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# Identity and Redistribution: Theory and Evidence.

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# Identity and Redistribution: Theory and Evidence.

## Abstract

We propose a theoretical model that embeds social identity concerns, as in Akerlof and Kranton (2000), with inequity averse preferences, as in Fehr and Schmidt (1999). We conduct an artefactual ultimatum game experiment with registered members of British political parties, for whom political identity is salient and redistribution is also likely to be salient. The empirical results are as follows. (1) Proposers and responders demonstrate ingroup-favoritism. (2) Proposers exhibit quantitatively stronger social identity effects relative to responders. (3) As redistributive taxes increase, average offers by proposers and the average minimum acceptable offers of responders (both as a proportion of income) decline by almost the same amount, suggesting a shared understanding that is characteristic of social norms. (4) Subjects experience less disadvantageous inequity from ingroup members relative to outgroup members.

JEL-Codes: D010, D030.

Keywords: social identity, political identity, prosocial behavior, ultimatum game, fiscal redistribution, entitlements.

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# I INTRODUCTION

How do humans distribute a cake of a given size among themselves? This is a fundamental question in the social sciences. In economics it is central to at least two main areas. There is a large literature on redistribution and its determinants in public economics (Atkinson and Bourguignon, 2000, 2015). In a range of experimental games, such as the dictator game, the ultimatum game, and the public goods game, among many others, the central question is reallocation/redistribution of resources (Camerer, 2003; Dhami, 2019, Volume 2). There has been a spurt of interest in both these literatures that use the lens of *social identity theory* to examine redistribution (Shayo, 2009; Klor and Shayo, 2010; Lindqvist and Östling, 2013; Costa-Font and Cowell, 2015; Holm, 2016; Holm and Geys, 2018; Besley and Persson, 2019).

Social identity theory, a highly active area of research within the social sciences, shows that people identify with social categories (Dhami, 2019, Vol. 2). *Social identity* refers to ones social category, e.g., Protestant or Catholic, Democrat or Republican, African-American or Asian-American, black or white. Members of the same social category typically have *shared norms of behavior* that they expect others in their social category to follow. Such norms may be enforced by punishments or sanctions, or by the self-esteem that individuals derive from conforming to them, or perhaps because they are hard-wired by evolution to do so (Tajfel, 1970; Tajfel and Turner, 1979, 1986; Turner and Reynold, 2010; Gintis, 2009; Fehr and Schurtenberger, 2018). Different social contexts may trigger different identities; for instance, a family identity, a regional identity, or a national identity (Turner et al., 1987).

Social identity theory has the following three features (Dhami, 2019, Vol. 2, Ch. 3). (i) *Categorization*: People classify into the relevant social categories. (ii) *Identification*: People identify with the norms and characteristics of their category. Members of the same category are termed as *ingroup members* and members of other categories as *outgroup members*. Identification typically involves favouring the ingroup members over the outgroup members. (iii) *Social comparisons*: People compare their own group to other groups on some criteria.

In the classic model of redistribution, individuals vote for alternative linear redistributive tax rates to maximize their own monetary payoff (Meltzer and Richards, 1981). However, in the recent literature, as in Shayo (2009), individuals also care for social identity; an extra term in the utility function captures the status of one's ingroup. Thus, individually optimal allocations in the Meltzer-Richard model might no longer be socially optimal. For instance, when poor individuals have concerns for a national identity, they might vote for lower redistribution (Shayo, 2009). This model has been extended to allow for multiple identities (Lindqvist and Östling, 2013); a social identity based on either local or national

jurisdiction which determines the flow of public funds within regions (Holm and Geys, 2018); and models of endogenous, dynamic social identities (Besley and Persson, 2019). In the experimental literature Klor and Shayo (2010) show that individuals trade-off their monetary payoffs against the best redistributive tax rates for their social ingroups.

Our paper adds to the insights from this broad literatures, but it differs in the theoretical model, the subject pool, and the experiments, as we explain below. In several papers, artificial, albeit plausible, social identities are created. In some cases, the predictions of such a model are studied using non-incentivized survey data that does not directly use the identities of the subjects or uses proxies for identities (Shayo, 2009; Holm and Geys, 2018). Other contributions are purely theoretical (Lindqvist and Östling, 2013; Besley and Persson, 2019). When experimental subjects are used, typically student populations, their lab identity may differ from their real world identity (Klor and Shayo, 2010; Chen and Li, 2009).

### *Real World Identity Relevant for Social Redistribution*

In many classic experiments on social identity, individuals are primed for a *minimal group identity* (MG) that bears little resemblance to their real world identities. Nevertheless, even when primed for trivial identities, say, blue and red groups, group members favour ingroup members over outgroup members; this is the main prediction of social identity theory (Billig and Tajfel, 1973; Tajfel and Turner, 1979, 1986; McDermott, 2009). Thus, humans may be hard-wired by evolution to exhibit such preferences. Ingroup favoritism arising from social identities can give rise to cooperation among ingroup members. But it can also lead to socially harmful outcomes such as intolerance, discrimination, and prejudice towards outgroup members (Baranowski et al., 2018). Typically students tend to form the basis of the subject pool for experiments using the MG design (Chen and Li, 2009; Guala et al., 2013; Fowler and Kam, 2007; Eckel and Grossman, 2005).

Natural group identities created by association with *actual social groups* (SG) may have greater ecological validity. Applications with the SG design include: field experiments with Swiss army trainees (Goette et al., 2006); ethnic groups (Habyarimana et al. 2007); effects of wartime violence on social cohesion (Gilligan et al. 2013); effects of internal sanctioning on cooperative behavior (Grossman et al., 2012); ethnic factors in judicial decisions (Grossman et al., 2016); exposure to religious messages and effects on egalitarianism and activism (McClendon and Riedl, 2015). Our interest in this paper is in SG rather than MG identities.

*Political identity* plays a central role in issues of real world redistribution. For instance, in the US, the Democratic Party is typically identified as the party of higher taxes and higher redistribution while the Republican party is identified with lower taxes and lower

redistribution (Dhimi, 2003). Similar distinctions on the spectrum of greater-lower redistribution exist in most democratic countries. For instance, in the UK, Labour and Liberal Democrats are typically associated with higher taxes and greater redistribution and the Conservatives with lower taxes and redistribution. It would seem to us that arguably the most relevant “real world” identity for studying issues of redistribution is the self-chosen political identity of the subjects.

Our subjects are registered members of the main British political parties: Labour, Liberal Democrats, Conservatives, Green, and UKIP (short for UK Independence Party). Party members pay a membership fee, receive party political literature that often highlights vexed and varied issues of societal redistribution, and pass on their views on such matters to the party. As such, political identity, and awareness of redistributive issues, for these individuals is very salient. Surprisingly little attention has been given to political identity.<sup>1</sup> This may partly be explained by the difficulty in getting access to registered political party members.<sup>2</sup>

### *The Experiment*

Fowler and Kam (2007) run dictator game experiments with students and find that the (self-reported) political identity of the students influences the degree of prosociality. However, real world redistribution is often influenced by strategic concerns (Fehr and Schmidt, 2006; Dhimi, 2003). For this reason, we use an ultimatum game in our artefactual lab experiments that introduces a minimal degree of strategic interaction between the players.<sup>3</sup>

Using registered members of British political parties who play the ultimatum game, we study the effects of political identity on social preferences in the presence (and the absence) of fiscal redistribution. There has been surprisingly little work in this important area.<sup>4</sup> Our experimental design ensures that each of the components of social identity theory is present. Subjects classify themselves into their political identities, outside the lab, by choosing to become fee paying members of political parties (*categorization*). Through their decisions (offers and acceptance/rejection) made in the Ultimatum Game, as proposers and responders, they engage in *identification* and *social comparison* with subjects from different political identities. One can check to see if proposers and responders act more favorably to ingroup members as in Mendoza et al. (2014), but in particular when group membership takes the form of political identities.

In the typical lab experiments on social preferences, the endowments are provided by the experimenter. Dictator game experiments have shown that the introduction of earned income to dictators reduces the pro-sociality of their offers (Cherry et al., 2002; Cappelen et al., 2007; Levitt and List, 2007). In Oxoby and Spraggon (2008) receivers in a dictator game earn the endowments; this increased the amounts transferred by the dictator. When

dictators earn their endowments, they reduce the amounts transferred. Thus, property rights may impact on experimentally observed social preferences. However, little is known about the importance of property rights on prosociality arising through earned income and taxation in ultimatum games. Lee and Shahriar (2017) find that as the earned income component of the proposer’s income increases, the responder’s rejection rate falls (but there is neither taxation, nor redistribution in this paper).

In our experimental design, we have two treatments. In the *standard ultimatum game*, Treatment 1, the endowments are provided by the experimenter. In the *augmented ultimatum game*, Treatment 2, in addition to identical endowments provided by the experimenter, we allow proposers to earn extra income; all income is subject to an income tax. A proportion of the income tax revenues are redistributed to the responder to mimic societal redistribution. A comparison of Treatments 1 and 2 then allows us to study the prosociality of proposer offers and responder minimum acceptable offers in a  $2 \times 2$  design that varies redistribution and political identities. It also allows us to infer the ordinal ranking of the parameters of inequity aversion towards ingroup and outgroup members.

### *The Theoretical Model*

The extent of pre-tax and post-tax income differences between individuals is a central feature in evaluating redistributive policies. Therefore, in the experimental literature on redistribution, it is not surprising that models of inequity aversion, such as the Fehr and Schmidt (1999) model, fit the data extremely well (Tyran and Sausgruber, 2006; Ackert et al., 2007). Further, the Fehr-Schmidt model is particularly suitable to a theoretical analysis of redistribution (Dhimi and al-Nowaihi, 2010a, 2010b). We show in this paper that the Fehr-Schmidt model can also be easily extended to account for social identity concerns, as in Akerlof and Kranton (2000). To the best of our knowledge, our paper is the first to combine these two literatures.

A central insight of the social identity model, backed by substantial empirical evidence, is that individuals are relatively more altruistic towards ingroup members. In the Fehr-Schmidt model, this is readily captured by restricting the parameter of advantageous inequity (which captures altruism) to be larger for ingroup members than outgroup members. By contrast, social identity theory does not provide guidance on the size of the disadvantageous inequity parameter in the Fehr-Schmidt model (which captures envy) for ingroup versus outgroup members. However, this can be empirically tested by using the predictions of an appropriately specified model, as we do.

Constructing a rigorous theoretical model not only gives precise predictions that can be stringently tested, it also shows that hypotheses based on informal arguments might not hold. For instance, it is routine in experimental papers that employ social identity in ultimatum games to argue that the responder will be more likely to accept offers made by



ingroup proposers relative to outgroup proposers. We show that the theoretical model does not make this prediction without restrictions on the disadvantageous inequity parameter.

### *Main Findings*

Our first finding confirms the classical ingroup favoritism result in social identity theory. The other findings are new, as far as we are aware.

1. (Ingroup favoritism) Proposers make relatively higher offers to responders of the same political identity. Averaged across all identities, responders also state lower *minimum acceptable offers* (henceforth, MAO) when the proposer shares the same political affiliation.
2. (Differences between parties) Proposers make relatively higher offers to responders from Labour, Liberal Democrats, or Green, parties, than to responders from the Conservative party or UKIP. Similarly, responders ask for relatively lower MAO from proposers who belong to the Labour, Liberal Democrats, or Green, parties, than to proposers from the Conservative party or UKIP.
3. (Differing effects of identity) The quantitative effect of political identity on the behavior of proposers is stronger as compared to the effect of political identity on the behavior of responders.
4. (Social Norms) In Treatment 2, where proposers earn their taxable endowments, they make significantly lower offers relative to Treatment 1, where endowments are unearned and untaxed. The MAOs of the responders also decrease significantly in Treatment 2. This in itself should not be surprising. However, the average reduction in proposer offers is almost identical to the corresponding average reduction in the MAOs of the responders, when both are expressed as a fraction of income (both decrease by approximately 5%). This suggests a shared understanding of how redistribution will be altered as taxes increase; such shared understanding is characteristic of social norms (Fehr and Schurtenberger, 2018). Differences over redistribution underpin many contemporary and historically important country/region/group conflicts. Thus, the finding that there is a minimum degree of shared understanding of the appropriate degree of redistribution suggests that humans may have evolved to reduce the states over which these conflicts arise.
5. (Predictions of the theoretical model) The empirical findings are consistent with the predictions of our theoretical model. Our empirical results show that the parameter of disadvantageous inequity aversion in Fehr-Schmidt preferences is higher for outsiders, relative to insiders, which is consistent with the findings of Chen and Li

(2009) who use a student population and make much stronger assumptions than us. This is an important finding that is only made possible by pitting the predictions of a rigorous theoretical model against the data.

### *Plan of the Paper*

Section II describes the theoretical model and its predictions which are tested in the rest of the paper. Section III explains our experimental design based on the ultimatum game and the subject pool comprising of registered British political party members. Section IV gives the experimental results for proposers then responders. Section V offers suggestions for future research that are based on weaker rationality requirements. Section VI concludes. The Appendices in Section VII give the proofs, the experimental instructions, and supplementary tables.

## II THE THEORETICAL MODEL

The *standard ultimatum game* is a sequential game played between two players, a *proposer* and a *responder* (Güth et al., 1982). The endowment of the proposer is  $x > 0$ , which is known to both players. The proposer first makes an offer  $s \in [0, x]$  to the responder, which is observed by the responder. If the responder accepts the offer, then the proposer gets to keep  $y_P(s) = x - s$  and the responder gets  $y_R(s) = s$ . If the responder rejects the offer, both get a zero payoff ( $y_P = y_R = 0$ ). If the monetary amounts are infinitely divisible and both players have self-regarding preferences, then in the subgame perfect equilibrium the outcomes are  $y_P^* = x$ ,  $y_R^* = 0$ .

We assume that the proposer and the responder have Fehr-Schmidt preferences, as in Fehr and Schmidt (1999). Let political identity be denoted by  $S = I, O$ , where  $I$  denotes *insider identity* and  $O$  denotes *outsider identity*. For players  $i, j$  and  $i \neq j$ , the *Fehr-Schmidt preferences* of player  $i$ , who could be a proposer ( $i = P$ ) or a responder ( $i = R$ ), are given by

$$U_i(s) = \begin{cases} y_i(s) - \beta_S [y_i(s) - y_j(s)] & \text{if } y_i(s) \geq y_j(s) \\ y_i(s) - \alpha_S [y_j(s) - y_i(s)] & \text{if } y_i(s) < y_j(s) \end{cases}, \quad i = P, R, \quad (1)$$

where  $\alpha_S \geq 0$  and  $\beta_S \geq 0$  are, respectively, the parameters of disadvantageous and advantageous inequity, which are common across the players (heterogeneity in parameters can be easily incorporated but it is not needed here). Self-regarding preferences is the special case,  $\alpha_S = \beta_S = 0$ . An individual is said to have *social preferences* or *other-regarding preferences*, if at least one of  $\beta_S$  or  $\alpha_S$  is non-zero.

**Remark 1:** Most experimental evidence shows that  $\beta_S \in [0, 1)$ ,  $\beta_S < \alpha_S$  (Dhimi, 2016, Section 5.2). In social identity theory, individuals are relatively more altruistic towards ingroup members. This is captured by  $\beta_I > \beta_O$  (Akerlof and Kranton, 2000). However, social identity theory does not predict whether envy,  $\alpha_S$ , as captured by Fehr-Schmidt preferences, is relatively greater or lower for ingroup members. Thus, a determination of the relative sizes of  $\alpha_I$ ,  $\alpha_O$ , is an empirical matter and can contribute to an enrichment of existing social identity theory. We allow different degrees of altruism and envy towards ingroup and outgroup members as well as differences in such parameters towards members of different outgroups. Hence, we could have used the more cumbersome notation  $\beta_{kj}$  and  $\alpha_{kj}$  where  $k$  indexes one's own political affiliation and  $j$  indexes the political affiliation of the other player. We allow for  $\beta_{kj} \neq \beta_{kl}$ , and  $\beta_{kj} \neq \beta_{lj}$ ,  $j \neq l$  and similarly  $\alpha_{kj} \neq \alpha_{kl}$ , and  $\alpha_{kj} \neq \alpha_{lj}$ ,  $j \neq l$ . However, the simpler notation in (1) is adequate.

We now introduce income taxation and social redistribution from the rich to the poor, to produce what we call the *augmented ultimatum game*. The proposer's income is taxed at the rate  $t \in [0, 1]$  prior to the offer being made to the responder; so total tax revenues equal  $tx$ . A part  $\delta \in [0, 1]$  of the tax revenues is redistributed to the responder prior to the responder choosing any action; we mimic here the main feature of societal redistribution as a transfer from the rich (proposer has all the income) to the poor (responder has zero income). The remaining part  $1 - \delta$  does not directly add to current material payoffs.<sup>5</sup> The economically interesting and empirically relevant case is the one where  $\delta > 0$ . Thus, the post-tax incomes of the proposer and the responder are given by

$$y_P(s) = (1 - t)x - s, \quad y_R(s) = s + \delta tx, \quad s \in [0, (1 - t)x]. \quad (2)$$

We assume that

$$1 - t - \delta t > 0. \quad (3)$$

From (2) and (3) we see that in the absence of the transfer  $s$ , i.e.,  $s = 0$ ,  $y_P(0) > y_R(0)$ . Thus, the main implication of (3) is that the tax rate,  $t$ , is never so high that in the absence of the transfer ( $s = 0$ ) the initially rich become as poor or poorer than the initially poor.

Using (2), we have

$$y_P(s) \gtrless y_R(s) \Leftrightarrow s \lesseqgtr \bar{s}(t) \quad (4)$$

where

$$\bar{s}(t) = \frac{1}{2}(1 - t - \delta t)x. \quad (5)$$

is the transfer to the agent that equalizes the payoffs of both players.

## Responder's Minimum Acceptable Offer

We first define the responder's *minimum acceptable offer* (MAO), then we derive its properties.

**Definition 1:** Let the utility of the responder be given by (1). Let  $s_M(t)$  be the minimum  $s \in [0, (1-t)x]$  satisfying  $U_R(s) \geq 0$ . Then  $s_M(t)$  is the minimum acceptable offer (MAO) for the responder.

The condition  $s \in [0, (1-t)x]$  in Definition 1 is required by (2). The condition  $U_R(s) \geq 0$  in Definition 1 is imposed because the responder can always guarantee himself a payoff of 0 by rejecting the offer. We now introduce two useful quantities,  $\bar{t}$  and  $\lambda(t)$  that enable us to show that the MAO takes a simple form (Proposition 1, below).

$$\bar{t} = \begin{cases} \frac{\alpha_S}{\alpha_S + \alpha_S \delta + \delta} & \text{if } \alpha_S > 0 \\ 0 & \text{if } \alpha_S = 0 \end{cases}, \quad (6)$$

$$\lambda(t) = \begin{cases} \frac{\alpha_S + \alpha_S \delta + \delta}{1 + 2\alpha_S} (\bar{t} - t) & \text{if } t < \bar{t} \\ 0 & \text{if } t \geq \bar{t} \end{cases}. \quad (7)$$

**Proposition 1:** Let  $\bar{t}$  be given by (6) and  $\lambda(t)$  by (7).

- (a) The minimum acceptable offer,  $s_M(t)$  (Definition 1), is given by  $s_M(t) = \lambda(t)x$ .
- (b) The minimum acceptable offer is bounded above by the transfer that equalizes payoffs of both players, i.e.,

$$0 \leq \lambda(t)x < \bar{s}(t) < (1-t)x. \quad (8)$$

From Proposition 1, we can now see the interpretation of  $\lambda(t)$ .  $\lambda(t) = \frac{s_M(t)}{x}$  is the ratio between the minimum acceptable offer,  $s_M(t)$ , of the responder and the initial endowment,  $x > 0$ , of the proposer. Notice that  $s_M(t)$  in Proposition 1 is independent of  $\beta_S$ . This is because the responder's income is never higher than the proposer's income.<sup>6</sup>

We now consider the comparative static effects on  $s_M(t)$ , when there are changes in (1) the tax rate  $t$  (which allows us to compare the results of Treatment 1,  $t = 0$ , and Treatment 2,  $t > 0$ ) and, (2) the disadvantageous inequity parameter,  $\alpha_S$ . We consider the two cases of an interior solution ( $t < \bar{t}$  so  $s_M(t) > 0$ ) and a corner solution ( $t \geq \bar{t}$  so  $s_M(t) = 0$ ).

**Proposition 2:** Let  $s_M(t)$  be the minimum acceptable offer (MAO) for the responder (Definition 1). Let  $\bar{t}$  be given by (6).

- (a) For  $t < \bar{t}$ , (i)  $\frac{\partial s_M(t)}{\partial \alpha_S} > 0$ , (ii)  $\frac{\partial s_M(t)}{\partial t} < 0$ .
- (b) For  $t \geq \bar{t}$ ,  $\frac{\partial s_M(t)}{\partial t} = \frac{\partial s_M(t)}{\partial \alpha_S} = 0$ .
- (c) The MAO is unaffected by  $\beta_S$ , i.e.,  $\frac{\partial s_M(t)}{\partial \beta_S} = 0$ .

*Discussion:* Let  $t < \bar{t}$ , which is consistent with our empirical results. There are three major implications of Proposition 2.

First, an increase in the tax rate reduces income inequality between a relatively poorer responder and a relatively richer proposer. Hence, the responder reduces the MAO because a smaller MAO is required to reduce income inequality. If however, the disadvantageous inequality parameter  $\alpha_S$  of the responder increases, then for any given split of income, the responder asks for a higher MAO in order to mitigate income inequality with the proposer.

Second, from Proposition 2(aii), as we move from Treatment 1 (experimenter-provided endowments and  $t = 0$ ) to Treatment 2 (earned income and  $t > 0$ ), our model predicts that the MAO of the responders will strictly decline. This is because the redistributive tax reduces post-tax income inequality between the two players.

Third, social identity theory does not pin down the relative sizes of  $\alpha_I$ ,  $\alpha_O$  (recall Remark 1). Our data show that the responder makes a strictly lower MAO,  $s_M(t)$ , to ingroup proposers relative to outgroup proposers. From this, and from Proposition 2, we can conclude that  $\alpha_I < \alpha_O$  (relatively lower ingroup envy). This confirms the results of Chen and Li (2009). However, our result requires much weaker assumptions and we use a real world identity.

Results of ultimatum games often express the MAO of the responder as a proportion of the proposer's income (in our case, the after-tax income). For this reason, and in the case  $t < 1$ , we shall find it convenient to use the new variable  $\tilde{s}_M(t) = \frac{s_M(t)}{(1-t)x}$ . Using  $s_M(t) = \lambda(t)x$  (Proposition 1) we can write

$$\tilde{s}_M(t) = \frac{s_M(t)}{(1-t)x} = \frac{\lambda(t)x}{(1-t)x} = \frac{\lambda(t)}{1-t}, \quad (9)$$

which is independent of the initial level of income,  $x$ . A simple calculation shows that the comparative static effects of the exogenous variables are identical whether our object of interest is  $s_M(t)$  or  $\tilde{s}_M(t)$ . This is summarized next.

**Corollary 1:** Let  $s_M(t)$  be the minimum acceptable offer (MAO) for the responder (Definition 1). Let  $\bar{t}$  be given by (6) and  $\lambda(t)$  by (7). Let  $\tilde{s}_M(t)$  be given by (9).

- (a) For  $t < \bar{t}$ , (i)  $\frac{\partial \tilde{s}_M(t)}{\partial \alpha_S} > 0$ , (ii)  $\frac{\partial \tilde{s}_M(t)}{\partial t} < 0$  for  $\delta > 0$  and  $\alpha_S > 0$ .
- (b) For  $t \geq \bar{t}$ ,  $\frac{\partial \tilde{s}_M(t)}{\partial t} = \frac{\partial \tilde{s}_M(t)}{\partial \alpha_S} = 0$ .

(c)  $\frac{\partial \tilde{s}_M(t)}{\partial \beta_S} = 0$ .

*Discussion of Corollary 1:* Comparing (a)-(c) in Corollary 1 with (a)-(c) of Proposition 2, we see that they are qualitatively identical. Thus, although responders decide on their MAO,  $s_M(t)$ , if we are interested only in the qualitative effects, we can equivalently consider the transformed variable  $\tilde{s}_M(t)$ , which is typically used in applied research. In our Treatment 2, we give proposers an opportunity to double their endowments by successfully answering quiz questions in order to create an entitlement to earnings. Hence, we have two kinds of proposers, those with endowment  $2x$  and those with endowment  $x$ , depending on whether they were successful or not in answering the quiz. This does not alter the comparative static results (a)-(c) for  $\tilde{s}_M(t)$  because  $\tilde{s}_M(t) = \frac{\lambda(t)}{1-t}$  is independent of  $x$ . In other words, these results hold for both types of proposers.

### *Proposer's Optimal Offer*

We assume that the proposer maximizes his objective function subject to the responder's minimal acceptable offer.<sup>7</sup> We give the formal definition.

**Definition 2:** Let the utility of the proposer,  $U_P(s)$ , be given by (1). Let  $s = s^*(t)$  maximize  $U_P(s)$  subject to  $s \in [0, (1-t)x]$  and the responder's minimum acceptable offer,  $s_M(t)$ , given by Definition 1 and Proposition 1. Then  $s^*(t)$  is an optimal offer (OF) for the proposer.

**Proposition 3:** Let the utility of the proposer be given by (1). Let  $s_M(t)$  be the minimum acceptable offer (MAO) for the responder, as given by Definition 1 and Proposition 1. Then an optimal offer (Definition 2),  $s^*(t)$ , exists and has the properties:

- (a) For  $\beta_S > \frac{1}{2}$ :
  - (i)  $s^*(t) = \bar{s}(t)$ . (ii)  $\frac{\partial s^*(t)}{\partial t} < 0$ . (iii)  $\frac{\partial s^*(t)}{\partial \alpha_S} = 0$ . (iv)  $\frac{\partial s^*(t)}{\partial \beta_S} = 0$ .
- (b) For  $\beta_S = \frac{1}{2}$ , any  $s \in [s_M(t), \bar{s}(t)]$  is optimal for the proposer.
- (c) For  $\beta_S < \frac{1}{2}$ :
  - (i)  $s^*(t) = s_M(t)$ . (ii)  $\frac{\partial s^*(t)}{\partial t} = \frac{\partial s_M(t)}{\partial t}$ . (iii)  $\frac{\partial s^*(t)}{\partial \alpha_S} = \frac{\partial s_M(t)}{\partial \alpha_S}$ . (iv)  $\frac{\partial s^*(t)}{\partial \beta_S} = 0$
- (d) Indicate the dependence of  $s^*$  on  $\beta$  by writing  $s^*(t, \beta)$ . Let  $\beta_1 < \frac{1}{2}$  and  $\beta_2 > \frac{1}{2}$  be two different values of  $\beta_S$ . Then

$$s^*(t, \beta_1) < s^*(t, \beta_2).$$

*Discussion of Proposition 3:* Proposition 3aii shows that, for  $\beta_S > \frac{1}{2}$ ,  $\frac{\partial s^*(t)}{\partial t} < 0$ . It follows that as we move from Treatment 1 ( $t = 0$ ) to Treatment 2 ( $t > 0$ ), the optimal share

offered by the proposer to the responder,  $s^*(t)$ , is predicted to strictly decline. Propositions 2a and 3c show that the same result holds for  $\beta_S < \frac{1}{2}$  and  $t < \bar{t}$ . Proposition 3d shows that an increase in  $\beta_S$  from below  $\frac{1}{2}$  to above  $\frac{1}{2}$ , leads to a discontinuous increase in the optimal offer,  $s^*(t, \beta_S)$ . An important application of this arises when one is relatively more altruistic to ingroup members in the sense that  $\beta_O < \frac{1}{2}$  but  $\beta_I > \frac{1}{2}$ , so that  $\beta_O < \beta_I$ . This can explain our empirical result (see below) that a proposer will offer more to an ingroup member relative to an outgroup member. It is noteworthy that the typical empirical estimate of  $\beta < \frac{1}{2}$  comes from studies where subjects are not primed for their social identity. Moreover, we know very little about the size of  $\beta$  in the presence of identity concerns (Dhami, 2019, Vol. 2, Chapter 2). The cut-off value of  $\beta_S = \frac{1}{2}$  follows from the linear form of FS preferences. If we use the non-linear form of FS preferences, as in Dhami and al-Nowaihi (2010a, 2010b), then we are likely to get continuous dependence of the proposer's share on  $\beta_S$ . However, the linear model suffices to explain our empirical findings in a pedagogically convenient manner.

Empirical analyses of ultimatum games often express the offer of the proposer as a proportion of the proposer's income (in our case, the after-tax income). Analogous to Corollary 1, we can introduce the new variable  $\tilde{s}^*(t) = \frac{s^*(t)}{(1-t)x}$ . We note the equivalence of the qualitative properties of  $\tilde{s}^*(t)$  and  $s^*(t)$  in the next Remark.

**Remark 2:** (a) Let  $\beta_S > \frac{1}{2}$ . From Proposition 3ai,  $s^*(t) = \bar{s}(t)$  and, hence,  $\tilde{s}^*(t) = \frac{\bar{s}(t)}{(1-t)x} = \frac{1-t-\delta t}{2(1-t)}$ . It follows that

$$\frac{\partial \tilde{s}^*(t)}{\partial t} = \frac{-\delta}{2(1-t)^2} < 0 \text{ for } \delta > 0,$$

which is qualitatively the same as Proposition 3a, though numerically different. The comparative statics with respect to  $\alpha_S$  and  $\beta_S$  are exactly the same as for Proposition 3a. (b) Let  $\beta_S < \frac{1}{2}$ . From Proposition 3ci,  $s^*(t) = s_M(t)$  and, hence,  $\tilde{s}^*(t) = \frac{s_M(t)}{(1-t)x} = \tilde{s}_M(t)$ . It follows that the comparative statics here are exactly the same as in Corollary 1.

From Remark 2, if one is interested in the qualitative results, one may consider either  $s^*(t)$  or the transformed variable  $\tilde{s}^*(t)$  that is typically used in empirical research.

### *A brief discussion of some model features*

1. The predictions of our model arise jointly from fairness preferences and strategic considerations as is any real world redistribution decision. For this reason, we are not interested in disentangling the separate effects of these two. Proposers and responders, both, exhibit a preference for fairness. In making his decision, the proposer

takes account of (1) strategic concerns that arise through backward induction, and (2) the fairness preferences of the responder, incorporated into the MAO of the responder, as well as his own fairness preferences. One can then derive comparative static effects of the parameters of the model, such as  $t, x, \alpha_S, \beta_S$ . These effects can be tested on experimental data, which is what we do. In particular, the beliefs of the players do not enter into the equilibrium offers and MAOs of the players.<sup>8</sup>

2. In Treatment 2, proposers can potentially double their endowments by correctly answering 4 simple arithmetic questions. One might wonder if in the presence of endogenous endowments, there is a possibility of selection effects that the model ignores (Erkal, et al., 2011). Could it be that inequity averse proposers deliberately give incorrect answers to the 4/5 questions that qualifies them for doubling their endowment so that their income inequity with respect to the responders is minimized? This reasoning is theoretically flawed and empirically rejected. In the theoretical model, proposers could earn the extra income and share it with the responders, without increasing income inequality between the two, but increasing the absolute incomes of both, which increases the utilities of both parties. Empirically, 95% of the proposers gave the correct answer to 4/5 questions.
3. In Treatment 2, in the presence of taxation/redistribution, proposer offers and responder MAOs are reduced as compared to Treatment 1 (where taxation and redistribution are absent). However, Treatment 2 gives two extra insights. First, it allows us to determine if the reductions in proposer offers and responder MAOs are similar. This allows us to determine if there is a shared understanding of the appropriate social redistribution in the presence of a fiscal system. Second, Treatment 2 allows us to calculate the tax elasticity of proposer offers and responder MAOs.

### III SUBJECT POOL AND EXPERIMENT DESIGN

#### *Subject Pool*

Our subjects are registered members of British political parties, who play the Ultimatum Game in the role of proposer or responder (but not both). As noted in the introduction, these subjects are likely to possess a strong *political identity* and engage in politically motivated activities, such as voting in elections and participating in debates on the degree of redistribution to be carried out in society. To the best of our knowledge, this is the first time that this subject pool has been studied in experiments of this kind.



We contacted five of the most widely supported national political parties in England for access to their registered members.<sup>9</sup> The five parties were the Green Party, Labour Party, Liberal Democrats, the Conservative Party, and the UK Independence Party (UKIP). This constitutes a richer spectrum of political parties relative to the few studies using US data (see the introduction); a limiting feature of these studies is that they are based on dictator games and unearned endowments. We were unable to garner sufficient observations from the UKIP supporters, possibly due to their relatively smaller number, hence, in this paper we focus on the other four parties.

British political party membership is generally set up so that only the local party office has access to the contact information for members in their area. Emails were sent from a University of Leicester email account to the local party office. The initial email included a detailed outline of the research and what the experiment would entail; an email reminder was sent in most cases. The emails also briefly explained some of the salient features of experiments within economics such as the roles of incentives and anonymity. Given the UK Data Protection Laws, we requested the parties to contact their members themselves, through an email containing the link to our experiment. Since the survey distribution takes place through emails sent out by the political party offices themselves, this may have a priming effect on political identity, increasing the salience of already existing political identities. Further priming takes place when we ask subjects to state the strength of their political affiliation with their chosen political party. This is likely to increase the relevance of our results for the predictions of social identity theory.

Respondents from political parties completed an online questionnaire using the survey platform Qualtrics, which ensured complete anonymity.<sup>10</sup> Participation in the experiments was voluntary.<sup>11</sup> Due to the nature of online experiments, it was not possible to completely control either the environment in which the experiment was conducted or the demographics of those who self-selected themselves into the experiment.<sup>12</sup> However, this is unavoidable given UK data protection laws and the fact that the participation decision is voluntary. The main advantage of using registered political party members is that it allows for a more demographically diverse, and politically primed, subject pool relative to a standard lab experiment with student subjects.

Whilst our experimental design does not randomly sample from the entire population of political party members in England, the demographics of our subject pool broadly reflect that of the party membership on aggregate. Data on political party make-up is hard to obtain because different parties classify membership differently and are under no legal obligations to report their membership numbers, let alone the demographic make-up of the members. However, using a House of Commons Briefing Paper—Membership of Political Parties (2015), and YouGov information<sup>13</sup>, we are able to make broad comparisons. Other than education (our subjects are more educated) our sample is representative of the general

membership of political parties.

Data collection took considerable time as we did not have direct access to the subjects. The only method of recruiting subjects was to continue to write to party offices who in turn made the decision to forward our request (or not) to their party members. The response from the different political parties was uneven; there were only 3 subject responses from the UKIP, which we had to eliminate from our sample. Among the rest, the number of subjects from the Conservative Party are the lowest.

Our use of the strategy method to elicit the responses of both proposers and responders in an ultimatum game significantly expands the data we gather. As part of the strategy method, responders (respectively, proposers) are asked to state their minimum acceptable offer (respectively, offer) when the other player is of any of the 5 different political identities and of an unknown political identity (anonymous identity). Due to the smaller number of Conservative party members in our sample, our data is subject to the caveat that it over-represents members of the Labour party. This is an unavoidable cost to pay when one moves from the sanitized lab environment to a relatively elusive field subject pool such as ours.

Additional and unavoidable problems arose during the lengthy data collection process.<sup>14</sup> As most of these events are related to the Brexit Referendum, we use a Mann-Whitney U test to determine whether our responses change significantly after this event. No temporal change in responses was found, so we chose to pool the data. Our results are robust to the inclusion of time fixed effects. In conjunction, these results show that political identity and prosociality were not affected by the other political events that occurred during the data collection process.

Table 1 outlines the total number of proposers and responders we have in our data for each political party.

### *The Experiment Design*

The details of the experimental design can be found in Appendix B. Here we briefly outline the main features. All participants were assured that the data collected in the experiment was anonymized. Subjects began by answering some demographic questions (age, gender, education). They then stated their political identity (one of Labour, Conservative, Liberal Democrat, Green, or UKIP), and the strength of their political affiliation on a 5 point Likert Scale from very strong (1) to very weak (5).

The Ultimatum Game was explained to the subjects and they were required to correctly answer two questions designed to test their understanding, in order to proceed further in the experiment. Subjects who correctly answered the test questions were assigned either the role of the proposer or the responder for the rest of the experiment (but not both roles).

Subjects sequentially played the following two treatments.

**Treatment 1:** Subjects play a *standard ultimatum game* extended to include the role of political identity. The proposer is given an endowment of £10. The proposer first played an ultimatum game against a responder whose political identity they did not know (first sub-treatment); we term such responders as having an anonymous (political) identity. In a separate, and second sub-treatment, the strategy method is then used to elicit the offers that proposers would make to a responder with the following 5 possible political identities: Labour, Conservative, Liberal Democrat, Green, and UKIP.

In the first sub-treatment for responders, we elicit the *minimum acceptable offer* (MAO) that subjects in their roles as responders demand from proposers whose political identity they did not know. We term such proposers as having an anonymous (political) identity. In the second sub-treatment, we then use the strategy method to elicit the responder’s MAO against the following possible political identities of the proposer: Labour, Conservative, Liberal Democrat, Green, and UKIP.

The strategy method allows us to elicit the complete strategy of each player and leads to a substantial increase in the data points (Bardsley et al., 2010). All decisions by proposers and responders were made using a slider task (see screenshots in Appendix B). In order to eliminate potential order effects, we undertook two precautions. (1) The order of the two sub-treatments for the proposer and for the responder was randomized. (2) When the strategy method was used to elicit the choices of the proposer and the responder, the order of the party-affiliations (Labour, Conservative, Liberal Democrat, Green, and UKIP) of the other player was also randomized.

**Treatment 2:** Subjects play an *augmented ultimatum game*, which takes account of real world fiscal redistribution. The difference from Treatment 1 is that (1) proposers can potentially earn extra income which is subject to an income tax, and (2) a part of the tax revenues is redistributed to the responder. Proposers were initially given an endowment of £10 and then given the chance to earn an extra £10 by correctly answering at least 4 out of 5 simple arithmetic questions (95% of our proposers got at least 4 correct answers). An earned income component allows us to consider income redistribution in a more realistic setting.

Furthermore, we implement a fiscal redistribution system within the game. Proposers, the only players with income in the model, are subject to an income tax at a rate of 30% on their endowment.<sup>15</sup> Half the tax revenues are redistributed to the responder, the player with no income, to mimic social redistribution. In terms of the model in Section II,  $t = 0.3$  and  $\delta = 0.5$ . The remaining 50% of the tax revenues are taken out of the experiment; this portion can be thought of as non-redistributive government expenditures. The fiscal redistribution is mutual knowledge to the proposer and the responder, enabling them to take it into account in making their decisions.

Table 1: Breakup of the data points by political identity.

Party \ Role	Proposers	Responders
Conservative	19 Participants 114 Data Points	15 Participants 90 Data Points
Green	32 Participants 192 Data Points	28 Participants 168 Data Points
Labour	52 Participants 312 Data Points	51 Participants 306 Data Points
Lib Dem	34 Participants 204 Data Points	37 Participants 222 Data Points
Total	137 Participants 822 Data Points	131 Participants 786 Data Points

In both treatments, subjects are informed at the start of the experiment that they will be matched randomly with a second player (a responder or a proposer, depending on their role) and one of the actual decisions will be selected at random and used to determine their payoffs to ensure incentive compatibility of decisions.

We did not randomize between Treatments 1 and 2 (although we randomize between sub-treatments and political identities as explained earlier). The ultimatum game in both Treatments is new to our subjects. Furthermore, Treatment 2 is significantly more complicated than Treatment 1 because it involves taxation and redistribution of income in addition to the game played in Treatment 1. As such, we are likely to get more accurate responses if subjects first learn to play the simpler Treatment 1 without taxes and redistribution. We cannot rule out order effects when comparing Treatments 1 and 2. However, we believe that our experimental design potentially mitigates these problems because subjects did not learn of the outcomes in any of the two treatments, until after they had played both treatments. Indeed, as noted above, when we compared the decisions of proposers and responders before the Brexit vote and after it, we found no order effects. The distributions of offers by proposers and MAOs by responders are statistically indistinguishable before and after the Brexit vote.

Each subject (with a fixed role as proposer or responder) played both treatments using the strategy method. Hence, the number of data points for each player is  $2 \times 6 = 12$  (2 is the number of treatments and 6 is the number of identities of the other player including 5 political parties and one anonymous identity). The survey was completed within 20 minutes for all respondents and the average payment was £4.59; this is in excess of 160% of the minimum wage in the UK. The number of data points corresponding to each political identity are described in Table 1; we have a total of 822 offers made by 137 proposers and 786 minimum acceptable offers by 131 responders for a total of 1608 data points. We had only 3 responses from UKIP voters for reasons noted in the introduction. For this reason we have dropped these three subjects from the analysis. However, in the strategy method all non-UKIP proposers (respectively responders) were asked to make offers (minimum

acceptable offers) against a UKIP responder (respectively, proposer). This data has been retained.

Each proposer’s decision was matched with a randomly chosen responder’s MAO. Each responder’s MAO was matched with a randomly chosen proposer’s offer. Hence, we do not require an identical number of proposers and responders.

### *Comments on our Experiment Design*

We are primarily interested in the effects of political identity on prosociality of choices in the presence of earnings and redistribution of earnings. With this in mind, it is worth addressing some further points about our design.

1. Our first point is methodological. We have two treatments. In Treatment 1 the proposer is given an (unearned) endowment. There is no taxation or redistribution. In Treatment 2, income is earned, taxed and redistributed. We could have had a third treatment where income is earned but there are neither taxes nor redistribution. We did not do this because it is already known that offers out of earned income are lower than offers out of unearned income (Cherry et al., 2002; Cappelen et al., 2007; Levitt and List, 2007). Thus we concentrate our resources on the novel aspect: earned income with taxation and redistribution. Taxation and redistribution are linked through the budget constraint. Hence, for the economically interesting and empirically relevant case,  $\delta > 0$ , we cannot vary taxation keeping redistribution fixed, nor can we vary redistribution keeping taxation fixed.

2. Recall that in our first sub-treatments for proposers and responders, their actions towards a subject with an anonymous identity were separately elicited. This was followed by eliciting their actions towards a subject with one of 5 political identities. The order of the two treatments was randomized. By construction, given that all our subjects were actual registered members of British political parties, none had an anonymous political identity. To maintain the purity of our sample, we did not wish to introduce subjects from outside the sample who professed to have an anonymous, but non-verifiable, political identity. In our descriptive statistics, we offer a comparison of the difference in actions of the proposers and responders towards an anonymous identity relative to a specific political identity because this question might be of some independent interest. However, in our regression analysis we argue (see below) that setting the anonymous identity as a benchmark relative to ingroups and outgroups is likely to lead to misleading results.

3. Consider the issue of potential subject deception in our experimental design. There are currently no widely accepted definitions of subject deception. We believe that our design did not mislead subjects. The subjects were told that all other subjects were members of one of the five political parties. It was explained to the subjects that “anonymous” meant “you do not know which political party the other subject belongs to”.

## IV EXPERIMENT RESULTS

In this section, we present our results and demonstrate significant effects of political identity in determining proposer offers and the MAOs of responders. We also relate the results to the predictions of our theoretical model.

**Note:** Unless otherwise specified, all proposer offers and responder MAOs are expressed as a percentage of the after tax endowments of the proposer. The normalization by post-tax endowment does not change the qualitative predictions of our theoretical model; see Corollary 1, Remark 2, and the discussions. The post-tax endowment of a proposer who has an endowment of 20 is  $20(1 - 0.3) = 14$ .

### *Descriptive Statistics on the Average Behaviour of Proposers*

In this section we give the descriptive statistics of the behavior of proposers, averaged across all political identities.<sup>16</sup> Thus, these statistics are based on decisions that are not conditioned on political identity. In the next section, we consider a regression analysis in which we condition behavior on the political identity of proposers.

Table 2 gives the summary data for the offers (as a percentage of the proposer’s after-tax income) made by proposers to each type of responder. Lib Dem stands for Liberal Democrats, Con for Conservatives, and Anon for Anonymous. The average and the median offers by proposers fall within the usual range observed in other ultimatum game experiments. Proposers offering over 90% of the endowment are clear outliers (less than 1.1% of total offers). All offers over 90% were to one’s own ingroup members. Average offers are relatively lower in Treatment 2 when incomes are taxed and redistributed. We also report the tax elasticities of the proposer offers (expressed as a percentage of their after-tax income) to responders of different political identities.<sup>17</sup> There is variation in the tax elasticities across political identities of the responder; the highest tax elasticity arises for Conservative responders and the lowest for Lib Dem responders.

Table 3 reports ‘pairwise differences’ of *average proposer offers* (i.e., averaged across all proposer identities) to responders with distinct political identities. These pairwise differences are tested using a Wilcoxon signed rank test. Each number in Table 3 shows the average offers made to a responder with the column identity minus the average offer made to a responder with the row identity, expressed as a percentage of the proposer’s after-tax income. For instance, the third entry in the column for Lib Dem, which is  $-0.02$ , is the average proposer offer to a Lib Dem responder minus the average offer to a Labour responder, as a percentage of the proposer’s after-tax income. Positive (respectively, negative) values, therefore, indicate a relatively higher offer to the responder with the column (respectively, row) identity.

Consider the average difference in offers from proposers to a responder with any of the

Table 2: Summary statistics of proposer offers to responders of different identities, as a percentage of the proposer’s after-tax income

Proposer Offers	Anon	Green	Labour	Lib Dem	Con	UKIP	Average
Treatment 1							
Mean	0.47	0.43	0.43	0.42	0.37	0.30	0.4
Median	0.50	0.50	0.50	0.50	0.49	0.30	
Treatment 2							
Mean	0.39	0.37	0.37	0.38	0.31	0.26	0.35
Median	0.39	0.39	0.39	0.39	0.35	0.29	
Tax Elasticity	-0.745	-0.140	-0.140	-0.095	-0.162	-0.133	0.125

Table 3: Wilcoxon Signed Rank Tests to test pairwise differences of average proposer offers, as a percentage of proposer’s after-tax income, to responders of two different political identities– the column responder identity minus the row responder identity. Null Hypothesis: No difference in the offers made by proposers to a responder with a column identity and a responder with a row identity. All tests are two sided. Stars denote significance levels; a single star ( $p < 0.1$ ); two stars ( $p < 0.05$ ); three stars ( $p < 0.01$ ).

	Green	Labour	Lib Dem	Con	UKIP
Treatment 1					
Anon	-0.04***	-0.03**	-0.05***	-0.09***	-0.17***
Green	-	0	-0.01	-0.05***	-0.13***
Labour	-	-	-0.02	-0.06***	-0.13***
Lib Dem	-	-	-	-0.04***	-0.12***
Con	-	-	-	-	-0.08***
Treatment 2					
Anon	-0.02	-0.03	-0.02	-0.08***	-0.14***
Green	-	0.07	0	-0.06***	-0.11***
Labour	-	-	0	-0.06***	-0.11***
Lib Dem	-	-	-	-0.07***	-0.12***
Con	-	-	-	-	-0.05***

5 political identities relative to an anonymous responder. We are able to reject the null hypothesis that these differences are equal for (1) all possible cases in Treatment 1 (see the top row of numbers in Table 3), and (2) in Treatment 2 when the column identity of the responder is a Conservative or UKIP member (see the last two numbers in the first row following Treatment 2 in Table 3). These differences are negative (and significant in 7 out of 10 cases) which shows that proposers offer less to a responder of any political identity relative to a responder with no political identity (Anon).

**Result 1** : *On average, and not controlling for the political identity of proposers, relatively higher amounts are offered to a responder with an anonymous political identity relative to a responder with a political identity.*

In Result 1, we only consider average offers across all proposers and do not control for the political identity of the proposer. When we consider the data on proposers disaggregated by political parties, Liberal Democrat proposers offer more to their ingroup responders, relative to Anon responders, and the difference is statistically significant at the 5% level. The difference between the offers made to ingroup responders and Anon responders is also positive for proposers belonging to the Green party, although the difference is significant only in Treatment 2. This difference in offers is not statistically significant for proposers belonging to any other political party. A plausible explanation is that for our subjects whose political identity is highly salient, other political parties may be viewed as competitors, as in the case of competition for votes in elections. Hence, a lower amount is offered to members of other political parties relative to an anonymous identity. This result is deserving of further replication.

For both treatments, let us omit the row for the Anon identity in Table 3 for the moment. Of the remaining data shown in Table 3, the numbers in the last two columns are statistically significant and negative, while none of the other numbers are significant. Thus, responders with either Conservative or UKIP identities are made a lower offer relative to responders of other political identities. Conservative responders are made offers by proposers that are on average 6.5% less than responders from all other parties. Offers to Conservative responders are only higher relative to UKIP responders (8% higher in Treatment 1 and 5% higher in Treatment 2).

Indicate the dependence of  $s^*$  on  $\beta$  by writing  $s^*(t, \beta)$ . Let  $\beta_1 < \frac{1}{2}$  and  $\beta_2 > \frac{1}{2}$  be two different values of  $\beta_S$ . Then from Proposition 3d we have that

$$s^*(t, \beta_1) < s^*(t, \beta_2). \tag{10}$$

**Remark 3:** From (10), it follows that Result 1 is consistent with proposers having a higher value of  $\beta_S$  (or being more altruistic) towards responders of anonymous political identity. Similarly, our model can account for Result 4 for responders, below.

### *Regression analysis for proposer offers*

To allow for a closer examination of the effects of political identity in the Ultimatum Game, we run 6 OLS regressions that are reported in Table 4. As explained above, we omit the 3 subjects with the UKIP identity. We estimate a regression of the following form



$$y = a_0 + a_1d_1 + \sum_{i=2}^{i=4} a_i d_i + a_5d_5 + a_6d_6 + a_7d_1d_6 + \mathbf{bX} + \varepsilon, \quad (11)$$

where  $\varepsilon$  is a error term (we cluster the standard errors at the subject level), and  $y$  is the proposer’s offer expressed as a percentage of the after-tax endowment. Omitting offers to Anon responders, for reasons stated below, each proposer makes one offer to each of 5 political identities of the responder in 2 different treatments, i.e., 10 allocation decisions. We have 137 proposers in the sample, giving 1370 observations on offers in total. The explanation of the regressors in (11) is as follows.

1. The dummy variable  $d_1$ , ‘Own’, takes the value of 1 if the responder is of the same political identity as the proposer, and 0 otherwise. This allows us to explore the classic ingroup-outgroup effects in social identity theory. Recall that Results 1 and 2 above, are for the average offers made to responders when we do not take account of the political identity of proposers. However, the regression analysis allows us to pinpoint the political identity of the proposer and identify if higher offers are made to ingroup or outgroup responders. This is the sense in which the subsequent results for proposers differ from Results 1 and 2.

An alternative approach might have been to use the three categories: Ingroup, Outgroup, Anonymous. We could then have introduced two dummy variables with Anonymous as the control category. However, in order to do so, the three categories must be mutually exclusive. In our experimental instructions, the anonymous identity corresponds to "unknown political identity" but not "absence of political identity." Thus, proposers may justifiably assign a non-zero probability that the anonymous identity is either an ingroup or an outgroup member. Hence, the three categories are not mutually exclusive, making this approach untenable.

2. We allow for proposer fixed effects through dummy variables that control for each proposer’s political affiliation. After omitting the 3 UKIP participants, we have four categories of political identity (Labour, Liberal Democrats, Conservatives, and Green). Using the category Conservatives as our benchmark, we use 3 dummy variables to control for the political identity of the proposer:  $d_2$  equals 1 if Green Party and zero otherwise;  $d_3$  equals 1 if Labour and zero otherwise;  $d_4$  equals 1 if Liberal Democrats and zero otherwise. These variables with respective acronyms Green, Labour, Lib Dem, allow us to examine the size of the offers made by proposers of different political parties, relative to the benchmark of a Conservative proposer.
3. The variable  $d_5$ , ‘Strength’, gives the subjective self-reported feelings of belonging to a political party on a 1–5 scale where 1 is the highest possible strength and 5

the lowest. This variable allows us to examine whether the proposers' offers are influenced by how strongly they identify with their political identity.

4. The dummy variable  $d_6$ , 'TreatDum', captures treatment effects on the prosociality of offers. It takes a value 1 for Treatment 2 and value 0 for Treatment 1.
5. The variable  $d_1d_6$  is the interaction term between the variables Own ( $d_1$ ) and TreatDum ( $d_6$ ).
6. The vector  $\mathbf{X}$  includes information on demographic variables such as age, gender, and education, as well as other interaction terms that did not turn out to be significant; and  $\mathbf{b}$  is the associated vector of regression coefficients.
7. We also included time fixed effects in our regression analysis but these did not turn out to be significant. To ensure the robustness of our results we also ran additional regressions controlling for the political identity of the responder. Consistent with the results shown in Table 3 lower offers are made to responders belonging to the Conservative Party and UKIP and both these were significant at the 1% level. These results are not reported in the table in order to keep it visually simple; but see the Tables in Appendix C where we show the breakdown of offers/MAO's by each proposer/responder identity to each responder/proposer identity. We have dropped some of the interaction terms (e.g., Own with Strength and Own with Male) and dummies for the political identity of the responder in the Table, because these were all statistically insignificant; these results are available from the authors on request.<sup>18</sup> In addition, attempts to interact the Own variable with the variables controlling for the political identity of the proposer resulted in serious multicollinearity issues.

Table 4 shows the regression results. The interaction term, Own with Strength, is probably insignificant because the variable Strength is a self-reported measure rather than an objective measure.<sup>19</sup> The insignificance of the interaction term Own with TreatDum is in line with the view that social identity is a fundamentally salient feature of human nature and, therefore, one may expect the ingroup-outgroup effects to be unaltered from one treatment to the next.

From the first row in Table 4 (see variable labelled 'Own'), proposers make significantly higher offers to responders who are of the same political identity (ingroup members) as compared to responders with a different political identity (outgroup members). These effects are robust to additional controls and are significant in all six regressions. On average, proposers transfer 11.65% more of their endowment to an ingroup responder relative to an outgroup responder (Proposition 3d).

Table 4: OLS regressions. Dependent variable in each of the reported regressions is the offer made by the proposer as a fraction of his after-tax income. Own variable signifies that the proposer and responder belong to the same political party. Standard errors in parenthesis clustered at the subject level. Demographic controls include age, gender and level of education. Significance levels: Three stars ( $p < 0.01$ ); two stars ( $p < 0.05$ ); one star ( $p < 0.1$ ).

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Own	0.117*** (0.016)	0.117*** (0.016)	0.117*** (0.016)	0.117*** (0.016)	0.114*** (0.016)	0.114*** (0.016)	0.111*** (0.017)
Green		0.129*** (0.042)	0.138*** (0.042)	0.138*** (0.042)	0.138*** (0.042)	0.140*** (0.044)	0.141*** (0.062)
Labour		0.094** (0.036)	0.100*** (0.036)	0.100*** (0.036)	0.100*** (0.036)	0.107*** (0.038)	0.121** (0.057)
Lib Dem		0.089** (0.038)	0.094** (0.037)	0.094** (0.037)	0.094** (0.037)	0.095** (0.039)	0.087 (0.062)
Strength			-0.017 (0.014)	-0.017 (0.014)	-0.017 (0.014)	-0.017 (0.013)	-0.017 (0.016)
TreatDum				-0.053*** (0.009)	-0.041* (0.025)	-0.041* (0.025)	-0.044* (0.025)
Own*TreatDum					-0.007 (0.012)	-0.007 (0.012)	-0.006 (0.012)
Constant	0.574*** (0.027)	0.486*** (0.038)	0.511*** (0.043)	0.538*** (0.044)	0.532*** (0.044)	0.324*** (0.060)	0.417*** (0.088)
Demographics	No	No	No	No	No	Yes	Yes
Date	No	No	No	No	No	No	Yes
$R^2$	0.06	0.10	0.10	0.12	0.12	0.18	0.17
AIC	-682.34	-725.71	-725.22	-725.22	-765.70	-778.30	-978.36
BIC	-671.89	-694.37	-688.67	-710.43	-723.92	-720.85	-795.82
$N$	1,370	1,370	1,370	1,370	1,370	1,370	1,370
Subjects	137	137	137	137	137	137	137

The dummy variables  $d_2$ ,  $d_3$ ,  $d_4$  (listed as Green, Labour, Lib Dem in Table 4) capture the difference in offers of proposers of different political identities relative to the benchmark of a Conservative proposer. Compared to a Conservative proposer, proposers of all other political affiliations offer a higher proportion of their endowment to the responder; these are significant in most regressions. Traditionally, the Conservatives in the UK favor lower redistribution relative to Labour and Liberal Democrats. A similar result holds for the Democrats and the Republicans in the US. This result can be explained along the lines of Remark 3 by assuming different values of the parameter  $\beta_S$  for Conservative proposers relative to proposers of other identities. The addition of the self-reported ‘Strength’ variable, or the interaction between ‘Own and Strength’ does not affect the ingroup favoritism that proposers exhibit. This suggests that the degree of ingroup favoritism is not affected by the strength of the proposers identification with their party. This result may change if objective measures of Strength were available.

**Result 2** : *Proposers offer a higher proportion of their endowment to responders who share their political identity, relative to a different political identity. This confirms the classic finding in social identity theory that ingroup members are treated more favorably than outgroup members.*

Our experimental design allows us to examine the effects of fiscal redistribution on prosociality, through our dummy variable  $d_6$  (labelled “TreatDum” in Table 4). TreatDum is negative and significant in all regressions.<sup>20</sup> Thus, proposers significantly reduce their offers (as a percentage of their after tax endowment) to responders when they earn their taxable endowments (Treatment 2) relative to the case of Treatment 1. When we use a Wilcoxon signed rank test to test the difference in offers between Treatments 1 and 2 for proposers of each political party when making an offer to a responder of the same party, we find that average offers are significantly lower in Treatment 2 relative to Treatment 1 ( $p < 0.001$  for each pairwise comparison). However, even controlling for the treatment effect (taxable earned endowment) one finds a significant effect of political identity in proposer’s offers in terms of ingroup favoritism.

**Result 3** : *The introduction of earned income under fiscal redistribution significantly reduces the average offers (expressed as a percentage of the proposer’s incomes) made by proposers but political identity is salient.*

Table 5: Summary statistics of responder MAOs as a percentage of the proposer’s after-tax income for proposers of different identities

Responder MAOs	Anon	Green	Labour	Lib Dem	Con	UKIP	Average
Treatment 1							
Mean	0.41	0.41	0.39	0.41	0.46	0.49	0.43
Median	0.49	0.49	0.49	0.49	0.5	0.50	
Treatment 2							
Mean	0.36	0.36	0.34	0.37	0.39	0.43	0.38
Median	0.36	0.36	0.36	0.36	0.38	0.39	
Tax Elasticity	-0.122	-0.121	-0.128	-0.098	-0.152	-0.122	-0.166

*Descriptive Statistics on the Average Responder MAOs*

We now offer some descriptive statistics of responder MAOs in Table 5 that do not condition on the political identity of the responders.<sup>21</sup> As noted above, all MAOs are expressed as a percentage of the after-tax income of the proposers.

In Treatment 1, the median MAO as a percentage of the proposer’s endowment across all possible political identities of the proposer is almost 50% i.e., an equal share. However, in Treatment 2, following the introduction of earned income and fiscal redistribution, the median MAO as a fraction of the proposer’s after-tax income is significantly reduced. Table 5 also reports the tax elasticities of the responder MAOs (expressed as a percentage of the proposer’s after tax income) to responders of different political identities.<sup>22</sup> As in the case of proposer offers there is heterogeneity in responses towards proposers of different political identities, but except for the Anon identity, the elasticity figures for proposer offers and responder MAOs are comparable. The overall elasticities for proposer offers and responder MAOs, respectively,  $-0.125$  and  $-0.116$ , are also comparable.

Table 6 reports ‘pairwise differences’ of *average responder MAOs* (i.e., averaged across all responder identities) to proposers with distinct political identities. These pairwise differences are tested using a Wilcoxon signed rank test. Each number in Table 6 shows the average MAO requested from a proposer with the column identity minus the average MAO requested from a proposer with the row identity, and it could be positive or negative. For instance, the second entry in the column for Conservatives, 0.05, is the average MAO asked from a Conservative proposer minus the average MAO asked from a Green proposer, expressed as a fraction of the proposer’s after-tax income.

We only find significant pairwise differences in the MAOs of the responder when the proposer has either a Conservative or UKIP identity; higher MAOs are required from such proposers (see last two columns of Table 6). Thus, without conditioning on the

Table 6: Wilcoxon Signed Rank Tests to test pairwise differences of average responder MAOs (as a fraction of the proposer’s after-tax income) from proposers of two different political identities– the column proposer identity minus the row proposer identity, as a percentage of the proposer’s income. Null Hypothesis: No difference in the MAOs made by responders to a proposer with a column identity and a proposer with a row identity. All tests are two sided. Stars denote significance levels; a single star ( $p < 0.1$ ); two stars ( $p < 0.05$ ); three stars ( $p < 0.01$ ).

	Green	Labour	Lib Dem	Con	UKIP
Treatment 1					
Anon	0	-0.01	0	0.06***	0.09***
Green	-	-0.02	0	0.05*	0.08***
Labour	-	-	-0.02	0.07***	0.10***
Lib Dem	-	-	-	0.05**	0.08***
Con	-	-	-	-	0.03***
Treatment 2					
Anon	0	-0.01	0.01	0.04**	0.07***
Green	-	-0.02	0.01	0.04*	0.07**
Labour	-	-	0.03	0.05**	0.09***
Lib Dem	-	-	-	0.02	0.06***
Con	-	-	-	-	0.04*

identity of the responder, we observe a bias against members of the Conservative party and UKIP. This result may be driven by the smaller number of data points that we have for Conservative and UKIP responders.<sup>23</sup>

**Result 4 :** *The average MAOs of responders, when we do not condition on the political identity of the responders, are significantly increased when the proposer is a member of the Conservative Party or UKIP.*

We now run OLS regressions for the MAOs of responders, conditioning on the political identity of the responders. We estimate a regression equation of the same form as (11) except that (i) the dependent variable  $y$  is now the MAO of responders, expressed as a percentage of the proposers post-tax endowment, and (ii) the variables are suitably altered to reflect the party affiliations of responders rather than proposers. All other explanatory variables are identical to those in (11) and have already been explained above.

Table 7: OLS regressions. Dependent variable is Responders MAO. Own variable signifies that the proposer and responder belong to the same political party. Standard errors in parenthesis clustered at the subject level. Demographic controls include age, gender and level of education. Significance levels: Three stars ( $p < 0.01$ ); two stars ( $p < 0.05$ ); one star ( $p < 0.1$ ).

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Own	-0.067*** (0.014)	-0.067*** (0.014)	-0.067*** (0.014)	-0.067*** (0.014)	-0.072*** (0.017)	-0.072*** (0.017)	-0.072*** (0.017)
Green		-0.058 (0.041)	-0.067 (0.044)	-0.067 (0.044)	-0.067 (0.044)	-0.061 (0.042)	0.010 (0.069)
Labour		-0.014 (0.035)	-0.023 (0.037)	-0.023 (0.037)	-0.023 (0.037)	-0.014 (0.037)	0.081 (0.074)
Lib Dem		-0.082** (0.038)	-0.091** (0.041)	-0.091** (0.041)	-0.091** (0.041)	-0.081* (0.041)	0.019 (0.061)
Strength			-0.018 (0.016)	-0.018 (0.016)	-0.018 (0.016)	-0.015 (0.016)	-0.016 (0.019)
TreatDum				-0.054*** (0.011)	-0.056*** (0.012)	-0.056*** (0.012)	-0.056*** (0.012)
Own*TreatDum					0.009 (0.016)	0.009 (0.017)	0.009 (0.017)
Constant	0.418*** (0.015)	0.460*** (0.028)	0.499*** (0.050)	0.526*** (0.051)	0.527*** (0.051)	0.445*** (0.069)	0.326** (0.130)
Demographics	No	No	No	No	No	Yes	Yes
Date	No	No	No	No	No	No	Yes
$R^2$	0.02	0.04	0.04	0.06	0.06	0.21	0.27
AIC	-302.84	-325.40	-328.13	-347.26	-345.36	-361.93	-635.14
BIC	-292.48	-299.51	-297.07	-311.01	-303.94	-304.97	-459.09
$N$	1,310	1,310	1,310	1,310	1,310	1,310	1,310
Subjects	131	131	131	131	131	131	131

## *Regression analysis of Responder MAOs*

Table 7 reports the regression results. As in the case of proposer offers, we have dropped the interaction terms that were statistically insignificant (Own with Strength and Own with Male) except that we have reported the interaction term Own\*TreatDum, which is insignificant. Responders also stated higher MAOs for proposers from the Conservative party and the UKIP, respectively significant at the 5% level and the 1% level. We have dropped these results from Table 7 for visual clarity but these results are available on request from the authors.

As was also the case for proposer offers, we find that ‘Own’ (corresponding to  $d_1$ ) is statistically significant and negative in all regressions. Responders consistently state a lower MAO when they share their political affiliation with the proposer. As noted above, in Proposition 2, this implies that the unobserved disadvantageous inequity parameter of the responder satisfies  $\alpha_I < \alpha_O$ , i.e., disadvantageous inequity is felt more strongly from outgroup members. This confirms the result with a student population in Chen and Li (2009) but we require fewer assumptions.<sup>24</sup>

Recall that the dummy  $d_4$  equals 1 if the responder is a Liberal Democrat and zero otherwise; where the omitted category is the Conservative responder identity. Thus, Liberal Democrat responders, relative to Conservative responders, state a lower MAO, which is significant in 4 out of the 5 regressions reported in Table 6, although in the best regression in terms of AIC, this difference is not significant. The dummy variables  $d_2$  and  $d_3$  are never significant, i.e., Green and Labour responders do not ask for significantly different MAOs relative to a Conservative responder. Comparing these results with the behavior of proposers in Table 4, where all these variables are statistically significant, political identity plays a relatively stronger role for proposers. This asymmetric role of political identity for proposers and responders in an artefactual political identity experiment, is also, to the best of our knowledge, a new finding.

The treatment dummy  $d_6$ , labelled ‘TreatDum’ is negative and significant at 1%, which suggests that responders state lower MAOs (as a percentage of the proposers post-tax endowment) in Treatment 2 relative to Treatment 1. This confirms the predictions in Proposition 2a.

As noted above, political identity appears to play a relatively stronger role for proposers. This finding is strengthened when we compare the quantitative sizes of the OWN variable in Tables 4 and 7; political identity has a more significant effect (quantitatively almost double) on the offers of proposers, relative to the MAOs of the responders. The constant term in Table 7 is highly significant at 1% in all regressions and accounts for the largest part of the quantitative effect on the MAO; all other explanatory variables have a smaller quantitative effect. This suggests that the MAO may be affected by social norms of



fairness to a larger extent as compared to political identity effects. However, the political identity effects improve our understanding of the responder decisions. A similar observation holds for the results from offers made by proposers (see the size and significance of the intercept term in Table 4).

The findings on political identity for responders are summarized in the next result.

**Result 5** : *The responders' MAOs as a percentage of the proposers post-tax endowment are significantly lower when the proposer is an ingroup member compared to when the proposer belongs to the outgroup. We can also conclude that  $\alpha_I < \alpha_O$ , i.e., disadvantageous inequity is more onerous when it is with respect to an outgroup proposer. Political identity concerns are relatively more important for proposers.*

Strikingly, as one moves from Treatment 1 to Treatment 2, the average amount that the responders reduce their MAO by (5.4%) is almost equal to the amount by which the proposers reduce their offers (5.7%), both expressed as a percentage of the proposer's post-tax endowment (see Tables 2 and 5). In conjunction, these results suggests that there might be a shared understanding of the responder's share in the presence of taxation and redistribution, as compared to the absence of these factors. Fehr and Schurtenberger (2018) highlight the 'shared understanding' aspect of a social norm. In this interpretation, our empirical results are consistent with there being a norm of behavior for prosocial sharing in the presence of taxes and redistribution. Here we are using the term "norm" in a general sense. For specific and formal definitions of norms that take account of empirical and normative expectations, but lie outside the scope of our paper, see Dhami (2019, Volume 2, Section 5.7).

## V SUGGESTIONS FOR FUTURE RESEARCH

The ultimatum game introduces strategic elements and, hence, an appropriate solution concept from game theory is needed. We use the standard game-theoretic concept of subgame perfect Nash equilibrium (SPNE). Our tests are joint tests of our model and SPNE. Hence, a confirmation of our predictions is a confirmation of both. However, confirmation is not proof. In particular, we express several caveats.<sup>25</sup> The main point raised by Referee 2 is how do experimental subjects, with limited cognition and limited time to learn, arrive at a SPNE? Within an epistemic model of a game, a SPNE implies *common belief in future rationality*; and this condition is indeed very demanding (see Perea, A. (2012), chapters 2,3,8; in particular, section Subgame perfect equilibrium, pp 459, 460). However, we only assume that subjects follow the equilibrium outcome of a SPNE; and our empirical tests do not reject this (a SPNE also specifies behavior off the equilibrium path, but our data

cannot test this). Furthermore, we are only interested in the qualitative predictions of a SPNE, as we will discuss further below. We conjecture that this is consistent with much weaker epistemic conditions; but our data cannot test this and, indeed, this would constitute a new research program.

An alternative is to use the heuristics and biases approach in economics in which individuals employ relatively simple decision (Dhimi, 2020, Vol. 5). There are now several attempts to formalize these approaches (Dhimi, 2019, Vol. 4).<sup>26</sup> We argue, informally, below that since our SPNE predictions are mainly of an ordinal nature (e.g., whether higher offers are made to ingroup members), these are similar to the predictions of a heuristics-based approach. Had we made cardinal predictions instead (e.g., how much higher are the offers made to ingroup members), these may very well have rejected the conjunction of our model with the SPNE.

The outline of a heuristics-based approach is as follows. Let the proposer be conditionally reciprocal, have political identity concerns, and be aware of the responder's political identity. Suppose that the proposer believes that the responder also exhibits conditional reciprocity and political identity concerns, although not necessarily to the same extent.<sup>27</sup> The proposer need not know the exact magnitudes of the responder's conditional reciprocity or political identity (say, as captured by the relevant parameters of the Fehr-Schmidt utility function). Suppose that the proposer wishes to maximize his earnings conditional on these (possibly incorrect) beliefs and uses simple rules of thumb that preclude the computation of a strict SPNE. It is still reasonable that the proposer will offer a strictly positive amount because he knows that conditionally reciprocal responders turn down low offers. There are two opposing tendencies in proposer offers (here we have ordinal concerns, i.e., whether the offers are high or low, but not by how much).

(i) The proposer may offer relatively more to ingroup responders than outgroup responders because of his own political identity concerns.

(ii) If the proposer knows that ingroup responders are less (more) likely to turn down lower offers, he might offer them a lower (higher) amount.

The outcome depends on the relative importance of these two factors, which is an empirical question. Yet these ordinal comparisons are similar to the predictions of the SPNE in our model. Our data cannot distinguish between the two cases of rules of thumb behavior and a SPNE, and neither do we directly require such a distinction for the questions that we pose. Of course, for a different set of questions that require cardinal comparisons, SPNE may fail.

## VI CONCLUSION

In this paper, we use an artefactual experiment using the ultimatum game with registered members of British political parties, to study the influence of political identity on prosociality. Furthermore, we distinguish between untaxed income and taxed-redistributed income in two different treatments in a novel experimental design. We use a simple, yet rigorous, theoretical model of social preferences and political identity, which offers a rich set of predictions that are then put to the test with our data.

We confirm the classic social identity predictions for proposers and responders. Proposer offers are significantly reduced when responders belong to a different political identity (outgroup members) relative to their own political identity (ingroup members). In parallel, responders when stating their minimum acceptable offers (MAOs) consistently state a lower MAO when matched with a proposer of their own identity. However, for proposers we find that their offers are conditional on their political affiliation. Compared to Conservative proposers, Green, Labour and Liberal Democrat proposers make significantly higher offers. For the responders, MAOs are less conditional on political identity. Quantitatively we find that political identity plays a more significant role in the decisions of proposers, as compared to the decisions of the responders. We are also able to infer that, for responders, the disadvantageous inequity parameter of Fehr-Schmidt preferences is higher when facing an outgroup proposer relative to an ingroup proposer.

The decisions of both proposers and responders are highly sensitive to treatment effects. In Treatment 1 the endowments are unearned and untaxed, while in Treatment 2 the endowments are earned, taxed, and redistributed. Proposer offers, as a percentage of their incomes, are reduced significantly as one moves from Treatment 1 to Treatment 2. Interestingly, the MAOs of the responders, expressed as a percentage of the proposer's income, also fall by a nearly identical amount. This new finding suggests that there is a shared understanding of the appropriate offer and MAO in the presence of taxation and redistribution. One potential explanation is that our subjects, fee paying British party members, are likely to be earning income and paying taxes, and are aware of social redistribution norms due to their heightened political identity.

On average, when we do not control for the political identity of the proposer, lower offers are made to responders of the Conservative party or UKIP as compared to responders from the Labour, Liberal Democrat, or Green parties. A similar result holds for the MAOs asked by responders. However, this result might be driven by our smaller sample size of Conservative party and UKIP members. Alternatively, these results could be explained by political identity factors which is consistent with our theoretical model. We find very little effect of demographic variables such as age, gender, and education on either the offers made by proposers or the MAOs stated by the responder. Experiments with student subjects

often do find significant demographic/gender effects. It would be an interesting question for future research to examine the reasons for these differences between artefactual and lab experiments.

# Notes

<sup>1</sup>We are not referring here to the survey-based studies on partisan attitudes, particularly based on US data (Green, 2004; Iyengar et al., 2012; Iyengar and Westwood, 2015; Mason, 2014). Survey data is self-reported and may be subject to well-known cognitive biases, while experiments, if they are run in an incentive compatible manner, are not subject to this problem.

<sup>2</sup>Such access, at least in Britain, is tightly controlled by party offices who are under no obligation to publish the details of individual party members, and are typically reluctant to expose their party members to lab experiments. A further compounding factor is that economics experiments require incentives. We found, however, that most political parties view the transfer of money from the experimenter to their party members via them with great suspicion, to the extent of reducing/blocking access to their members. This posed enormous problems of recruitment of subjects in the field for us.

<sup>3</sup>The ultimatum game is a two player game in which a proposer makes offers from a fixed endowment to a responder, who either accepts the offer or rejects. In the latter case both get zero. The neoclassical prediction is that the proposer offers the smallest divisible unit of currency, 1 cent, to the responder. Since this offer is greater than zero, it is immediately accepted by the responder. This is possibly the most widely replicated experimental game (Camerer, 2003; Dhami, 2016, 2019, Vol. 2). The main results are as follows (Dhami, 2016, Section 5.2). The mean offer is 30-40 percent of the endowment and the median offer is 40-50 percent of the endowment. There are rarely any unfair offers (say, less than 10 percent of the endowment) or over-fair offers (say, over 50 percent of the endowment). Low offers are rejected and the main reason for the rejections is that the responders feel that the offers were unfair. These results continue to hold with reasonable increases in the stake size. However, at very high stakes responders are willing to receive lower offers.

<sup>4</sup>For a recent survey of the link between social identity and redistribution, see Costa-Font and Cowell (2015). However, they are able to cite very few actual studies of the relationship between these two factors and they cite no artefactual experiments that explore this relationship.

<sup>5</sup>This may be taken to be the analogue of real world expenditure items such as deadweight loss of taxation, expenses of operating the tax system, defence, and infrastructure expenditure.

<sup>6</sup>This follows from (4), (8) and Proposition 1.

<sup>7</sup>Our solution method is backward induction and the proposer behaves in a manner that is similar to a Stackelberg leader.

<sup>8</sup>Beliefs can be rigorously incorporated into the framework by applying the machinery of psychological game theory within a different model that endogenizes the roles of emotions (Dhami, 2019, V4. Sections 2.5, 3.6; Dhami et al., 2019).

<sup>9</sup>Only the local offices of parties in England were contacted. This was due to the salience of national identities in Wales, Scotland and Northern Ireland that results in large support bases for the Nationalist parties in each country. Our sampling area was across England, focussing primarily on large cities.

<sup>10</sup>Neither the experimenter nor other participants were able to identify our subjects, and this was known to the subjects. Given the often sensitive nature of political affiliation and the possible discriminatory nature of social identity decisions, this was of vital concern for the accuracy of our data.

<sup>11</sup>All respondents were required to give their consent for participation, without which they could not proceed any further. Those who were unwilling to give consent were thanked for their time and offered inclusion into a lottery to win £10 (this occurred only once in the experiment and the subject that declined consent did not select into the lottery).

<sup>12</sup>For instance, online experiments can only be taken by those with internet accesses and, thus, may not be applicable to all sections of society although there is near-universal access to the internet in England.

<sup>13</sup><https://yougov.co.uk/news/2017/04/25/demographics-dividing-britain/>

<sup>14</sup>In a fast moving series of events, the Brexit referendum occurred, David Cameron resigned as Prime Minister, Nick Clegg resigned as leader of the Liberal Democrats, Ed Miliband resigned as leader of the Labour Party in conjunction with other political occurrences.

<sup>15</sup>In response to a query from a reviewer, currently, there are four income tax bands in the UK that have the respective tax rates 0%, 20%, 40%, 45%. Averaged across the non-zero tax rates gives an average

tax of 35%, and averaged across the 4 income bands gives an average tax rate of 26.25%. 30% is a rough average of 35% and 26.25% that we have used in the experiments.

<sup>16</sup>For supplementary tables that give the detailed breakdown of offers and minimum acceptable offers by political affiliation of the proposers and the responders, see Appendix C.

<sup>17</sup>The elasticity is defined in the usual manner as  $\frac{\text{Change in proposer offer}}{\text{Change in tax rate}} \times \frac{\text{Tax rate}}{\text{Initial offer}}$ .

<sup>18</sup>Fershtman and Gneezy (2001) find that social identity concerns are stronger for male subjects when the underlying problem is one of ethnic discrimination. However, when we interact the two variables, Own and Male, we find that the coefficient is quite small (0.033) and insignificant. This variable is similarly insignificant in explaining responder MAOs. This suggests context and cultural dependence of preferences across different studies that is of central importance in behavioral economics. We are very grateful to Referee 3 for his/her query in this regard.

<sup>19</sup>The vast majority of all subjects (more than 80%) report high levels of strength of affiliation with their party, hence there is little variation in the Strength variable.

<sup>20</sup>In the absence of the interaction term Own\*TreatDum, it is always significant at 1%, but in the presence of Own\*TreatDum its significance drops to 10%. However, the individual effect of Own\*TreatDum by itself is relatively small (about 1/7 of the effect of the TreatDum on its own).

<sup>21</sup>For the details of responder MAOs separated by political parties in each treatment, see the supplementary tables in Appendix C.

<sup>22</sup>The elasticity is defined in the usual manner as  $\frac{\text{Change in responder MAOs}}{\text{Change in tax rate}} \times \frac{\text{Tax rate}}{\text{Initial MAO}}$ .

<sup>23</sup>Alternatively, it could be that Conservative supporters are perceived to have higher average incomes and UKIP is considered too right-leaning; as noted earlier, this would fit into the explanation outlined in Remark 3 using our theoretical model. Pinpointing the exact reason, with a larger data set, is likely to be an interesting question for future research to address.

<sup>24</sup>Chen and Li (2009) measure the actual sizes of  $\alpha_I, \alpha_O$ , but in order to do so they require the extra assumption that subjects play a mixed strategy in which each pure strategy is played with a probability given by the logistic form. We do not require such an assumption.

<sup>25</sup>We are grateful to a reviewer for raising these issues. They are important, urgent, and exciting. However, addressing them adequately would require new experiments and a new paper; in fact, a whole new research program.

<sup>26</sup>For instance, al-Nowaihi and Dhami (2015) propose evidential reasoning as an alternative to Nash equilibrium that explains the empirical results from several important games. Evidential reasoning requires that in forming beliefs about the actions of other potentially like-minded opponents, players assign diagnostic significance to their own actions and beliefs. Players then play a best response to such (possibly incorrect) beliefs.

<sup>27</sup>Such beliefs would be implied by evidential reasoning, the false consensus effect, and the related concept of social projection in psychology (Dhami, 2019, Vol. 4, Section 2.7.4).

## VII APPENDICES

### Appendix A: Proofs

*Proof of Proposition 1:* (a) From (3) and (5) we get  $\bar{s}(t) > 0$  and  $(1-t)x - \bar{s}(t) = \frac{1}{2}(1-t+\delta t)x > 0$ . Hence

$$0 < \bar{s}(t) < (1-t)x. \quad (12)$$

Thus,  $\bar{s}(t)$  is a feasible share for the proposer to offer to the responder. Using (4), it follows from (1)-(12) that

$$U_P(s) = \begin{cases} (1-t)x - s - 2\beta_S[\bar{s}(t) - s] & \text{if } s \leq \bar{s}(t) \\ (1-t)x - s - 2\alpha_S[s - \bar{s}(t)] & \text{if } s > \bar{s}(t) \end{cases}, S = I, O. \quad (13)$$

$$U_R(s) = \begin{cases} s + \delta tx - 2\beta_S[s - \bar{s}(t)] & \text{if } s \geq \bar{s}(t) \\ s + \delta tx - 2\alpha_S[\bar{s}(t) - s] & \text{if } s < \bar{s}(t) \end{cases}, S = I, O. \quad (14)$$

From (13) and (14) we get

$$\frac{\partial U_P(s)}{\partial s} = \begin{cases} 2\beta_S - 1 & \text{if } s \leq \bar{s}(t) \\ -1 - 2\alpha_S < 0 & \text{if } s > \bar{s}(t) \end{cases}, S = I, O. \quad (15)$$

$$\frac{\partial U_R(s)}{\partial s} = \begin{cases} 1 - 2\beta_S & \text{if } s \geq \bar{s}(t) \\ 1 + 2\alpha_S > 0 & \text{if } s < \bar{s}(t) \end{cases}, S = I, O. \quad (16)$$

From (14) and (8),  $U_R(\lambda(t)x) = \lambda(t)x + \delta tx - 2\alpha_S[\bar{s}(t) - \lambda(t)x]$ . Substitute for  $\bar{s}(t)$  from (5), then simplify, to get

$$U_R(\lambda(t)x) = [(1 + 2\alpha_S)\lambda(t) - (\alpha_S + \alpha_S\delta + \delta)(\bar{t} - t)]x. \quad (17)$$

We have two cases to consider:

(i)  $t \geq \bar{t}$ . From (7) we have  $\lambda(t) = 0$ . Substitute in (17) to get  $U_R(\lambda(t)x) = (\alpha_S + \alpha_S\delta + \delta)(t - \bar{t})x \geq 0$ . Therefore,

$$\lambda(t)x = \min \{s \in [0, (1-t)x] : U_R(s) \geq 0, t \geq \bar{t}\}. \quad (18)$$

(ii)  $t < \bar{t}$ . From (7) we have  $\lambda(t) = \frac{\alpha_S + \alpha_S\delta + \delta}{1 + 2\alpha_S}(\bar{t} - t)$ . Substitute in (17), then simplify, to get  $U_R(\lambda(t)x) = 0$ . Suppose  $\lambda(t)x > 0$ . Let  $s \in [0, \lambda(t)x]$ . From (8),  $s < \bar{s}(t)$ . From (16),  $\frac{\partial U_R(s)}{\partial s} > 0$ . Hence,  $U_R(s) < U_R(\lambda(t)x) = 0$ . Therefore,

$$\lambda(t)x = \min \{s \in [0, (1-t)x] : U_R(s) \geq 0, t < \bar{t}\}. \quad (19)$$

From (18) and (19) it follows that  $\lambda(t)x = \min \{s \in [0, (1-t)x] : U_R(s) \geq 0\} = s_M(t)$ .

(b) From (7), it is obvious that  $\lambda(t) \geq 0$  and is continuous. We also have  $\bar{s}(t) - \lambda(t)x = \bar{s}(t)$  for  $t \geq \bar{t}$ ; and  $\bar{s}(t) - \lambda(t)x = \frac{1}{2} \left[ \frac{\delta}{\alpha_S + \alpha_S \delta + \delta} + \frac{(1-\delta)(\bar{t}-t)}{1+2\alpha_S} \right] x > 0$  for  $t < \bar{t}$ . Hence, using (12), we directly get (8) in the statement of the Proposition. ■

*Proof of Proposition 2:* The results follow from (3), (7) and Proposition 1. ■

*Proof of Corollary 1:* The results follow from (9) and Proposition 2. The reason for the restriction  $\delta > 0$  in part (aii) is as follows. For  $t < \bar{t}$  and  $\delta = 0$ , (6) and (7) give  $\lambda(t) = \frac{\alpha_S}{1+2\alpha_S}(1-t)$ . Hence, from (9),  $\tilde{s}_M(t) = \frac{\alpha_S}{1+2\alpha_S}$  is independent of  $t$ . ■

*Proof of Proposition 3:*

(a) From (15) we have  $\frac{\partial U_P(s)}{\partial s} > 0$  for  $s < \bar{s}(t)$  and  $\frac{\partial U_P(s)}{\partial s} < 0$  for  $s > \bar{s}(t)$ . Since  $U_P(s)$  is continuous, it follows that  $U_P(s)$  is maximized when  $s = \bar{s}(t)$ . From (12)-(14) we get  $U_P(\bar{s}(t)) \geq 0$  and  $U_R(\bar{s}(t)) \geq 0$ . Hence,  $s^*(t) = \bar{s}(t)$ . This establishes (i). Parts (ii)-(iv) then follow from (5).

(b) For  $\beta_S = \frac{1}{2}$  and  $s \leq \bar{s}(t)$ , (13) gives  $U_P(s) = (1-t)x - \bar{s}(t)$  independently of  $s$ , and (12) gives  $U_P(s) > 0$ . For  $s > \bar{s}(t)$ , (15) gives  $\frac{\partial U_P(s)}{\partial s} < 0$ . Hence,  $U_P(s)$  is maximized at any  $s \in [0, \bar{s}(t)]$ , provided  $U_R(s) \geq 0$ . However, from (16), (8), Definition 1 and Proposition 1, it follows that  $U_R(s) \geq 0$  for all  $s \in [s_M(t), \bar{s}(t)]$ .

(c) For  $\beta_S < \frac{1}{2}$ , (15) gives  $\frac{\partial U_P(s)}{\partial s} < 0$  for  $s \leq \bar{s}(t)$  and  $s > \bar{s}(t)$ . Since,  $U_P(s)$  is continuous, it follows that  $U_P(s)$  is strictly decreasing for  $s \in [0, (1-t)x]$ . Hence,  $U_P(s)$  is maximized when  $s = s_M(t)$ . Hence,  $s^*(t) = s_M(t)$ .

(d) Substitute from (5), (6), (7) into  $\bar{s}(t) - s_M(t)$ , use Proposition 1, then simplify, to get

$$\bar{s}(t) - s_M(t) = \begin{cases} \frac{(1-t+\delta t)x}{2(1+2\alpha_S)} & \text{if } t < \bar{t} \\ \frac{1}{2}(1-t-\delta t)x & \text{if } t \geq \bar{t} \end{cases}. \quad (20)$$

From part (ai),  $s^*(t, \beta_2) = \bar{s}(t)$ . From part (ci),  $s^*(t, \beta_1) = s_M(t)$ . Since  $1-t-\delta t > 0$ , it follows from this and (20) that  $s^*(t, \beta_1) < s^*(t, \beta_2)$ . ■



## Appendix B: Experiment Instructions

Comments for the reader of our paper (and not our experimental subjects) are enclosed by \*\*, for instance, \*\*New Page\*\*.

Subjects initially filled-in a consent form that highlighted several points such as voluntary participation, anonymity of data, and the use of the data for research purposes only.<sup>28</sup>

\*\*All Participants who gave consent are presented with the following demographic questions\*\*

Age

18-24

35-49

50-64

65+

Gender

Male

Female

Political Affiliation

Labour

Liberal Democrat

Green

Conservative

UKIP

How Strong is your support for the political party you affiliate with?

Very Strong  Strong  Somewhat  Weak  Very Weak

\*\*New Page\*\*

The “Ultimatum Game” is played between two people; the PROPOSER and the RESPONDER. The PROPOSER is given £10 to divide between themselves and the RESPONDER. The PROPOSER’S offer is put to the RESPONDER. If the RESPONDER accepts the offer from the PROPOSER then they both receive this split. If the RESPONDER rejects the PROPOSER’S offer then they both receive £0. The final amounts that the PROPOSER and the RESPONDER receive is called the “outcome”.

**Example 1:** Sally and James are playing the “Ultimatum Game”. Sally is the PROPOSER, James is the RESPONDER. The PROPOSER is given £10. She proposes a split of £7 for herself and £3 for James, the RESPONDER. If the RESPONDER rejects this offer, how much will they both receive?

Sally \$7, James \$3

Sally \$3, James \$7

Both receive \$0

**Example 2:** This time Sally, the PROPOSER, offers James, the RESPONDER, £5. The RESPONDER accepts this offer. How much do they both receive?

Both receive \$5

Both receive \$0

Sally \$0, James \$5

**\*\*New Page\*\***

You will now have the opportunity to play the “Ultimatum Game” in four different scenarios. One of these games will be selected at random and you shall receive the monetary outcomes from it based on the choices you make. The game that is randomly selected will be paired with another randomly selected participant in the study who is playing the opposite role to you. If you are a PROPOSER your match will be a RESPONDER. If you are a RESPONDER your match will be a PROPOSER. Payment details will be given at the end of the survey.

**\*\*Subjects are randomly assigned as Proposer or Responder and remain in that role for the duration of the Experiment\*\***

**\*\*We first give the instructions for Treatment 1, followed by the instructions for Treatment 2\*\***

**\*\*Instructions follow for subjects in the role of Proposers\*\***

You are a PROPOSER

You face an anonymous individual, the RESPONDER and are asked to split £10 between yourself and the RESPONDER. You do not know anything about the person you are playing with. Please indicate how much you are willing to offer to the RESPONDER .

**\*\*Slider Task here. For a screenshot when the responder has several possible political identities, please see Figure 1.\*\***

Here, you will play the “Ultimatum Game” five times.

You face five individuals, the RESPONDERS, one at a time. You are asked to split £10 between yourself and each of the RESPONDERS, making your decision one at a time. You do not know anything about the person you are playing with apart from their **political affiliation**. The political affiliation of each RESPONDER is indicated on the left. Please indicate how much you are willing to offer to each of the RESPONDERS.

**\*\*Slider Task. See Figure 1 for a screenshot.\*\***

**\*\*Instructions follow for subjects in the role of Responders\*\***

You are a RESPONDER.

You face an anonymous individual, the PROPOSER. The PROPOSER is asked to split £10 between themselves and you, the RESPONDER. You do not know anything about the person you are playing with. Please indicate **the amount below which you will reject** the PROPOSER’S offer.

Figure 1: Slider Task Proposers

Here, you will play the Ultimatum Game five times.

You face five individuals, the RESPONDERS. You are asked to split £10.00 between yourself and each of the RESPONDER.

You do not know anything about the person you are playing with apart from their political affiliation. This is indicated for each RESPONDER on the left.

Please indicate how much you are willing to offer to each of the RESPONDERS.



\*\*Slider Task. For a screenshot when the proposer has several possible political identities, please see Figure 2.\*\*

Here, you will play the “Ultimatum Game” five times.

You face five individuals, the PROPOSERS, one at a time. Each PROPOSER is asked to split £10 between themselves and you, the RESPONDER. You do not know anything about the person you are playing with apart from their **political affiliation**. The political affiliation is indicated for each PROPOSER on the left.

Please indicate **the amount below which you will reject** each PROPOSER’S offer.

\*\*Slider Task. See Figure 2 for a screenshot.\*\*

\*\*This concludes the experimental instructions for Treatment 1. Below are the experimental instructions for Treatment 2 in which proposers could earn their endowments and these endowments are taxed and partly redistributed.\*\*

\*\*Proposers are shown the following screens\*\*

You the PROPOSER have the opportunity to earn some extra money, over and above your £10, to play the upcoming Ultimatum Game.

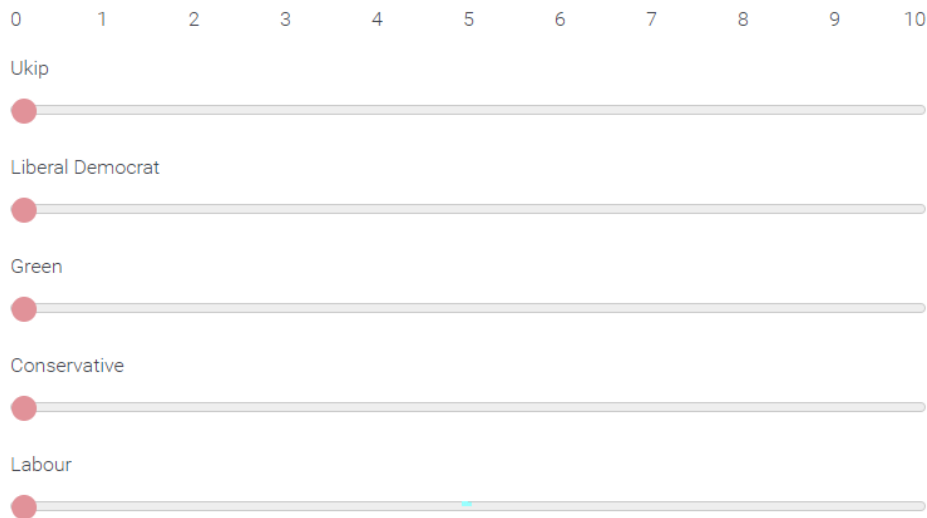
Figure 2: Slider Task Responders

Here, you will play the Ultimatum Game five times.

You face five individuals, the PROPOSERS. Each PROPOSER is asked to split £10.00 between themselves and you, the RESPONDER.

You do not know anything about the person you are playing with apart from their political affiliation. This is indicated for each PROPOSER on the left.

Please indicate **the amount below which you will reject** each PROPOSER'S offer.



You must answer 5 questions. If you answer 4 or more correctly you play the Ultimatum Game with £20. If you answer less than 4 correctly you will play the Ultimatum Game with £10.

**\*\*The five questions follow.\*\***

$$45 + 21 + 9 =$$

$$43 + 18 + 21 =$$

$$57 + 9 + 20 =$$

$$24 + 53 + (2 \times 4) =$$

$$(17 + 18)/2 =$$

**\*\*Depending on the number of Questions answered correctly subjects are shown one of the two statements: "You have earned £20 to play the Ultimatum Game." "You have earned £10 to play the Ultimatum Game."**

**\*\*New Page\*\***

**\*\*First we give the instructions for proposers who play the ultimatum game with £20\*\***

You face an anonymous individual, the RESPONDER and are asked to split £20 of your earned income between yourself and the RESPONDER.

HOWEVER, your income is subject to a tax rate of 30%. You are left with an after-tax income of £14.

50% of your tax payment is redistributed and is given to the RESPONDER. The RESPONDER will receive £3.

You are now asked to split your after-tax income with the RESPONDER. You do not know anything about the person you are playing with. Please indicate how much you will offer to the RESPONDER.

**\*\*The remaining instructions for the proposer are as in Treatment 1, so we omit them.\*\***

**\*\*Now we give the instructions for proposers who play the ultimatum game with £10\*\***

**\*\*The only difference from the case where the proposer has £20 is given in the following instructions\*\***

You face an anonymous individual, the RESPONDER and are asked to split £10 of your earned income between yourself and the RESPONDER.

HOWEVER, you are subject to a tax rate of 30%. You are left with an after-tax income of £7

50% of your tax payment is redistributed and goes to the RESPONDER. The RESPONDER will receive £1.50.

**\*\*The remaining instructions are as for a Proposer with an income of £20, hence, are omitted here\*\***

**\*\*This is followed by instructions for Responders. These instructions are identical to those described in Treatment 1, so these are omitted. Responders were fully aware of the taxation and redistribution of the Proposer's income in Treatment 2. \*\***

Thank you for taking the time to answer the decision part of the survey. Please could you now take a few minutes to complete some follow up questions.

What is your Marital Status?

- Single
- Married or Domestic Partnership
- Divorced

What is your Occupation? \_\_\_\_\_

What is the highest level of schooling you have completed?

- Higher Degree (e.g. MSc or PhD)
- Degree (including foundation degrees and PGCE)

- A-level, Vocational level 3 and equivalent
- GCSE/O-level, Vocational level 2 and equivalent
- Other Qualifications
- No Qualifications

To try to ensure we have surveyed a representative population of the area please leave your postcode (optional).\_\_\_\_\_

Thank you for your time. Payments will be made via PayPal, all that is required is your email address. Please provide this below.

Alternatively, if you wish to receive your payments via an alternative method, e.g. postal cheque please leave these details.

All payments made will be the outcome of the randomly selected round of the “Ultimatum Game”.

If payments for your outcome are delayed, they will be subject to an interest rate paid for the delay in line with the Bank of England base rate. This will be added to your payment.

*Appendix C: Supplementary Tables*

Table 8: Proposers offers in Treatment 1 as a percentage of the endowment to each responder by political identity. For example a Green Proposers offers an Anon responder 0.48% of the endowment, a fellow Green 52% and a Labour member 47%

Proposer/Responder		Anon	Green	Labour	Lib Dem	Con	UKIP
Green	Mean	0.48	0.52	0.47	0.43	0.39	0.36
	Median	0.5	0.5	0.5	0.5	0.5	0.41
	Max	0.92	1	0.92	0.93	0.91	0.94
Labour	Mean	0.47	0.44	0.46	0.38	0.38	0.32
	Median	0.5	0.5	0.5	0.5	0.5	0.4
	Max	0.52	0.75	1	0.6	0.71	0.7
Lib Dem	Mean	0.47	0.42	0.44	0.52	0.35	0.23
	Median	0.5	0.5	0.5	0.5	0.4	0.2
	Max	0.6	0.51	0.62	0.1	0.6	0.5
Con	Mean	0.44	0.25	0.27	0.28	0.39	0.27
	Median	0.5	0.21	0.25	0.3	0.49	0.29
	Max	0.6	0.55	0.6	0.7	0.62	0.55

Table 9: Proposers offers in Treatment 2 as a percentage of the endowment to each responder by political identity.

Proposer/Responder		Anon	Green	Labour	Lib Dem	Con	UKIP
Green	Mean	0.43	0.48	0.41	0.39	0.29	0.29
	Median	0.43	0.46	0.39	0.41	0.29	0.32
	Max	0.79	0.93	0.79	0.79	0.79	0.79
Labour	Mean	0.39	0.36	0.4	0.35	0.32	0.28
	Median	0.39	0.39	0.4	0.39	0.36	0.34
	Max	0.74	0.66	0.86	0.61	0.61	0.51
Lib Dem	Mean	0.38	0.36	0.36	0.47	0.28	0.2
	Median	0.39	0.38	0.37	0.41	0.34	0.21
	Max	0.86	0.8	0.74	1	0.61	0.51
Con	Mean	0.35	0.24	0.22	0.23	0.37	0.23
	Median	0.32	0.21	0.21	0.21	0.36	0.21
	Max	0.71	0.57	0.57	0.57	0.79	0.5

Table 10: Responders MAO's in Treatment 1 as a percentage of the endowment to each proposer by political identity.

Responder/Proposer		Anon	Green	Labour	Lib Dem	Con	UKIP
Green	Mean	0.4	0.32	0.37	0.39	0.44	0.41
	Median	0.43	0.46	0.41	0.5	0.5	0.5
	Max	0.81	0.81	0.82	0.82	1	0.81
Labour	Mean	0.41	0.52	0.4	0.46	0.51	0.55
	Median	0.49	0.5	0.49	0.5	0.5	0.5
	Max	0.65	0.6	0.74	1	1	1
Lib Dem	Mean	0.38	0.38	0.37	0.32	0.43	0.46
	Median	0.45	0.45	0.46	0.4	0.5	0.5
	Max	0.51	0.6	0.5	0.7	1	1
Con	Mean	0.44	0.48	0.45	0.49	0.4	0.51
	Median	0.5	0.49	0.49	0.49	0.4	0.49
	Max	0.8	1	0.99	1	0.5	1



Table 11: Responders MAO's in Treatment 2 as a percentage of the endowment to each proposer by political identity.

Responder/Proposer		Anon	Green	Labour	Lib Dem	Con	UKIP
Green	Mean	0.35	0.37	0.35	0.38	0.39	0.39
	Median	0.38	0.36	0.36	0.4	0.43	0.42
	Max	0.62	0.73	0.76	0.74	1	1
Labour	Mean	0.35	0.36	0.32	0.34	0.42	0.47
	Median	0.36	0.36	0.34	0.36	0.36	0.39
	Max	0.79	0.79	1	1	1	1
Lib Dem	Mean	0.34	0.32	0.32	0.29	0.37	0.39
	Median	0.39	0.36	0.36	0.29	0.39	0.39
	Max	0.79	0.61	0.65	0.61	0.79	1
Con	Mean	0.4	0.44	0.43	0.43	0.37	0.45
	Median	0.43	0.41	0.41	0.39	0.35	0.43
	Max	0.6	1	0.71	1	0.51	1

Table 12: Summary statistics on demographics by party affiliation. Data given in percentages. Strong/Weak represent strength of political affiliation self reported by subjects, missing category is "somewhat". Final three columns indicate highest level of education achieved, missing category "no qualifications".

	Male	18-24	25-34	35-49	50-64	65+	Strong	Weak	Degree+	A-level	GCSE
Green	58	5	38	30	18	8	83	3	87	10	3
Labour	46	11	22	24	34	10	88	2	83	12	3
Lib Dem	35	11	24	25	23	17	86	1	79	20	0
Con	38	18	18	29	15	21	82	6	56	21	18

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Own	0.117*** (0.016)	0.117*** (0.016)	0.117*** (0.016)	0.117*** (0.016)	0.114*** (0.016)	0.137*** (0.028)	0.130*** (0.028)
Green		0.129*** (0.042)	0.138*** (0.042)	0.138*** (0.042)	0.138*** (0.042)	0.140*** (0.044)	0.141** (0.062)
Labour		0.094** (0.036)	0.100*** (0.036)	0.100*** (0.036)	0.100*** (0.036)	0.107*** (0.038)	0.121** (0.057)
Lib Dem		0.089** (0.038)	0.094** (0.037)	0.094** (0.037)	0.094** (0.037)	0.095** (0.039)	0.087 (0.062)
Strength			-0.017 (0.014)	-0.017 (0.014)	-0.017 (0.014)	-0.017 (0.013)	-0.017 (0.016)
TreatDum				-0.053*** (0.009)	-0.041* (0.025)	-0.041* (0.025)	-0.044* (0.025)
Own*TreatDum					-0.007 (0.012)	-0.007 (0.012)	-0.006 (0.012)
Own*Male						0.041 (0.034)	0.033 (0.034)
Constant	0.574*** (0.027)	0.486*** (0.038)	0.511*** (0.043)	0.538*** (0.044)	0.532*** (0.044)	0.594*** (0.071)	0.673*** (0.089)
Demographics	No	No	No	No	No	Yes	Yes
Date	No	No	No	No	No	No	Yes
$R^2$	0.06	0.10	0.10	0.12	0.12	0.14	0.28
AIC	-682.34	-725.71	-725.22	-725.22	-765.70	-779.05	-978.52
BIC	-671.89	-694.37	-688.67	-710.43	-723.92	-716.38	-790.77
$N$	1,370	1,370	1,370	1,370	1,370	1,370	1,370
Subjects	137	137	137	137	137	137	137

Table 13: OLS regressions. Dependent variable in each of the reported regressions is the offer made by the proposer as a fraction of his after-tax income. Own variable signifies that the proposer and responder belong to the same political party. Standard errors in parenthesis clustered at the subject level. Demographic controls include age, gender and level of education. Significance levels: Three stars ( $p < 0.01$ ); two stars ( $p < 0.05$ ); one star ( $p < 0.1$ ).

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Own	-0.067*** (0.014)	-0.067*** (0.014)	-0.067*** (0.014)	-0.067*** (0.014)	-0.072*** (0.017)	-0.079*** (0.026)	-0.079*** (0.026)
Green		-0.058 (0.041)	-0.067 (0.044)	-0.067 (0.044)	-0.067 (0.044)	-0.061 (0.042)	0.010 (0.069)
Labour		-0.014 (0.035)	-0.023 (0.037)	-0.023 (0.037)	-0.023 (0.037)	-0.014 (0.037)	0.081 (0.074)
Lib Dem		-0.082** (0.038)	-0.091** (0.041)	-0.091** (0.041)	-0.091** (0.041)	-0.081* (0.041)	0.019 (0.061)
Strength			-0.018 (0.016)	-0.018 (0.016)	-0.018 (0.016)	-0.015 (0.016)	-0.016 (0.019)
TreatDum				-0.054*** (0.011)	-0.056*** (0.012)	-0.056*** (0.012)	-0.056*** (0.012)
Own*TreatDum					0.009 (0.016)	0.009 (0.017)	0.009 (0.017)
Own*Male						0.013 (0.028)	0.013 (0.028)
Constant	0.418*** (0.015)	0.460*** (0.028)	0.499*** (0.050)	0.526*** (0.051)	0.527*** (0.051)	0.447*** (0.069)	0.328*** (0.130)
Demographics	No	No	No	No	No	Yes	Yes
Date	No	No	No	No	No	No	Yes
$R^2$	0.02	0.04	0.04	0.06	0.06	0.07	0.27
AIC	-302.84	-325.40	-328.13	-347.26	-345.36	-360.13	-633.4
BIC	-292.48	-299.51	-297.07	-311.01	-303.94	-298.00	-452.17
$N$	1,310	1,310	1,310	1,310	1,310	1,310	1,310
Subjects	131	131	131	131	131	131	131

Table 14: OLS regressions. Dependent variable is Responders MAO. Own variable signifies that the proposer and responder belong to the same political party. Standard errors in parenthesis clustered at the subject level. Demographic controls include age, gender and level of education. Significance levels: Three stars ( $p < 0.01$ ); two stars ( $p < 0.05$ ); one star ( $p < 0.1$ ).

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