).

Fourth, our results are not derived from an actual experiment, but from a questionnaire-experimental survey. It would be interesting to see, in an experimental setting, if the differentiated law internalization found among our respondents translates to actual behaviours.

Lastly, it would be enlightening to devise further empirical designs to further understand the social, psychological, and cultural factors that drive the adaptation of normative preferences.

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Appendix

Appendix 1. Survey questions[11]

The Two Countries

Imagine two countries, Country A and Country B, which are identical except that in Country A, the rules that define how society is organized are fair, but they do not necessarily lead to a fair distribution of wealth and income among the citizens. In Country B, wealth and income are fairly distributed among the citizens, but the rules that define how society is organized are not necessarily fair.

In your opinion, which country is the fairer?

Country A ○ ○ ○ ○ ○ ○ Country B

The Inheritance

Old Mr. Baker passed away, leaving a legacy of 10.000 dollars to two distant heirs, Paul and Tom. Tom and Paul do not know each other. They will never know neither the magnitude of the inheritance nor how much the other heir received. Paul and Tom are identical (age, psychology, talent, preferences, and desert). We know that Tom is a millionaire and that Paul earns a minimal wage.

In your opinion, what percentage of the legacy is it fair to give to Tom (the billionaire)?

Answer: _____ %

Imagine now that the law provides that Tom (millionaire) should earn 99 % of the inheritance while Paul (minimal wage) should receive 1 % of the inheritance. In your opinion, what percentage of the legacy is it fair to give to Tom (the billionaire)?

Answer: _____ %

The Box

You take part in a game where you are asked to choose between two locked boxes, Boxes A and B. You will win the content of the box you have chosen. You know that:

- There are 100 dollars in Box A
- There is a 50 % chance that Box B is empty, and a 50% chance that it contains X dollars.

What is the minimal amount X that would encourage you to choose Box B?

Answer: _____ euros.

The Ten Dollar Game

You take anonymously part in a game, where you are given 10 dollars. You are asked to share this amount between you and another anonymous player. How much do you choose to give to the other player?

Answer: _____ euros.

The Gold Rush

During the Gold Rush, two miners, Jack and Bill, who are identical (age, personality, talents, preferences…) work together in a gold mine. Imagine that neither Jack nor Bill has any gold nugget to begin with. Jack has brought 2 tons of rubble to the machine that sifts the rubble and extracts the gold nuggets. Bill has brought 8 tons of rubble to the machine. At the end of the day, 10 gold nuggets were found by the machine.

In your opinion, how is it fair to share the 10 new nuggets?

---

11 Translated from the original French version of the survey.

_____ nuggets for Jack and _____ nuggets for Bill

Imagine now that Jack only brought 2 tons of rubble to the machine because he didn't want to tire himself. In your opinion, how is it fair to share the 10 nuggets?

_____ nuggets for Jack and _____ nuggets for Bill

Socio-demographic questions

You are □ A woman □ A man

What is the nationality of your father? _____

What is the nationality of your mother? _____

In your opinion, today your family is

□ Among the top 33% richest families

□ Among the bottom 33% poorest families

□ Somewhere between the two

In your opinion, in 10 years you will be

□ Among the top 33% income earners

□ Among the bottom 33% income earners

□ Somewhere between the two

In your opinion, how many of your peers produce more effort than you in their studies?

□ Less than 50%

□ About 50%

□ More than 50%

How do you feel about religion?

□ I am an atheist or an agnostic

□ I do not want to disclose my religion

□ I have a religion but do not observe its rituals

□ I have a religion and observe its rituals

Between freedom and equality, how do you place your preference?

Equality o o o o o o Freedom

Politically speaking, between Left and Right, how do you place your preference?

Left o o o o o o Right

Appendix 2. Pruning of classification trees

As we explained in Section 3, at an extreme, a fully developed tree has as many leaves as respondents, and leaf purity is perfect. Such a tree is probably over-fitted to the data and does not provide an interpretable structural mapping of the variable combination associated to the interest variable.

It is therefore necessary to prune the trees, which means trading off complexity for interpretability.

The ideal pruned tree has a small cross-validation estimate of misclassification error. K-fold cross-validation is performed by creating k alternative pairs of training and test sub-samples of respectively n/k and n-n/k respondents, so that every respondent is used 1 time in a test set and k-1 times in the training sets. The cross-validation estimate of misclassification errors is computed as the average misclassification indicators computed across each of k folds (see Therneau et al., 2017, p. 12, for a detailed technical presentation of the computation of the misclassification indicator).

Here, we classically rely on a 10-fold cross-validation procedure. Figures A5 and A6 show the cross-validation errors associated with increasing tree sizes. It should be noted that subsequent passes of the algorithm produced slightly different cross-validation errors.

We chose the tree sizes that were as small as possible while still providing interpretable results: we chose to keep a 12-leaf pruned 'redistribution' tree and an 11-leaf pruned 'law internalization' tree.

These tree sizes are tractable from an interpretative point of view and are associated with low misclassification errors. For the 'redistribution' tree, lower errors are also associated with either a trivial tree (2-leaf tree) or a too large 16-leaf tree. For the 'law internalization' tree, our chosen tree size was often the one with the lower error.

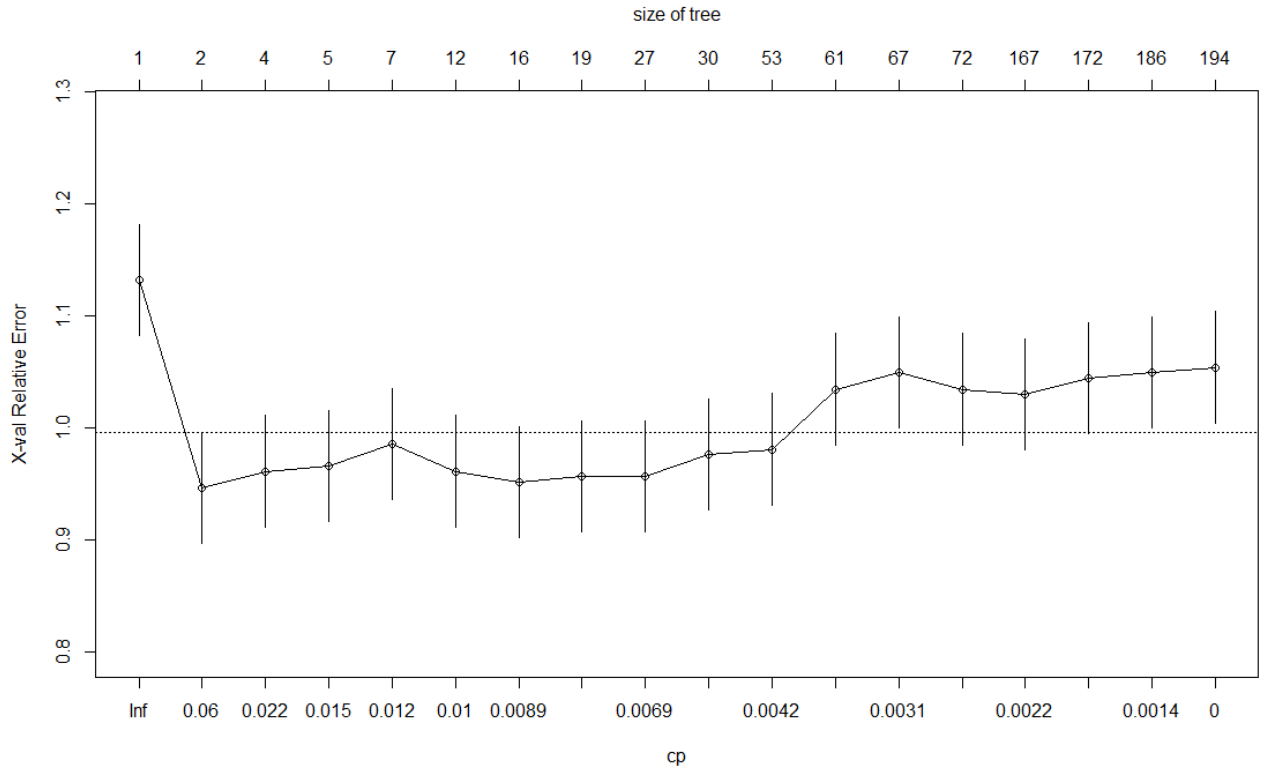

Figure A5. Trade-off between relative error and tree size for redistributive preferences

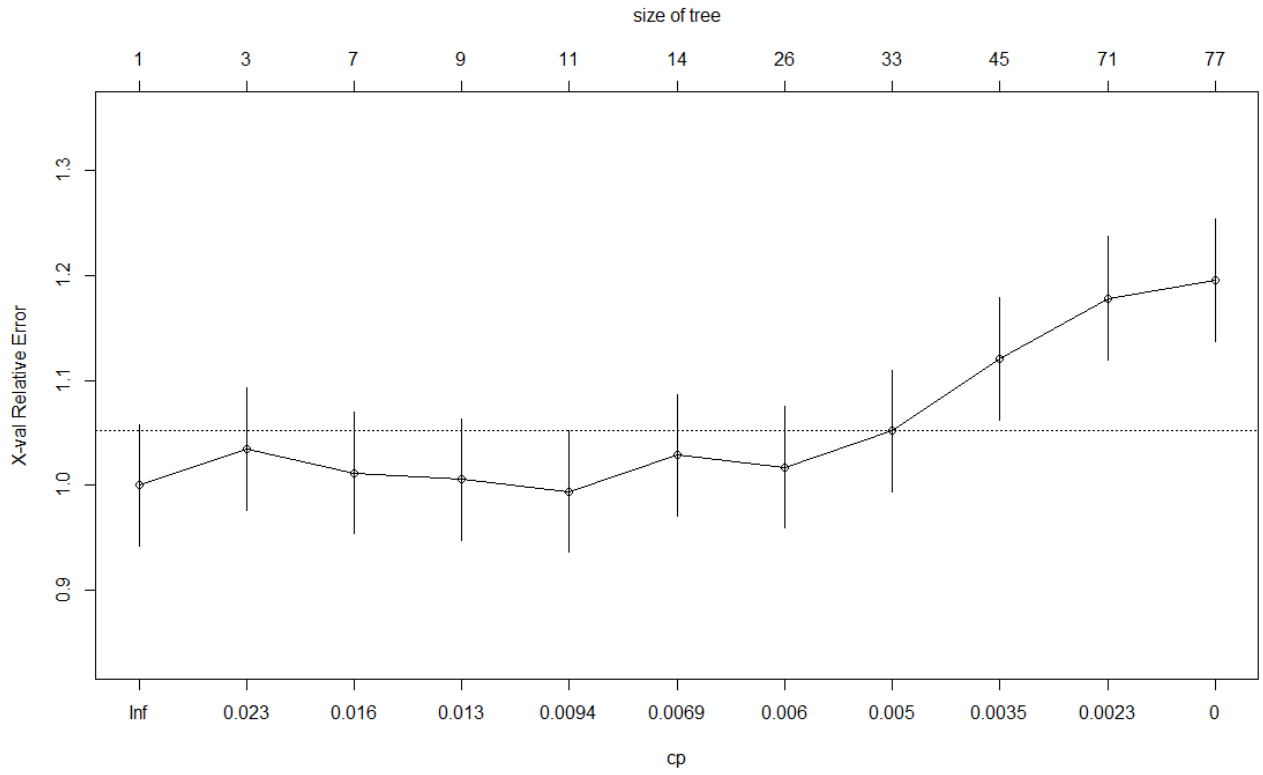

Figure A6. Trade-off between relative error and tree size for law internalization attitudes

Appendix 3. Descriptive statistics and categorization of the interest variables

Figure A1 shows the distribution of the amount given to the poor before being informed about the law. It appears that the initial redistributive choices of the respondents cannot be accurately described in terms of a continuous variable, since a great number of respondents chose to split evenly the inheritance between the heirs, while an increasing proportion of respondents gave increasing shares of the inheritance to the poorer heir.

We see in Figure A1 that a very tiny minority (9 respondents) gave more to the richer heir. In the paper we decided to exclude the 9 counter-compensators of this study, since they are very few and we cannot be sure that their choice is genuine and not the result of a mistake in completing the survey.

We also chose to consider the variable 'redistribution' as a categorical variable, with two categories: equal distribution and compensation. The drawback is that we ignore the increasing nature of the frequency of compensators, but we believe that if accurately captures the contrast between equalizers and the rest of the respondents.

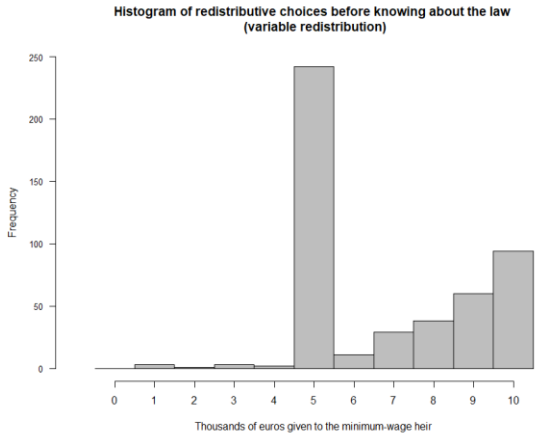

Figure A1. Amount given to the poorer heir before knowing about the law

Figure A2 shows the distribution of the amount given to the poorer heir after knowing about the law.

Figure A3 presents the distribution of the variation in the amount given to the poor before and after knowing about the law. The distribution of this variable, which captures the expressive and backlash effects of the law, would clearly be very poorly represented by a continuous variable, since it is dominated by a single group of respondents who are not affected by knowing about the law.

As a result, we chose to consider the variable 'law internalization' as a categorical variable, with three categories depicting the three main possible attitudes

- Indifference : no change in the amount given to the poor
- Compliance : reduction of the amount given to the poor
- Defiance: augmentation of the amount given to the poor

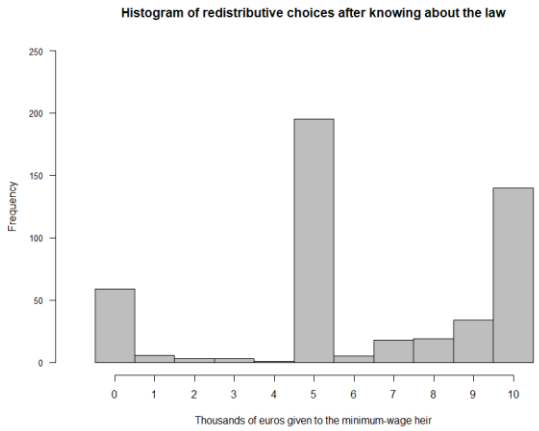

Figure A2. Amount given to the poorer heir after knowing about the law

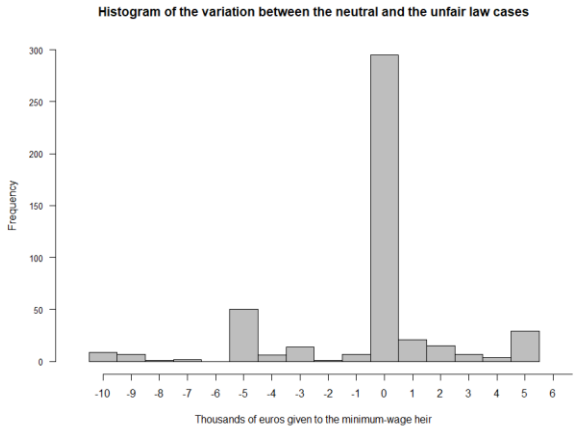

Figure A3. Variation of the amount given to the poorer heir before and after knowing about the law

To sum up, Figure A4 shows how the respondents are distributed across both the redistribution and the law internalization variables. We can see that if indifference dominates both groups, the proportion of indifferent respondents is clearly smaller among the group of compensators, who by contrast house a greater absolute number of compliant and defiant respondents that the equalizers.

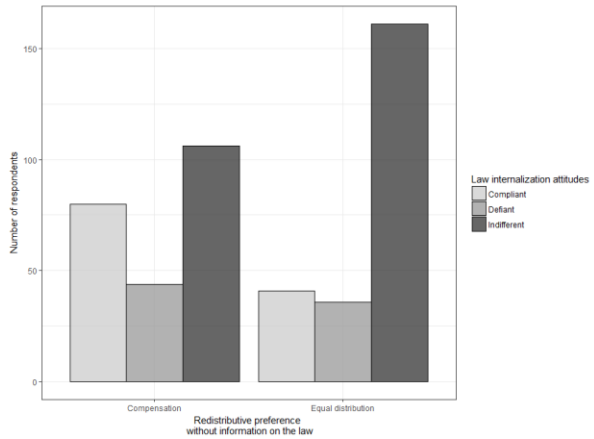

Figure A4. Cross-distribution of the respondents according to their redistributive preferences and law internalization attitudes

Appendix 4 Robustness checks

In this section, we present alternative results obtained using different samples that allow to check the robustness of the main methodological choices made when constructing our variables: (1) the issue of the indifferent maxi-compensators, the treatment of the agnostic respondents for the variables (2) proceduralism, (3) political opinion and (4) freequal and, lastly, the choice to (5) exclude the respondents who rewarded the lazy attitude in the variable 'effort matters'.

Section 4.1. discusses the sample selection of the main database used in the paper. Section 4.2. presents the results found using these alternative samples for redistributive preferences and law internalization attitudes (regressions and random forests).

4.1. Discussion of main & alternative sample selections

4.1.1. Indifference of 'maxi-compensators'

First, it must be noted that our choices in the creation of the categorical variables redistribution and law internalization create a difficulty: what about the respondents who initially chose to give all the inheritance to the poor? When knowing about the law, they cannot be categorized as law internalization-defiant, since they cannot give more to the poorer heir than what they gave him before.

By construction, for the 'maxi-compensators', it is not possible to distinguish between defiant and indifferent attitudes. Figure A7 indeed shows that no maxi-compensators are labelled as defiant while 30 of them are, for some mistakenly, labelled as indifferent.

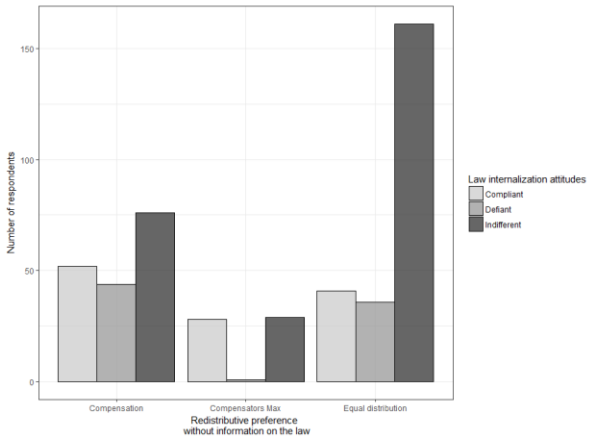

Figure A7. Redistributive preferences and law internalization attitudes

As a result, the data presented in the main part of the paper overestimates, for the group of compensators, the proportion of indifferent respondents and underestimates the proportion of defiant respondents.

The good news is that one of the main results of the paper (i.e. that equalizers tend to be indifferent to the law while compensators tend to be either more defiant or more compliant) is actually quite conservative, since it was obtained using data that under-estimates the proportion of defiant respondents among the compensators.

A strategy to check the impact of this unavoidable side-effect of the construction of the variable 'law internalization' on our results was to replicate them using a new sample of respondents where an 'indifferent' or 'defiant' attitude was randomly allocated to each of the 30 indifferent maxi-compensators (6.41% of the raw sample). Results with this alternative sample (1) are presented in the following sections.

4.1.2. Agnosticism between proceduralism and consequentialism (variable 'proceduralism')

Second, we chose to drop from our sample the 13 respondents (2.78% of the raw sample, see Figure A8) who refused to state a preference between proceduralism and consequentialism (variable 'proceduralism') by ticking between ticks 3 and 4 in the Likert-like scale used in the survey (see Appendix 1). We built two alternative samples where these respondents were kept as a separate category (alternative sample 2) and where they were randomly assigned a procedural of consequentialist preference (alternative sample 3). Results with these alternative samples are presented in the following sections.

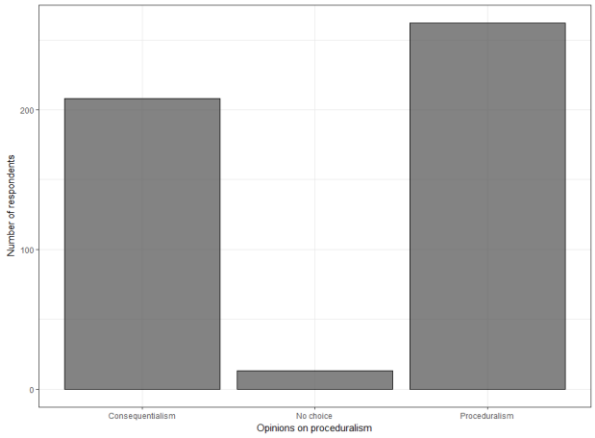

Figure A8. Distribution of the opinions on the consequentialism vs. proceduralism choice, with the identification of the agnostic respondents

4.1.3. Agnosticism between left- and right-wing (variable 'political')

Third, we chose to drop from our sample the 28 respondents (5.98 % of the raw sample, see Figure A9) who refused to state a preference between left-wing and right-wing political opinions (variable 'political') by ticking between ticks 3 and 4 in the Likert-like scale used in the survey (see Appendix 1).

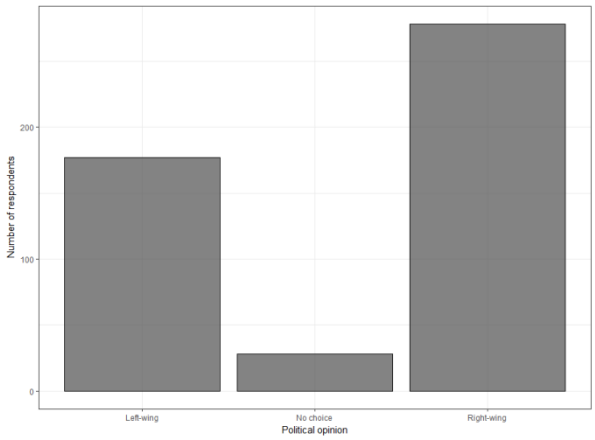

Figure A9. Distribution of the opinions on the left- vs. right-wing choice, with the identification of the agnostic respondents

We built two alternative samples where these respondents were kept as a separate category (alternative sample 4) and where they were randomly assigned a left- or right-wing political preference (alternative sample 5). Results with these alternative samples are presented in the following sections.

4.1.4. Reward of the lazy in the variable 'effort matters')

Last, 22 of the respondents (4.70 % of the sample, see Figure A10) chose to reward the lazy worker in the 'Gold Rush' vignette. We intuit that it denotes either poor attention to the survey or playfulness towards its designers, and dropped these respondents from the main sample. We cannot however overrule that it manifests a genuine normative attitude. We therefore built an alternative sample where these respondents were kept as a separate category (alternative sample 8). Results with this alternative sample are presented in the following sections.

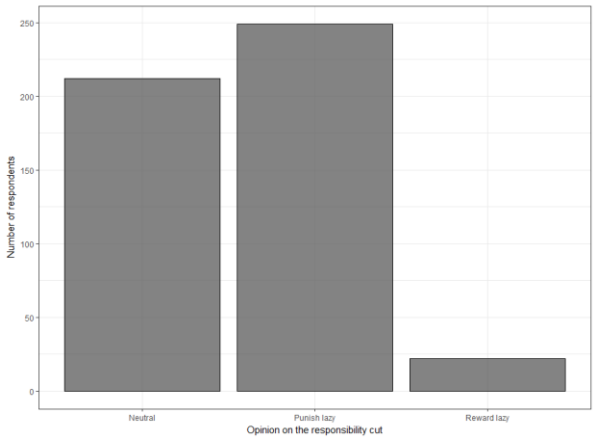

Figure A10. Distribution of the opinions on the treatment of the lazy worker (neutrality, punishment, reward)

4.2. Alternative results

4.2.1. Redistributive preferences[12]

	Main sample			Alternative sample (2) Random assignment of procedural agnostics			Alternative sample (3) Procedural agnostics kept in the sample		
	Odds	Coefficients (Std.)	P-value	Odds	Coefficients (Std.)	P-value	Odds	Coefficients (Std.)	P-value
(Intercept)	0.598	-0.513 (0.413)	0.214	0.642	-0.444 (0.409)	0.278	0.639	-0.448 (0.41)	0.274
Gender (ref = male)	1.235	0.211 (0.235)	0.369	1.224	0.202 (0.234)	0.386	1.214	0.194 (0.234)	0.408
Subject (ref = economics)	0.710	-0.343 (0.226)	0.129	0.706	-0.348 (0.224)	0.121	0.707	-0.346 (0.225)	0.123
Income (ref = rich)	0.976	-0.024 (0.468)	0.959	0.923	-0.08 (0.466)	0.863	0.914	-0.089 (0.466)	0.848
Origin (ref = both parents French)	0.856	-0.155 (0.565)	0.783	0.841	-0.173 (0.563)	0.759	0.833	-0.183 (0.564)	0.746
Optimism (ref = high)	1.651	0.502 (0.461)	0.277	1.640	0.495 (0.459)	0.280	1.633	0.49 (0.459)	0.285
Effort (ref = high)	0.970	-0.03 (0.437)	0.944	1.028	0.028 (0.431)	0.949	1.010	0.01 (0.433)	0.982
Effort matters (ref = neutral)	1.485	0.396* (0.215)	0.065	1.443	0.366* (0.213)	0.086	1.439	0.364* (0.213)	0.088
Risk aversion (ref = not high)	0.643	-0.442 (0.463)	0.340	0.569	-0.564 (0.456)	0.216	0.565	-0.57 (0.456)	0.211
Altruism (ref = low)	0.811	-0.209 (0.219)	0.340	0.758	-0.277 (0.217)	0.202	0.760	-0.274 (0.217)	0.207
Belief (ref = religion)	0.815	-0.205 (0.216)	0.342	0.822	-0.196 (0.214)	0.360	0.828	-0.188 (0.215)	0.380
Political opinion (ref = right-wing)	1.616	0.480** (0.226)	0.034	1.699	0.53** (0.224)	0.018	1.700	0.531** (0.224)	0.018
Proceduralism (ref = procedural)									
Consequentialism	1.455	0.375* (0.217)	0.084	1.433	0.36* (0.216)	0.095	1.477	0.39* (0.217)	0.072
Agnosticism							1.807	0.591 (0.792)	0.455
Income X effort	1.639	0.494 (0.498)	0.321	1.631	0.489 (0.492)	0.321	1.668	0.512 (0.494)	0.300
Income X optimism	0.912	-0.092 (0.504)	0.855	0.923	-0.08 (0.499)	0.873	0.926	-0.077 (0.5)	0.877
Income X risk aversion	0.691	-0.37 (0.562)	0.511	0.747	-0.292 (0.557)	0.600	0.746	-0.293 (0.557)	0.599
Income X origin	1.524	0.421 (0.624)	0.500	1.598	0.469 (0.624)	0.453	1.598	0.469 (0.625)	0.453
Origin X effort	0.499	-0.695 (0.469)	0.138	0.467	-0.761 (0.468)	0.104	0.472	-0.75 (0.469)	0.109
Origin X optimism	1.472	0.387 (0.501)	0.440	1.497	0.403 (0.501)	0.421	1.507	0.41 (0.501)	0.413
Origin X risk aversion	2.332	0.847 (0.567)	0.135	2.430	0.888 (0.566)	0.117	2.458	0.9 (0.567)	0.112
Optimism X effort	0.663	-0.411 (0.45)	0.361	0.669	-0.402 (0.447)	0.368	0.658	-0.419 (0.448)	0.349
Number of observations		414			422			422	
AIC		577.618			586.555			587.844	
Mc Fadden R2 (p-value)		0.0667			0.0691			0.0704	
Hosmer-Lemeshow (p-value)		0.3817			0.1377			0.4118	

Notes. *** p-value < 0.01, ** p-value < 0.05, * p-value < 0.1. In the main sample, respondents who refused to choose between 'proceduralism' and 'consequentialism' in the 'proceduralism' variable were dropped. They were randomly assigned a side in the alternative sample (2) and were kept as a distinct category in the alternative sample (3).

Table A1. Redistributive preferences with alternative samples (2) and (3) – variable 'proceduralism'

12 All binomial logit regressions were performed using the R software function glm() of package {base}.

	Main sample			Alternative sample (4) Random assignment of political agnostics			Alternative sample (5) Political agnostics kept in the sample		
	Odds	Coefficients (Std.)	P-value	Odds	Coefficients (Std.)	P-value	Odds	Coefficients (Std.)	P-value
(Intercept)	0.598	-0.513 (0.413)	0.214	0.619	-0.479 (0.405)	0.237	0.628	-0.466 (0.405)	0.250
Gender (ref = male)	1.235	0.211 (0.235)	0.369	1.261	0.232 (0.229)	0.312	1.249	0.222 (0.23)	0.334
Subject (ref = economics)	0.710	-0.343 (0.226)	0.129	0.666	-0.407* (0.22)	0.065	0.673	-0.396* (0.221)	0.073
Income (ref = rich)	0.976	-0.024 (0.468)	0.959	0.883	-0.125 (0.446)	0.780	0.889	-0.118 (0.447)	0.793
Origin (ref = both parents French)	0.856	-0.155 (0.565)	0.783	0.858	-0.153 (0.555)	0.783	0.834	-0.182 (0.557)	0.744
Optimism (ref = high)	1.651	0.502 (0.461)	0.277	1.553	0.44 (0.45)	0.328	1.490	0.399 (0.453)	0.379
Effort (ref = high)	0.970	-0.03 (0.437)	0.944	0.998	-0.002 (0.418)	0.996	1.012	0.012 (0.418)	0.978
Effort matters (ref = neutral)	1.485	0.396* (0.215)	0.065	1.501	0.406** (0.207)	0.049	1.484	0.395* (0.208)	0.057
Risk aversion (ref = not high)	0.643	-0.442 (0.463)	0.340	0.815	-0.204 (0.444)	0.645	0.811	-0.209 (0.444)	0.638
Altruism (ref = low)	0.811	-0.209 (0.219)	0.340	0.791	-0.234 (0.211)	0.268	0.787	-0.239 (0.212)	0.259
Belief (ref = religion)	0.815	-0.205 (0.216)	0.342	0.833	-0.183 (0.209)	0.382	0.826	-0.191 (0.209)	0.361
Political opinion (ref = right-wing)									
Left-wing	1.616	0.480** (0.226)	0.034	1.616	0.411* (0.217)	0.058	1.645	0.497** (0.224)	0.027
Agnostic						0.116	1.025	0.025 (0.478)	0.959
Proceduralism (ref = procedural)	1.455	0.375* (0.217)	0.084	1.433	0.327 (0.208)	0.214	1.380	0.322 (0.208)	0.122
Income X effort	1.639	0.494 (0.498)	0.321	1.820	0.599 (0.482)	0.996	1.749	0.559 (0.483)	0.247
Income X optimism	0.912	-0.092 (0.504)	0.855	1.003	0.003 (0.489)	0.453	1.011	0.011 (0.489)	0.982
Income X risk aversion	0.691	-0.37 (0.562)	0.511	0.667	-0.405 (0.54)	0.537	0.667	-0.405 (0.541)	0.454
Income X origin	1.524	0.421 (0.624)	0.500	1.459	0.378 (0.611)	0.153	1.475	0.389 (0.612)	0.525
Origin X effort	0.499	-0.695 (0.469)	0.138	0.524	-0.646 (0.451)	0.534	0.523	-0.648 (0.454)	0.154
Origin X optimism	1.472	0.387 (0.501)	0.440	1.353	0.303 (0.486)	0.193	1.366	0.312 (0.489)	0.523
Origin X risk aversion	2.332	0.847 (0.567)	0.135	2.056	0.721 (0.553)	0.388	2.050	0.718 (0.555)	0.196
Optimism X effort	0.663	-0.411 (0.45)	0.361	0.689	-0.373 (0.432)		0.702	-0.354 (0.433)	0.414
Number of observations	414			436			436		
AIC	577.618			612.482			613.015		
Mc Fadden R2 (p-value)	0.0667			0.0559			0.0584		
Hosmer-Lemeshow (p-value)	0.3817			0.5688			0.1783		

Notes. In the main sample (1), respondents who refused to choose between 'left' and 'right' in the 'political' variable were dropped. They were randomly assigned a political side in the alternative sample (3) and were kept as a distinct category in the alternative sample (4).

Table A2. Redistributive preferences with alternative samples (4) and (5) – variable 'political'

	Main sample			Alternative sample (6) Reward of the lazy Kept in the sample		
	Odds	Coefficients (Std.)	P-value	Odds	Coefficients (Std.)	P-value
(Intercept)	0.598	-0.513 (0.413)	0.214	0.623	-0.474 (0.412)	0.250
Gender (ref = male)	1.235	0.211 (0.235)	0.369	1.255	0.227 (0.227)	0.317
Subject (ref = economics)	0.710	-0.343 (0.226)	0.129	0.640	-0.446** (0.221)	0.043
Income (ref = rich)	0.976	-0.024 (0.468)	0.959	1.049	0.048 (0.461)	0.917
Origin (ref = both parents French)	0.856	-0.155 (0.565)	0.783	0.916	-0.088 (0.563)	0.876
Optimism (ref = high)	1.651	0.502 (0.461)	0.277	1.713	0.538 (0.459)	0.241
Effort (ref = high)	0.970	-0.03 (0.437)	0.944	0.934	-0.069 (0.429)	0.873
Effort matters (ref = neutral)						
Punish the lazy	1.485*	0.396 (0.215)	0.065	1.493	0.401* (0.214)	0.061
Reward the lazy				1.050	0.049 (0.53)	0.927
Risk aversion (ref = not high)	0.643	-0.442 (0.463)	0.340	0.653	-0.426 (0.457)	0.352
Altruism (ref = low)	0.811	-0.209 (0.219)	0.340	0.750	-0.288 (0.215)	0.180
Belief (ref = religion)	0.815	-0.205 (0.216)	0.342	0.823	-0.195 (0.212)	0.357
Political opinion (ref = right-wing)	1.616**	0.48 (0.226)	0.034	1.610	0.476** (0.222)	0.032
Proceduralism (ref = procedural)	1.455*	0.375 (0.217)	0.084	1.413	0.346 (0.212)	0.102
Income X effort	1.639	0.494 (0.498)	0.321	1.721	0.543 (0.49)	0.268
Income X optimism	0.912	-0.092 (0.504)	0.855	0.818	-0.201 (0.496)	0.685
Income X risk aversion	0.691	-0.37 (0.562)	0.511	0.840	-0.174 (0.549)	0.751
Income X origin	1.524	0.421 (0.624)	0.500	1.364	0.31 (0.62)	0.617
Origin X effort	0.499	-0.695 (0.469)	0.138	0.535	-0.625 (0.457)	0.171
Origin X optimism	1.472	0.387 (0.501)	0.440	1.588	0.463 (0.493)	0.348
Origin X risk aversion	2.332	0.847 (0.567)	0.135	1.749	0.559 (0.551)	0.310
Optimism X effort	0.663	-0.411 (0.45)	0.361	0.688	-0.374 (0.439)	0.394
Number of observations	414			432		
AIC	577.618			603.473		
Mc Fadden R2 (p-value)	0.0667			0.06574		
Hosmer-Lemeshow (p-value)	0.3817			0.3211		

Notes. In the main sample, respondents who choose to reward the lazy are dropped. They are kept in alternative sample (6). In both samples and all agnostic respondents are excluded for the variables 'proceduralism' and 'political'.

Table A3. Redistributive preferences with alternative sample (6) –variable 'effortmatters'

4.2.2. Law internalization attitudes

	Defiant vs Indifferent			Defiant vs Compliant			Compliant vs Indifferent		
	Odds	Coefficients (Std.)	P-value	Odds	Coefficients (Std.)	P-value	Odds	Coefficients (Std.)	P-value
(Intercept)	5.183	1.645*** (0.527)	0.002	0.240	-1.427* (0.82)	0.082	21.599	3.073*** (0.745)	0.000
Gender (ref = male)	1.777	0.575* (0.295)	0.052	2.309	0.837** (0.396)	0.034	0.770	-0.262 (0.354)	0.459
Subject (ref = economics)	0.264	-1.331*** (0.307)	0.000	0.753	-0.283 (0.407)	0.486	0.351	-1.048*** (0.344)	0.002
Income (ref = rich)	1.066	0.064 (0.566)	0.910	0.953	-0.048 (0.893)	0.957	1.119	0.112 (0.82)	0.891
Origin (ref = both parents French)	2.351	0.855 (0.749)	0.254	0.000	-15.375 (895.135)	0.986	11 x 10^6	16.22 (890.812)	0.985
Optimism (ref = high)	0.760	-0.274 (0.561)	0.625	1.488	0.398 (0.843)	0.637	0.511	-0.672 (0.774)	0.385
Effort (ref = high)	1.190	0.174 (0.54)	0.747	1.751	0.56 (0.808)	0.488	0.680	-0.386 (0.728)	0.596
Effort matters (ref = neutral)	1.202	0.184 (0.268)	0.493	1.313	0.272 (0.349)	0.435	0.915	-0.089 (0.315)	0.779
Risk aversion (ref = not high)	1.719	0.542 (0.606)	0.371	3.283	1.189 (0.843)	0.158	0.524	-0.647 (0.721)	0.369
Altruism (ref = low)	1.482	0.393 (0.27)	0.145	1.063	0.061 (0.344)	0.859	1.394	0.332 (0.311)	0.285
Belief (ref = religion)	1.305	0.267 (0.268)	0.319	1.329	0.285 (0.345)	0.409	0.982	-0.018 (0.309)	0.953
Political opinion (ref = right-wing)	0.779	-0.25 (0.281)	0.374	0.406	-0.902** (0.369)	0.015	1.920	0.652** (0.333)	0.050
Proceduralism (ref = procedural)	1.186	0.171 (0.269)	0.526	1.795	0.585* (0.344)	0.089	0.661	-0.414 (0.308)	0.178
Redistribution (ref = equal distribution)	0.249	-1.388*** (0.281)	0.000	0.380	-0.966*** (0.356)	0.007	0.656	-0.422 (0.308)	0.171
Income X effort	1.758	0.564 (0.625)	0.367	2.487	0.911 (0.961)	0.343	0.707	-0.347 (0.876)	0.692
Income X optimism	1.475	0.389 (0.622)	0.532	3.060	1.118 (0.961)	0.244	0.482	-0.73 (0.875)	0.404
Income X risk aversion	0.806	-0.216 (0.762)	0.777	0.293	-1.228 (1.065)	0.249	2.752	1.012 (0.91)	0.266
Income X origin	0.193	-1.643** (0.82)	0.045	1.9 x 10^6	14.47 (895.135)	0.987	0.000	-16.103 (890.812)	0.986
Origin X effort	0.809	-0.212 (0.589)	0.719	1.762	0.566 (0.754)	0.453	0.459	-0.778 (0.696)	0.264
Origin X optimism	1.270	0.239 (0.614)	0.697	2.212	0.794 (0.865)	0.359	0.574	-0.554 (0.794)	0.485
Origin X risk aversion	0.750	-0.288 (0.769)	0.708	2.610	0.959 (0.933)	0.304	0.287	-1.247 (0.834)	0.135
Optimism X effort	0.539	-0.618 (0.554)	0.264	0.152	-1.883** (0.795)	0.018	3.544	1.265* (0.723)	0.080
Notes. Number of observations 412. AIC = 776.0509. McFadden pseudo-R2 = 0.1317. Log-likelihood (p-value = 3.219e-07). *** p-value < 0.01, ** p-value < 0.05, * p-value < 0.1.									

Table A4. Law internalization attitudes – main sample

	Defiant vs Indifferent			Defiant vs Compliant			Compliant vs Indifferent		
	Odds	Coefficients (Std.)	P-value	Odds	Coefficients (Std.)	P-value	Odds	Coefficients (Std.)	P-value
(Intercept)	5.273	1.663*** (0.538)	0.002	0.381	-0.964 (0.745)	0.196	13.822	2.626*** (0.668)	0.000
Gender (ref = male)	1.791	0.583** (0.3)	0.052	2.108	0.746** (0.372)	0.045	0.849	-0.163 (0.331)	0.622
Subject (ref = economics)	0.255	-1.366*** (0.313)	0.000	0.577	-0.55 (0.376)	0.143	0.442	-0.816*** (0.314)	0.009
Income (ref = rich)	1.112	0.106 (0.572)	0.853	0.833	-0.183 (0.826)	0.825	1.335	0.289 (0.755)	0.702
Origin (ref = both parents French)	1.882	0.633 (0.764)	0.408	0.857	-0.154 (1.099)	0.888	2.196	0.787 (0.942)	0.404
Optimism (ref = high)	0.552	-0.594 (0.584)	0.310	2.091	0.738 (0.717)	0.304	0.264	-1.331** (0.649)	0.040
Effort (ref = high)	1.437	0.362 (0.548)	0.508	1.000	0.000 (0.755)	1.000	1.436	0.362 (0.672)	0.590
Effort matters (ref = neutral)	1.236	0.212 (0.273)	0.438	1.163	0.151 (0.327)	0.644	1.063	0.061 (0.296)	0.837
Risk aversion (ref = not high)	1.588	0.462 (0.62)	0.456	3.629	1.289* (0.74)	0.082	0.438	-0.826 (0.621)	0.183
Altruism (ref = low)	1.570	0.451 (0.276)	0.103	1.053	0.052 (0.324)	0.874	1.491	0.4 (0.294)	0.175
Belief (ref = religion)	1.345	0.296 (0.272)	0.277	1.225	0.203 (0.324)	0.532	1.098	0.094 (0.291)	0.748
Political opinion (ref = right-wing)	0.712	-0.34 (0.285)	0.234	0.543	-0.61* (0.34)	0.073	1.310	0.27 (0.307)	0.379
Proceduralism (ref = procedural)	1.156	0.145 (0.274)	0.598	1.645	0.498 (0.325)	0.126	0.702	-0.353 (0.291)	0.225
Redistribution (ref = equal distribution)	0.213	-1.548*** (0.284)	0.000	0.545	-0.607* (0.34)	0.074	0.390	-0.941*** (0.292)	0.001
Income X effort	1.352	0.302 (0.639)	0.637	3.973	1.38 (0.862)	0.109	0.340	-1.078 (0.774)	0.163
Income X optimism	1.889	0.636 (0.644)	0.323	2.088	0.736 (0.854)	0.389	0.905	-0.1 (0.764)	0.896
Income X risk aversion	0.939	-0.063 (0.777)	0.936	0.225	-1.491 (0.945)	0.115	4.171	1.428* (0.785)	0.069
Income X origin	0.258	-1.355 (0.847)	0.110	0.493	-0.708 (1.204)	0.557	0.523	-0.648 (1.041)	0.534
Origin X effort	0.838	-0.176 (0.598)	0.768	1.540	0.432 (0.701)	0.538	0.544	-0.608 (0.642)	0.343
Origin X optimism	1.178	0.164 (0.63)	0.795	1.805	0.59 (0.798)	0.459	0.653	-0.427 (0.722)	0.555
Origin X risk aversion	0.711	-0.342 (0.78)	0.662	2.634	0.968 (0.877)	0.269	0.270	-1.31* (0.764)	0.086
Optimism X effort	0.592	-0.524 (0.563)	0.352	0.187	-1.678** (0.74)	0.023	3.169	1.153* (0.673)	0.086

Notes. Number of observations 411. AIC = 803.7312. McFadden pseudo-R2 = 0.1264. Log-likelihood (p-value = 4.138e-07). *** p-value < 0.01, ** p-value < 0.05, * p-value < 0.1.

Table A5. Law internalization attitudes with alternative sample (1) – random allocation of a defiant or indifferent attitude to the maxi-compensators

	Defiant vs Indifferent			Defiant vs Compliant			Compliant vs Indifferent		
	Odds	Coefficients (Std.)	P-value	Odds	Coefficients (Std.)	P-value	Odds	Coefficients (Std.)	P-value
(Intercept)	4.984	1.606*** (0.521)	0.002	0.193	-1.647 (0.822)	0.045	25.869	3.253*** (0.749)	0.000
Gender (ref = male)	1.905	0.644** (0.293)	0.028	2.410	0.88** (0.396)	0.026	0.790	-0.235 (0.353)	0.506
Subject (ref = economics)	0.272	-1.303*** (0.303)	0.000	0.798	-0.226 (0.406)	0.578	0.341	-1.077*** (0.343)	0.002
Income (ref = rich)	1.114	0.108 (0.56)	0.847	1.216	0.196 (0.882)	0.825	0.916	-0.088 (0.808)	0.914
Origin (ref = both parents French)	2.567	0.943 (0.746)	0.206	0.000	-15.333 (886.906)	0.986	11 x 10^6	16.266 (882.657)	0.985
Optimism (ref = high)	0.844	-0.169 (0.557)	0.761	1.856	0.618 (0.826)	0.454	0.455	-0.788 (0.753)	0.295
Effort (ref = high)	1.116	0.109 (0.526)	0.835	1.889	0.636 (0.79)	0.421	0.591	-0.526 (0.714)	0.461
Effort matters (ref = neutral)	1.134	0.126 (0.265)	0.634	1.301	0.263 (0.348)	0.449	0.872	-0.137 (0.313)	0.661
Risk aversion (ref = not high)	1.768	0.57 (0.6)	0.342	4.233	1.443* (0.809)	0.074	0.418	-0.873 (0.682)	0.201
Altruism (ref = low)	1.346	0.297 (0.266)	0.264	1.055	0.054 (0.342)	0.874	1.275	0.243 (0.307)	0.428
Belief (ref = religion)	1.333	0.287 (0.265)	0.277	1.315	0.274 (0.344)	0.426	1.014	0.014 (0.307)	0.965
Political opinion (ref = right-wing)	0.762	-0.272 (0.277)	0.327	0.387	-0.949*** (0.368)	0.010	1.968	0.677** (0.331)	0.041
Proceduralism (ref = procedural)	1.120	0.113 (0.266)	0.671	1.778	0.576* (0.343)	0.093	0.630	-0.463 (0.305)	0.130
Redistribution (ref = equal distribution)	0.256	-1.363*** (0.279)	0.000	0.371	-0.991*** (0.356)	0.005	0.689	-0.372 (0.306)	0.224
Income X effort	1.869	0.626 (0.615)	0.309	2.058	0.722 (0.924)	0.435	0.908	-0.096 (0.835)	0.908
Income X optimism	1.395	0.333 (0.615)	0.589	2.274	0.822 (0.928)	0.376	0.613	-0.489 (0.837)	0.559
Income X risk aversion	0.781	-0.247 (0.756)	0.744	0.225	-1.494 (1.04)	0.151	3.478	1.246 (0.879)	0.156
Income X origin	0.190	-1.663 (0.816)	0.042	1.8 x 10^6	14.453 (886.906)	0.987	0.000	-16.107 (882.657)	0.985
Origin X effort	0.761	-0.274 (0.584)	0.640	1.758	0.564 (0.754)	0.454	0.433	-0.838 (0.692)	0.226
Origin X optimism	1.263	0.233 (0.612)	0.703	2.245	0.809 (0.865)	0.350	0.562	-0.576 (0.793)	0.468
Origin X risk aversion	0.716	-0.334 (0.766)	0.662	2.648	0.974 (0.934)	0.297	0.270	-1.308 (0.831)	0.115
Optimism X effort	0.576	-0.552 (0.547)	0.313	0.176	-1.739** (0.78)	0.026	3.278	1.187* (0.705)	0.092

Notes. Number of observations 421. AIC = 790.56. McFadden pseudo-R2 = 0.1287. Log-likelihood (p-value = 3.88e-07). *** p-value < 0.01, ** p-value < 0.05, * p-value < 0.1.

Table A6. Law internalization attitudes with alternative sample (2) – variable 'proceduralism', random assignation of agnostics.

	Defiant vs Indifferent			Defiant vs Compliant			Compliant vs Indifferent		
	Odds	Coefficients (Std.)	P-value	Odds	Coefficients (Std.)	P-value	Odds	Coefficients (Std.)	P-value
(Intercept)	4.860	1.581*** (0.523)	0.003	0.230	-1.472* (0.818)	0.072	21.174	3.053*** (0.745)	0.000
Gender (ref = male)	1.879	0.631** (0.294)	0.032	2.401	0.876** (0.395)	0.027	0.783	-0.245 (0.354)	0.489
Subject (ref = economics)	0.270	-1.307*** (0.304)	0.000	0.764	-0.27 (0.406)	0.507	0.354	-1.038*** (0.344)	0.003
Income (ref = rich)	1.127	0.12 (0.564)	0.832	0.989	-0.011 (0.893)	0.990	1.140	0.131 (0.82)	0.873
Origin (ref = both parents French)	2.564	0.942 (0.748)	0.208	0.000	-15.311 (895.826)	0.986	11 x 10^6	16.243 (891.463)	0.985
Optimism (ref = high)	0.839	-0.175 (0.557)	0.753	1.593	0.466 (0.842)	0.580	0.527	-0.641 (0.773)	0.407
Effort (ref = high)	1.051	0.05 (0.529)	0.925	1.605	0.473 (0.802)	0.555	0.655	-0.423 (0.728)	0.561
Effort matters (ref = neutral)	1.167	0.154 (0.267)	0.563	1.292	0.256 (0.349)	0.463	0.903	-0.102 (0.315)	0.747
Risk aversion (ref = not high)	1.806	0.591 (0.604)	0.328	3.397	1.223 (0.842)	0.147	0.532	-0.632 (0.721)	0.380
Altruism (ref = low)	1.400	0.337 (0.268)	0.209	1.026	0.026 (0.344)	0.940	1.364	0.311 (0.31)	0.316
Belief (ref = religion)	1.362	0.309 (0.266)	0.245	1.370	0.315 (0.345)	0.362	0.994	-0.006 (0.309)	0.985
Political opinion (ref = right-wing)	0.742	-0.298 (0.279)	0.285	0.393	-0.935** (0.369)	0.011	1.891	0.637* (0.333)	0.056
Proceduralism (ref = procedural)									
Consequentialist	1.182	0.167 (0.269)	0.534	1.791	0.583* (0.344)	0.091	0.660	-0.416 (0.307)	0.176
Agnostic	2.515	0.922 (1.172)	0.431	0.000	-15.055 (1668.595)	0.993	8.6 x 10^6	15.964 (1657.406)	0.992
Redistribution (ref = equal distribution)	0.248	-1.394*** (0.28)	0.000	0.377	-0.976*** (0.357)	0.006	0.659	-0.417 (0.308)	0.175
Income X effort	1.936	0.661 (0.618)	0.285	2.672	0.983 (0.959)	0.306	0.725	-0.322 (0.875)	0.713
Income X optimism	1.341	0.293 (0.617)	0.635	2.865	1.053 (0.959)	0.273	0.468	-0.76 (0.874)	0.385
Income X risk aversion	0.770	-0.261 (0.762)	0.732	0.285	-1.257 (1.066)	0.238	2.707	0.996 (0.91)	0.274
Income X origin	0.183	-1.699** (0.818)	0.038	1.8 x 10^6	14.43 (895.826)	0.987	0.000	-16.12 (891.463)	0.986
Origin X effort	0.815	-0.205 (0.587)	0.727	1.750	0.559 (0.754)	0.458	0.466	-0.764 (0.695)	0.271
Origin X optimism	1.220	0.199 (0.613)	0.745	2.152	0.766 (0.865)	0.376	0.567	-0.567 (0.794)	0.475
Origin X risk aversion	0.743	-0.296 (0.77)	0.700	2.598	0.955 (0.934)	0.307	0.286	-1.251 (0.833)	0.133
Optimism X effort	0.589	-0.529 (0.55)	0.336	0.162	-1.823** (0.794)	0.022	3.648	1.294* (0.722)	0.073

Notes. Number of observations 422. AIC = 796.0004. McFadden pseudo-R2 = 0.1308. Log-likelihood (p-value = 5.073e-07). *** p-value < 0.01, ** p-value < 0.05, * p-value < 0.1.

Table A7. Law internalization attitudes with alternative sample (3) – variable 'proceduralism'. Agnostics are kept as a new category

	Defiant vs Indifferent			Defiant vs Compliant			Compliant vs Indifferent		
	Odds	Coefficients (Std.)	P-value	Odds	Coefficients (Std.)	P-value	Odds	Coefficients (Std.)	P-value
(Intercept)	6.083	1.805*** (0.526)	0.001	0.258	-1.354* (0.821)	0.099	23.553	3.159*** (0.744)	0.000
Gender (ref = male)	1.784	0.579** (0.289)	0.045	2.326	0.844** (0.392)	0.031	0.767	-0.265 (0.352)	0.452
Subject (ref = economics)	0.266	-1.325*** (0.302)	0.000	0.689	-0.373 (0.4)	0.351	0.386	-0.952*** (0.338)	0.005
Income (ref = rich)	0.836	-0.179 (0.535)	0.738	0.686	-0.377 (0.876)	0.667	1.219	0.198 (0.811)	0.807
Origin (ref = both parents French)	2.185	0.782 (0.746)	0.295	0.000	-15.301 (903.352)	0.986	9.6 x 10^6	16.078 (901.046)	0.986
Optimism (ref = high)	0.648	-0.434 (0.55)	0.430	1.407	0.342 (0.836)	0.683	0.460	-0.776 (0.769)	0.313
Effort (ref = high)	1.210	0.191 (0.526)	0.717	1.725	0.545 (0.801)	0.496	0.702	-0.354 (0.722)	0.624
Effort matters (ref = neutral)	1.091	0.088 (0.259)	0.736	1.159	0.147 (0.339)	0.663	0.942	-0.06 (0.306)	0.845
Risk aversion (ref = not high)	1.879	0.631 (0.602)	0.295	3.470	1.244 (0.844)	0.140	0.541	-0.614 (0.717)	0.392
Altruism (ref = low)	1.363	0.31 (0.261)	0.235	0.941	-0.061 (0.336)	0.857	1.448	0.371 (0.304)	0.222
Belief (ref = religion)	1.226	0.204 (0.26)	0.433	1.308	0.268 (0.338)	0.427	0.937	-0.065 (0.304)	0.832
Political opinion (ref = right-wing)	0.897	-0.109 (0.27)	0.687	0.430	-0.843** (0.361)	0.019	2.085	0.735** (0.327)	0.025
Proceduralism (ref = procedural)	1.226	0.204 (0.26)	0.434	1.998	0.692** (0.336)	0.040	0.614	-0.488 (0.301)	0.105
Redistribution (ref = equal distribution)	0.255	-1.366*** (0.27)	0.000	0.438	-0.826** (0.345)	0.017	0.583	-0.54* (0.299)	0.071
Income X effort	1.654	0.503 (0.606)	0.406	2.644	0.972 (0.944)	0.303	0.625	-0.469 (0.862)	0.586
Income X optimism	1.952	0.669 (0.601)	0.266	4.036	1.395 (0.948)	0.141	0.483	-0.727 (0.868)	0.402
Income X risk aversion	0.793	-0.232 (0.755)	0.758	0.362	-1.017 (1.043)	0.330	2.192	0.785 (0.882)	0.374
Income X origin	0.230	-1.469* (0.802)	0.067	2.1 x 10^6	14.558 (903.352)	0.987	0.000	-16.022 (901.046)	0.986
Origin X effort	0.837	-0.177 (0.571)	0.756	1.827	0.603 (0.737)	0.413	0.458	-0.78 (0.683)	0.253
Origin X optimism	0.986	-0.014 (0.59)	0.982	1.566	0.449 (0.85)	0.597	0.630	-0.462 (0.788)	0.558
Origin X risk aversion	0.711	-0.34 (0.765)	0.656	2.163	0.772 (0.907)	0.395	0.329	-1.112 (0.808)	0.169
Optimism X effort	0.592	-0.524 (0.533)	0.325	0.174	-1.749** (0.781)	0.025	3.405	1.225* (0.715)	0.086

Notes. Number of observations = 434. AIC = 810.03. McFadden pseudo-R2 = 0.1296. Log-likelihood (p-value = 1.18e-07). *** p-value < 0.01, ** p-value < 0.05, * p-value < 0.1.

Table A8. Law internalization attitudes with alternative sample (4) – variable 'political', random assignation of agnostics.

	Defiant vs Indifferent			Defiant vs Compliant			Compliant vs Indifferent		
	Odds	Coefficients (Std.)	P-value	Odds	Coefficients (Std.)	P-value	Odds	Coefficients (Std.)	P-value
(Intercept)	6.734	1.907*** (0.526)	0.000	0.283	-1.261 (0.821)	0.125	23.771	3.168*** (0.742)	0.000
Gender (ref = male)	1.794	0.585** (0.29)	0.044	2.411	0.88** (0.393)	0.025	0.744	-0.296 (0.353)	0.402
Subject (ref = economics)	0.265	-1.328*** (0.301)	0.000	0.695	-0.363 (0.399)	0.362	0.381	-0.965*** (0.338)	0.004
Income (ref = rich)	0.748	-0.291 (0.534)	0.586	0.636	-0.453 (0.88)	0.607	1.176	0.162 (0.813)	0.842
Origin (ref = both parents French)	1.821	0.599 (0.7)	0.392	0.000	-15.519 (847.212)	0.985	9.9 x 10^6	16.109 (843.427)	0.985
Optimism (ref = high)	0.681	-0.384 (0.553)	0.487	1.417	0.348 (0.839)	0.678	0.481	-0.732 (0.769)	0.341
Effort (ref = high)	1.072	0.069 (0.515)	0.893	1.550	0.438 (0.797)	0.582	0.691	-0.369 (0.722)	0.609
Effort matters (ref = neutral)	1.065	0.063 (0.259)	0.807	1.103	0.098 (0.341)	0.773	0.965	-0.035 (0.308)	0.909
Risk aversion (ref = not high)	1.595	0.467 (0.575)	0.417	3.012	1.103 (0.828)	0.183	0.530	-0.636 (0.716)	0.375
Altruism (ref = low)	1.403	0.339 (0.261)	0.195	0.973	-0.027 (0.337)	0.936	1.442	0.366 (0.304)	0.229
Belief (ref = religion)	1.215	0.195 (0.259)	0.453	1.292	0.256 (0.337)	0.447	0.940	-0.062 (0.303)	0.838
Political opinion (ref = right-wing)									
Left-wing	0.789	-0.237 (0.279)	0.395	0.401	-0.913** (0.367)	0.013	1.967	0.676** (0.333)	0.042
Agnostic	1.069	0.067 (0.584)	0.909	0.427	-0.851 (0.905)	0.347	2.504	0.918 (0.811)	0.258
Proceduralism (ref = procedural)	1.215	0.194 (0.259)	0.454	1.978	0.682** (0.336)	0.042	0.614	-0.488 (0.301)	0.105
Redistribution (ref = equal distribution)	0.254	-1.369*** (0.27)	0.000	0.434	-0.835** (0.346)	0.016	0.586	-0.534* (0.3)	0.075
Income X effort	2.014	0.7 (0.593)	0.237	3.217	1.169 (0.943)	0.215	0.626	-0.468 (0.865)	0.588
Income X optimism	1.810	0.594 (0.596)	0.319	3.847	1.347 (0.947)	0.155	0.471	-0.754 (0.868)	0.385
Income X risk aversion	1.080	0.077 (0.716)	0.915	0.471	-0.752 (1.027)	0.464	2.290	0.829 (0.881)	0.347
Income X origin	0.314	-1.159 (0.746)	0.120	2.8 x 10^6	14.855 (847.212)	0.986	0.000	-16.005 (843.427)	0.985
Origin X effort	0.714	-0.337 (0.559)	0.546	1.518	0.418 (0.736)	0.570	0.470	-0.755 (0.686)	0.271
Origin X optimism	1.035	0.035 (0.589)	0.953	1.675	0.516 (0.847)	0.543	0.618	-0.481 (0.788)	0.541
Origin X risk aversion	0.508	-0.677 (0.728)	0.352	1.674	0.515 (0.894)	0.565	0.303	-1.192 (0.808)	0.140
Optimism X effort	0.608	-0.498 (0.531)	0.349	0.177	-1.734** (0.78)	0.026	3.441	1.236* (0.715)	0.084

Notes. Number of observations = 434. AIC = 813.195. McFadden pseudo-R2 = 0.1306. Log-likelihood (p-value = 2.396e-07). *** p-value < 0.01, ** p-value < 0.05, * p-value < 0.1.

Table A9. Law internalization attitudes with alternative sample (5) – variable 'political'. Agnostics are kept as a new category.

	Defiant vs Indifferent			Defiant vs Compliant			Compliant vs Indifferent		
	Odds	Coefficients (Std.)	P-value	Odds	Coefficients (Std.)	P-value	Odds	Coefficients (Std.)	P-value
(Intercept)	5.588	1.721*** (0.526)	0.001	0.313	-1.162 (0.794)	0.143	17.860	2.883*** (0.722)	0.000
Gender (ref = male)	1.591	0.464 (0.284)	0.102	1.747	0.558 (0.362)	0.123	0.911	-0.093 (0.332)	0.778
Subject (ref = economics)	0.299	-1.206*** (0.292)	0.000	0.864	-0.146 (0.38)	0.700	0.347	-1.06*** (0.334)	0.002
Income (ref = rich)	1.082	0.079 (0.562)	0.889	0.933	-0.07 (0.844)	0.934	1.160	0.148 (0.777)	0.849
Origin (ref = both parents French)	2.299	0.833 (0.747)	0.265	0.000	-15.349 (903.687)	0.986	10.6 x 10^6	16.176 (901.148)	0.986
Optimism (ref = high)	0.677	-0.39 (0.554)	0.481	1.210	0.191 (0.816)	0.815	0.559	-0.581 (0.754)	0.441
Effort (ref = high)	1.297	0.26 (0.536)	0.627	1.804	0.59 (0.763)	0.439	0.719	-0.33 (0.687)	0.631
Effort matters (ref = neutral)									
Punish the lazy	1.219	0.198 (0.266)	0.456	1.337	0.29 (0.344)	0.400	0.912	-0.092 (0.314)	0.770
Reward the lazy	0.168	-1.785** (0.743)	0.016	1.354	0.303 (0.628)	0.629	0.124	-2.089*** (0.771)	0.007
Risk aversion (ref = not high)	1.734	0.551 (0.602)	0.361	3.472	1.245 (0.805)	0.122	0.500	-0.694 (0.685)	0.311
Altruism (ref = low)	1.452	0.373 (0.263)	0.156	0.884	-0.123 (0.328)	0.708	1.642	0.496 (0.303)	0.102
Belief (ref = religion)	1.150	0.14 (0.26)	0.591	1.097	0.093 (0.329)	0.778	1.048	0.047 (0.302)	0.877
Political opinion (ref = right-wing)	0.748	-0.29 (0.273)	0.287	0.394	-0.932*** (0.354)	0.008	1.899	0.641** (0.328)	0.051
Proceduralism (ref = procedural)	1.174	0.161 (0.261)	0.538	1.716	0.54* (0.327)	0.098	0.684	-0.379 (0.299)	0.205
Redistribution (ref = equal distribution)	0.261	-1.342*** (0.271)	0.000	0.488	-0.717** (0.337)	0.033	0.535	-0.625** (0.299)	0.037
Income X effort	1.343	0.295 (0.611)	0.629	1.926	0.656 (0.907)	0.470	0.697	-0.361 (0.834)	0.665
Income X optimism	1.497	0.403 (0.609)	0.508	2.874	1.056 (0.909)	0.246	0.521	-0.653 (0.837)	0.436
Income X risk aversion	0.849	-0.163 (0.745)	0.826	0.417	-0.875 (0.991)	0.377	2.038	0.712 (0.847)	0.401
Income X origin	0.212	-1.552* (0.814)	0.056	2.2 x 10^6	14.585 (903.687)	0.987	0.000	-16.132 (901.148)	0.986
Origin X effort	0.763	-0.271 (0.572)	0.635	1.635	0.491 (0.713)	0.491	0.466	-0.763 (0.675)	0.258
Origin X optimism	1.436	0.362 (0.599)	0.546	2.595	0.954 (0.819)	0.244	0.553	-0.592 (0.767)	0.440
Origin X risk aversion	0.591	-0.526 (0.735)	0.475	1.263	0.234 (0.859)	0.785	0.468	-0.759 (0.79)	0.337
Optimism X effort	0.592	-0.525 (0.537)	0.328	0.190	-1.661** (0.744)	0.026	3.115	1.136* (0.687)	0.098
Notes. Number of observations = 431. AIC = 822.070. McFadden pseudo-R2 = 0.1343. Log-likelihood (p-value = 5.061e-08). *** p-value < 0.01, ** p-value < 0.05, * p-value < 0.1.									

Table A10. Law internalization attitudes with alternative sample (8) – variable 'effortmatters'. Those who reward the lazy are kept as a new category

	Redistributive preferences	Law internalization attitudes		
		Defiant vs Indifferent	Defiant vs Compliant	Compliant vs Indifferent
(Intercept)		Significant for all samples	Significant for main sample & samples (3) (4) (5) Not significant for samples (1) (2) (6)	Significant for all samples
Gender (ref = male)		Significant for main sample & samples (1) (2) (3) (4) (5) Not significant for sample (6)	Significant for main sample & samples (1) (2) (3) (4) (5) Not significant for sample (6)	
Subject (ref = economics)	Not significant for main sample & samples (1) (2) (3) Significant for samples (4) (5) (6)	Significant for all samples		Significant for all samples
Income (ref = rich)				
Origin (ref = both parents French)				Not significant for main sample & samples (2) (3) (4) (5) (6) Significant for sample (1)
Optimism (ref = high)				
Effort (ref = high)				
Effort matters (ref = neutral)	Significant for all samples	Not significant for main sample & samples (1) (2) (3) (4) (5) Significant for sample (6)		Not significant for main sample & samples (1) (2) (3) (4) (5) Significant for sample (6)
Risk aversion (ref = not high)			Not significant for main sample & samples (3) (4) (5) (6) Significant for samples (1) (2)	
Altruism (ref = low)				
Belief (ref = religion)				
Freedom vs equality (ref = freedom)				
Political opinion (ref = right-wing)	Significant for all samples		Significant for all samples	Significant for main sample & samples (2) (3) (4) (5) (6) Not significant for sample (1)
Proceduralism (ref = procedural)	Significant for main sample & samples (1) (2) (3) Not significant for samples (4) (5) (6)		Significant for main sample & samples (2) (3) (4) (5) (6) Not significant for sample (1)	
Redistribution (ref = equal distribution)		Significant for all samples	Significant for all samples	Not significant for main sample & samples (2) and (3) Significant for samples (1) (4) (5) (6)
Income X effort				
Income X optimism				
Income X risk aversion				Not significant for main sample & samples (2) (3) (4) (5) (6) Significant for sample (1)
Income X origin		Significant for main sample & samples (3) (4) (6) Not significant for samples (1) (2) (5)		Not significant for main sample & samples (2) (3) (4) (5) (6) Significant for sample (1)
Origin X effort				
Origin X optimism				
Origin X risk aversion				Not significant for main sample & samples (2) (3) (4) (5) (6) Significant for sample (1)
Optimism X effort			Significant for all samples	Significant for all samples

Notes. Alternative sample (1) = maxi-compensators are randomly assigned an indifferent or defiant law internalization attitude; (2) procedural agnostics are randomly assigned a procedural or consequentialist preference; (3) procedural agnostic are kept as a category of the variable 'procedural'; (4) political agnostics are randomly assigned left- or right-wing political opinions; (5) political agnostic are kept as a category of the variable 'political'; (6) respondents who reward the lazy in the 'Gold Rush' vignette are kept as a category of the variable 'effort matters'. In the main sample, all political and procedural agnostics are excluded as well as the respondents who reward the lazy in the 'Gold Rush' vignette, and all maxi-compensators are conservatively labelled as 'indifferent'.

Table A14. Summary of differences between main and alternative samples (regressions)

4.2.3. Random Forest conditional importance factors

In this section, we present the random forest conditional importance factors computed for the main and alternative samples. All factors are computed for 1000-tree random forests using the function {varimp} of the R package {party}.

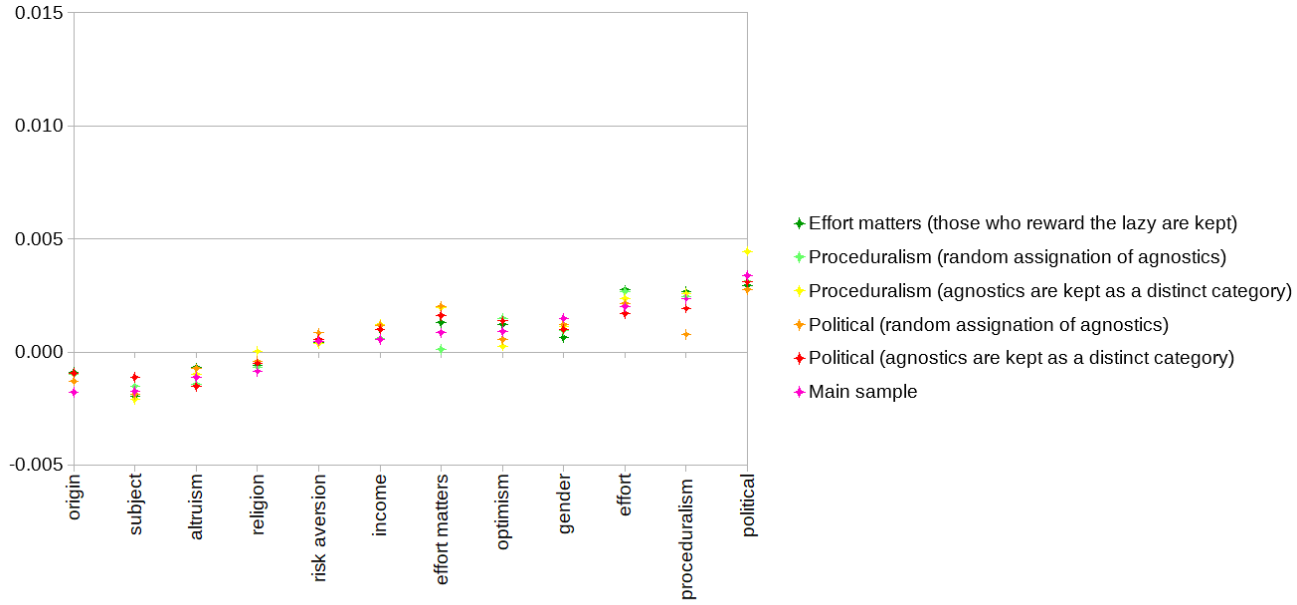

Figure A11. Random forest conditional importance factors with alternative samples for redistributive preferences (1,000-tree forests)

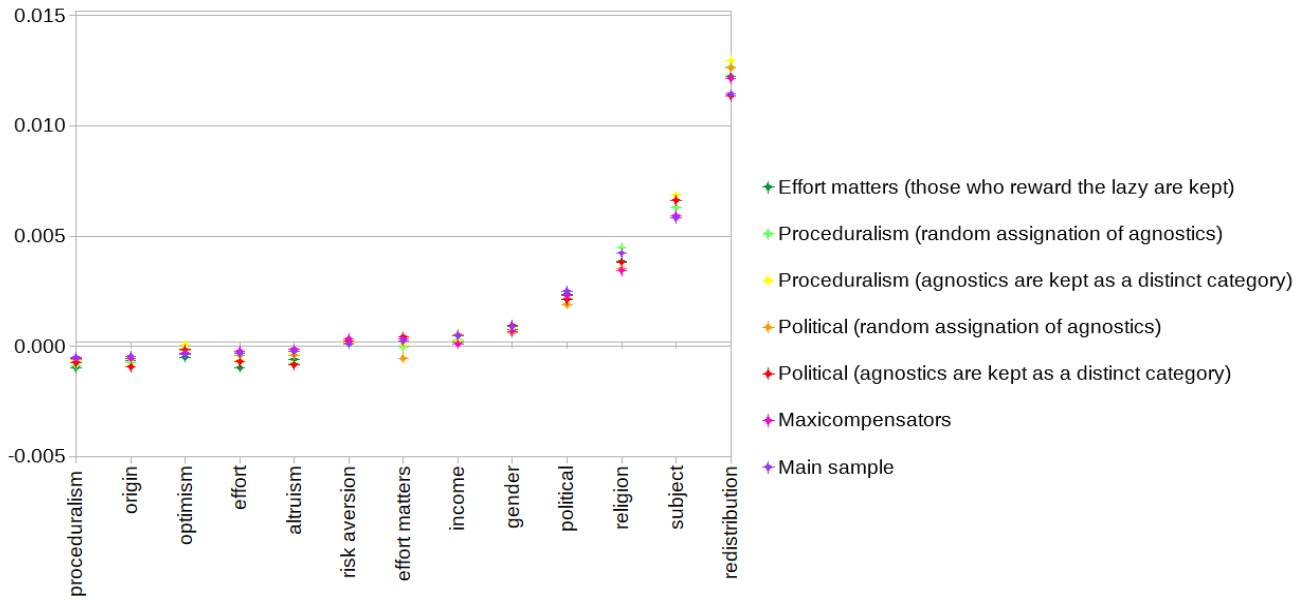

Figure A12. Random forest conditional importance factors with alternative samples for law internalization attitudes (1,000-tree forests)