Voting in a Multi-dimensional Space: a Conjoint Analysis Employing Valence and Ideology Attributes of Candidates

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Valence matters in voting behaviour, but how exactly? A large body of scholarly research concludes that valence adds a second important dimension to the standard policy-based electoral competition. Valence issues have the peculiar property of voters having identical preferences over them. They all prefer more to less of a given valence attribute. They prefer more to less competent politicians; they prefer more to less honest politicians. Fittingly, Groseclose (2007) argues that valence adds 'half' a dimension to the standard one-dimensional Downsian model of electoral competition.

Indeed, most formal models of electoral competition add a single and separable valence component to the voters' utility function (e.g. Adams and Merrill III 2009; Ansolabehere and Snyder Jr 2000; Aragones and Palfrey 2002; Aragones and Palfrey 2004; Castanheira, Crutzen, and Sahuguet 2010; Groseclose 2001; Londregan and Romer 1993; Schofield 2003; Schofield 2007). The utility U_i of voter i is therefore represented as

$$U_i(x_C) = \delta_C - \phi(|x_C - x_i|)$$

It is a positive function of the valence δ_C of candidate C and a negative function of the difference between x_i and x_C, the voter's and the candidate's positions along a policy dimension, where δ_C, x_i and $x_C \in \mathbb{R}$ (Groseclose 2001). Voters hold homogeneous views with regard to the valence issue; and policy and valence dimensions have the same saliency. Variants to this standard approach include uncertainty over the valence advantage (Adams and Merrill III 2009; Londregan and Romer 1993), multiple policy dimensions and valence traits (Adams et al. 2011; Ansolabehere and Snyder Jr 2000), as well as different types of politicians (Adams and Merrill III 2009; Groseclose 2001).

Only Groseclose (2001 appendix B) takes seriously the possibility that policy and valence components are not separable. Valence may take what he calls, the *competency* form. He argues: "suppose valence represents the candidate's *competency* for implementing the policy position that he or she announces. Here, it is reasonable to believe that the voter appreciates a candidate's competency more when the candidate has adopted a policy that he or she likes… That is, the marginal gains from valence is [sic] larger when policy distance is smaller" (882).

These models are designed to produce expectations about the positioning of politicians on the policy-valence space. Valence plays also a central role in the literature conceiving elections as screening mechanisms (e.g. Besley and Coate 1997; Caselli and Morelli 2004; Fearon 1999; Galasso and Nannicini 2011; Mattozzi and Merlo 2008; Messner and Polborn 2004). Galasso and Nannicini (2011) for instance assume that, in a one dimensional policy space, only centrist voters care about valence, while extreme voters choose their preferred party, regardless of its valence. This is equivalent of assuming that voters do not hold homogeneous views about valence, or that only subset of voters assign to valence a saliency weight strictly greater than zero. More extremely, Caselli and Morelli (2004) propose a model of citizen-candidates where valence is the only relevant dimension of competition. These works are primarily concerned with the selection mechanisms of specific types of low or high valence politicians.

Regardless as to whether the focus is on competition or selection, these models rely on a set of assumptions about voting behaviour. But how exactly do voters behave in a multi-dimensional choice setting? How do they choose when confronted with candidates that embody more and less likable traits? Empirical studies of voting behaviour provide contradicting results. For instance, J. Green and Hobolt (2008) for Britain and Buttice and Stone (2012) for the US find valence voting to play a greater role as parties and candidates converge ideologically. Cross-country studies suggest otherwise. Pardos-Prado (2012) show that the effect of valence on the propensity to vote for a party increases as ideological polarisation intensifies; similarly, Clark and Leiter (2014) find that valence

effects on electoral performance increase as parties diverge from the mean voter's ideological position.[1]

In this article, we employ an experimental technique called conjoint analysis to understand how voters make decisions when faced with multi-dimensional choices. We have designed a so-called stated preference experiment where participants are asked to choose between candidates that vary along three valence (education, income and honesty) and two ideological attributes (attitudes toward taxation and spending and the rights of same-sex couples). We have administered the experiment to 347 subjects in 2012-3, resulting in 9,352 votes over pair-wise compared candidates. Our results indicate that education and integrity, but not income, indeed behave like valence issues where voters prefer more to less. More interestingly, policy positions and valence attributes are not separable. They interact, apparently taking the competency form. The impact of higher valence on the likelihood of voting for a candidate is conditional on such candidate's policy positions. It is higher when positions are closer to those of the respondents. Finally, when push comes to shove, policy trumps valence. Voters are ready to trade a higher valence candidate, with whom they do not share policy views, for a lower valence one with whom they share such views.

In the next section, we formalize voters' choice in a multidimensional space employing spatial voting theory, emphasizing the importance of separable and non-separable preferences and of

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[1] In an experimental study, Mondak and Huckfeld (2006) find that competence and integrity matter the most when participants with clear political views evaluate candidates with clear political affiliations. They matter less if signals about political affiliation are mixed or participants hold centrist views. However, without measures of participant-candidate ideological proximity, it is hard to infer whether these results support positive or negative complementarity. Recently, Galeotti and Zizzo (2014) have analysed the trade-off between competence and trustworthiness of candidates, showing a slight bias in favour of the latter.

saliency of the dimensions. We then introduce the design of the experiment, explain the estimation model and discuss the main results.

VOTER CHOICE OVER CANDIDATES WITH MULTIPLE ATTRIBUTES

Let $\mathbf{C} = \{1, \dots, C\}$ be a set of candidates, $\mathbf{A} = \{1, \dots, A\}$ a set of attributes, and $\mathbf{v_a} = (v_a^1, \dots, v_a^l)$ a l-tuple of values of attribute a, where v_a^l is the lth value of attribute a and $l \geq 2$ for $\forall a$. $\mathbf{V}$ is the set of all attributes' values and the profile of the cth candidate is denoted by a column vector of attributes' values $\mathbf{P_c} = [v_{1c} \dots v_{ac}]'$, where v_{ac} is the value of attribute a for candidate c. For example, there may be three relevant attributes, such as education, integrity and position on taxation and spending, and each of these attributes can take any of three ordered values. The profile of a candidate can be characterized by low education, high integrity and a pro-spending position.

The ideal candidate of a respondent i is represented by the column vector $\mathbf{\Theta_i} = [\theta_{i1}, \dots, \theta_{ia}]'$, where θ_{ia} is her ideal value of attribute a and $\theta_{ia} \in \mathbf{V}$. In a pairwise comparison of candidates' profiles (i.e. $c = 2$), let $Y_i(\mathbf{P_c}) \in \{0,1\}$ be the potential binary outcome of respondent i over a candidate with profile $\mathbf{P_c}$. The value of 1 represents that the respondent would choose the cth profile if she got the treatment $\mathbf{P_c}$, while the value of 0 means that she would not choose such profile. Since respondents must choose one profile in each decision, $\sum_{c=1}^{C} Y_i(\mathbf{P_c}) = 1$ for $\forall i$. Employing the weighted Euclidean distance of spatial voting theory (Enelow and Hinich 1984; Hinich and Munger 1997: 80), we have therefore,

$$Y_i(\mathbf{P_c}) = 1 \text{ iff } [(\mathbf{P_c} - \mathbf{\Theta_i})'\mathbf{S_i}(\mathbf{P_c} - \mathbf{\Theta_i})]^{1/2} < [(\mathbf{P_{\neg c}} - \mathbf{\Theta_i})'\mathbf{S_i}(\mathbf{P_{\neg c}} - \mathbf{\Theta_i})]^{1/2} \quad ,$$

where $\mathbf{S_i}$ is a symmetric positive-definite matrix of order A.[2] The diagonal elements in $\mathbf{S_i}$ measure the salience attached by respondent i to each attribute, and the off-diagonal elements capture the interaction across attributes. If $\mathbf{S_i}$ is an identity matrix, respondent i attaches the same weight to

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[2] In case of equivalence, the respondent is indifferent between the two candidates and we assume that she flips a coin.

each attribute and preferences are separable across attributes. If the diagonal elements in $\mathbf{S_i}$ take difference values, the respondent assigns more salience to some attributes in her voting decision. For instance, she may consider a candidate's integrity more important than his income. In a bidimensional space, indifference contours take an elliptical rather than a circular shape. If the off-diagonal elements in $\mathbf{S_i}$ are different from zero, preferences are nonseparable and attributes interact along the lines of the competency form discussed by Groseclose (2001). Attributes can be positive (negative) complements if a higher level of one attribute makes a respondent wanting more (less) of another attributes.[3] For instance, a voter may value a candidate's level of education more when the candidate shares the voter's opinions on policy. If a candidate's reputation is tainted, she may display more conservative attitudes on taxation and spending.

A CONJOINT ANALYSIS VOTING EXPERIMENT

Conjoint analysis is a method that allows isolating the aspects that influence a respondent's choice in a multidimensional space. It originates from mathematical psychology (Luce and Tukey 1964) and it has been extensively employed in marketing research and economics to measure consumer preference, forecast demand and develop new products (P. E. Green and Rao 1971; P. E. Green, Krieger, and Wind 2001; Hensher, Rose, and Greene 2005; Raghavarao, Wiley, and Chitturi 2010).

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[3] Take the case of two attributes, the weighted Euclidean distance (WED) is $w_1(\theta_1 - v_1)^2 + 2z(\theta_1 - v_1)(\theta_2 - v_2) + w_2(\theta_2 - v_2)^2$, where θ_a, v_a and w_a are respectively the ideal and candidate values and the salience weight of attribute $a = 1,2$, while z the interaction between the attributes (the off-diagonal element in $\mathbf{S_i}$). Since $\partial WED/\partial(\theta_1 - v_1) = 2w_1(\theta_1 - v_1) + 2z(\theta_2 - v_2)$, the marginal effect of the difference between the ideal and candidate values along attribute 1 is also a function of such difference in attribute 2 and of the sign of the interaction term z. The spatial model cannot not capture the possibility that sets of attributes may be nonseparable from other sets of attributes (Lacy 2001, 240).

It has been applied only very recently to research questions in political science (Hainmueller and Hopkins 2012; Hainmueller, Hopkins, and Yamamoto 2014).

We have designed a conjoint analysis voting experiment to assess how attributes of candidates, related to valence and ideology, affect voters' choice. Respondents are subject to K choice tasks where they have to choose between two generically labelled candidates A and B.[4] These candidates are characterised by five attributes and each attribute takes one of three values, that is, $\mathbf{C} = \{1,2\}$, $\mathbf{A} = \{1, ... ,5\}$ and $\mathbf{v_a} = (v_a^1, v_a^2, v_a^3)$ where $a = 1, ... 5$.

The five attributes and their values are described in Table 1; three are meant to be related to valence, two to ideology or policy. Following Stokes (1963) seminal contribution, the literature offers a long list of possible valence factors, from the strength of the economy (e.g. Anderson 2000; Butler and Stokes 1969; Fiorina 1977; Lewis-Beck, Nadeau, and Elias 2008; Palmer and Whitten 2000), to issue ownership (e.g. Budge and Farlie 1983; Bélanger and Meguid 2008; Clarke et al. 2004; J. Green and Hobolt 2008), party unity (Clark 2009), incumbency, name recognition and campaigning skills (e.g. Adams et al. 2011; Enelow and Hinich 1982; Fiorina 1981; Groseclose 2001; Londregan and Romer 1993; Stone and Simas 2010). These factors are not particularly meaningful or useful in pairwise comparisons between generically labelled candidates. They are either context-specific or instrumental – and the latter are not valued intrinsically by voters. In light

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[4] Like Hainmueller, Hopkins and Yamamoto (2014), we exclude party labels because the opinions participants have with regard to a given party may either be correlated with existing attributes or be proxies for omitted ones, therefore confounding our analysis of how respondents trade between policy and valence. With generic labels, the unobserved components of the choice function are less likely to be cross-correlated and more likely to have the same distribution (Hensher, Rose, and Greene 2005, 112–3). The design of the experiment is also simplified because otherwise you would need several party labels and more tasks. The downside is that we cannot test the impact of party identification.

of the models reviewed above, we are interested in candidate-specific and character-based attributes related competence and integrity (e.g. Adams et al. 2011; Clark 2009; Clark and Leiter 2014; Funk 1996; Funk 1999; Kulisheck and Mondak 1996; McCurley and Mondak 1995; Mondak and Huckfeldt 2006; Stone and Simas 2010).

TABLE 1 *Attributes and attribute levels*

Attributes	Attribute levels
Education	Junior high/middle school diploma (*licenza media*)
	High school diploma (*diploma superiore*)
	Univesity degree (*laurea*)
Income	Low (less than € 900 a month)
	Middle
	High (more than € 3000 a month)
Integrity	The candidate has been convicted of corruption
	The candidate is under investigation for corruption
	No proceedings against the candidate
Social services and taxation	"More social services, even at the cost of higher taxes"
	"Maintain the level of provision of social services and taxation"
	"Cut taxes, even at the cost of fewer social services"
Family law	"Same rights to same-sex couples"
	"Some rights to same-sex couples"
	"No rights to same-sex couples"

Attributing directly a level of competence to a candidate would make the whole exercise pleonastic. The choice between a competent candidate and an incompetent one is banal. We employ instead education and income, which are considered proxies for competence in several recent models (Caselli and Morelli 2004; Galasso and Nannicini 2011; Messner and Polborn 2004). A higher educational attainment is plausibly related to greater perceived competence as it indicates, or even determines, higher cognitive and problem solving skills in policy making. The link between income and competence, or valence more generally, may instead raise a few eyebrows. Yet, citizen-

candidate models, which seek to fully endogenize candidacies by removing the distinction between the electorate and the political class and are particularly concerned with the qualities of politicians (Dewan and Shepsle 2011), unabashedly assign to income a strong connotation of valence as "a measure of market success and ability" (Galasso and Nannicini 2011, 79). For Caselli and Morelli (2004, 775), "voters use [candidates'] market incomes as a signal of their competence" in office. On the other hand, income may signal other features, such as class membership, and therefore display no valence behaviour. Our experiment will subject these assertions to testing.

The education attribute includes three levels of attainment: junior high school diploma, high school diploma and university degree. In Italy, they are called *licenza media, diploma superiore* and *laurea*. The levels of income are low, medium and high. Low income is specified as below €900 a month, which is approximately the second decile of the 2009 income distribution in Italy. High income is specified as above €3000 a month, approximately the ninety-fifth percentile.[5]

As far as the third valence attribute is concerned, it is introduced as additional information, thus avoiding more laden terms such as integrity. A candidate may have been convicted of corruption, be under investigation for corruption or have a clean sheet - corruption being the most common office-related crime a politician is likely to be charged with.

Candidates also differentiate along policy positions which are derived from well-established cleavages: the liberal-interventionist economic divide and liberal-conservative social one (e.g. Benoit and Laver 2006: 160; Kitschelt 1994). To capture the former, we established that candidates may want to increase the provision of social services, even at the cost of more taxation, to maintain the current levels, or to cut taxes, even at the cost of fewer social services. These are frequently the top priorities of government for Italian public opinion (European Commission 2010: 24). For the latter, candidates may want to grant no family-related rights to same-sex couples, to grant these couples some rights or even the same rights as traditional families. This is currently the most

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[5] Eurostat dataset on the distribution of income by quantiles in 2009, source: SILC.

debated issue that captures the liberal-conservative social divide in Italy. Others, such as abortion and euthanasia, are less prominent.

TABLE 2 *Example of a choice task*

Question: For whom would you vote?		
	Candidate A	Candidate B
Education	High school diploma	High school diploma
Income	High (more than € 3000 a month)	Middle
Other information	The candidate is under investigation for corruption	The candidate is under investigation for corruption
Opinion on social services and taxation	More social services, even at the cost of higher taxes	Cut taxes, even at the cost of fewer social services
Opinion on family law	Some rights to same-sex couples	Same rights to same-sex couples

Table 2 illustrates an example of a choice task. Note that it does not offer the possibility of abstention. Although including this option would better reflect the situation in which voters find themselves, we are not interested in participation in this context. Our objective is to assess the impact of candidates' attributes on voters' choice. A no vote alternative is a hindrance for our analysis because the only information that can be derived from abstention is that the respondent would prefer not to choose. We do not obtain any information of why this is so. As Hensher, Rose and Greene (2005: 176) argue, 'by forcing decision makers to make a choice, we oblige decision makers to trade off the attribute levels of the available alternatives and thus obtain information on the relationships that exist between the varying attribute levels and choice'.

Experimental Design Considerations

Which candidate profiles should be included in the conjoint analysis and how should be paired? A full factorial design is one in which all possible treatment combinations (i.e. profiles) are enumerated (Hensher, Rose, and Greene 2005: 109). With five attributes and three levels per attribute, we have 243 (i.e. 3^5) different profiles. Since we ask respondents to pairwise compare candidates, the full enumeration of choice tasks amounts to 29,403, that is $\binom{243}{2}$, combinations. Such a design is clearly unfeasible. We will therefore use only a fraction of these combinations – a so-called fractional factorial design.

The minimum number of profiles of a fractional factorial design is determined by the degrees of freedom we need for the subsequent model estimation. Since the alternative candidates are unlabelled, the estimation of the main effects of five attributes requires at least six degrees of freedom for a linear model and, because each attribute takes three values, at least eleven degrees for a non-linear model. Moreover, testing the competency form entails interactions. The addition of an interaction between two attributes requires the estimation of one more parameter in case of a linear model and four more parameters in case of a non-linear model. In other words, if we want to estimate the main effects and, say, two interactions, we need at least eight degrees of freedom for a linear model and nineteen degrees for a non-linear model.

Additionally, a statistically efficient fractional factorial design must be orthogonal, where columns display zero correlation (Hensher, Rose, and Greene 2005: 115). In other words, the levels that an attribute takes across all choice tasks should be statistically independent from the levels other attributes take. Orthogonality may demand a number of combinations that exceeds the minimum requirement imposed by the degrees of freedom (in our case, nineteen for a non-linear model). However, for unlabelled designs, only within-alternative orthogonality needs to be maintained (Hensher, Rose, and Greene 2005: 152). In other words, the education attribute of candidate A across all the choice tasks does not need to be orthogonal to the education attribute of candidate B.

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A last appreciable feature is that the design should be balanced. Each level of any given attribute should appear the same number of times.

Since we require only within-alternative orthogonality, we generated a main-effects orthogonal design for five attributes and three levels for attribute, setting at twenty-seven the minimum number of cases (rows). The design is balanced because each level of each attribute appears nine times. We have assigned attributes to the columns of the design in order to ensure statistically efficient estimations of the main effects and of the interactions between education and the two policy dimensions (for the details on the procedure see Hensher, Rose, and Greene 2005: 127-150). Seven out of the possible ten two-way interactions between attributes display zero correlation with the main effects. Several interactive terms are also uncorrelated with each other. In practise, this means that we can efficiently estimate the marginal effects of all the ten pairwise interactions among the five attributes.[6] We have now twenty-seven orthogonal profiles of candidate A. We have then randomized the sequence of these profiles and assigned them to candidate B, making sure that the randomized combination does not match the original. This procedure ensures within-alternative orthogonality (Hensher, Rose, and Greene 2005: 152).

The core of the experiment consists in twenty-seven choice tasks (i.e. $K = 27$) where respondents are requested to choose between two candidates' profiles. The order of the attributes, as it appears in Table 2, does not change for each respondent in order to ease the cognitive burden, but the

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[6] The fractional factorial and orthogonal design is the most widely used in the conjoint analysis literature. In introducing this method to political science, Hainmueller, Hopkins and Yamamoto (2014) recently proposed a randomized variant of conjoint analysis that does not require any assumption about choice probabilities. Our design imposes no restrictions to the pairwise interactions and to five of the six three-way interactions. Of the interaction between income, integrity and family law, only the following profiles are observed: middle income, corrupt and some rights; high income, investigated and some rights; high income, corrupt, no rights.

sequence of tasks is randomized across respondents in order to minimise primacy and recency effects.

The only applications of conjoint analysis in political science is in the field of public opinion (Hainmueller and Hopkins 2012; Hainmueller, Hopkins, and Yamamoto 2014). In light of the formal literature reviewed above, our interest is more circumscribed. We want to analyze how respondents reconcile valence and policy features of candidates in their voting choices. We are less interested in how different types of respondents prefer different candidates, although trade-offs may differ across types. Given the nature of our inquiry, a set of relatively homogeneous respondents allows us to better control for unobservables that may confound the interaction between attributes (Hensher, Rose, and Greene 2005). We have therefore involved 155 undergraduate students in the period between February and May 2012, and then repeated the exercise with further 192 students between January and May 2013. The experiment, structured as an online survey, has been administered by the Opinion Polls Laboratory (*Laboratorio Indagini Demoscopiche*) of the *Università degli Studi di Milano*. Clearly, our results are not generalizable to a wider population, but we are nevertheless able to highlight similarities with recent public opinion studies (Hainmueller, Hopkins, and Yamamoto 2014). Future research should consider the development of a representative online sample for further corroborating these findings.

ESTIMATION

To estimate how attributes of candidates influence the choice of respondents, we employ a binomial model with a conditional logit link function. Voting is assumed to be generated by a Bernoulli process. The stochastic component of the model is therefore $Y_{ic} \sim Bernoulli(y_{ic}|\pi_{ic})$, where $\pi_{ic} = Pr(Y_{ic} = 1|\beta)$ for respondent i and candidate c. The systematic component is

$$\pi_{ic} = \frac{\exp[(\sum_{a=1}^{4} \beta_a v_{ac}) + \beta_5 v_{1c} v_{4c} + \beta_6 v_{1c} v_{5c} + (\boldsymbol{\beta} \circ \mathbf{R}_i) \cdot \boldsymbol{P}_c]}{\sum_{c=1}^{2} \exp[\sum_{a=1}^{4} \beta_a v_{ac}) + \beta_5 v_{1c} v_{4c} + \beta_6 v_{1c} v_{5c} + (\boldsymbol{\beta} \circ \mathbf{R}_i) \cdot \boldsymbol{P}_c]} \tag{1}$$

where v_{ac} is the value of attribute a for candidate c, with the interactions between education (v_{1c}) and the two policy dimensions (v_{4c}, v_{5c}), $\boldsymbol{\beta} \circ \mathbf{R}_i$ is the Hadamard product of row vectors of betas

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and socio-demographic and political characteristics[7] of the respondent i, while $\mathbf{P_c}$ is the column vector of attributes of candidates. Respondent characteristics must interact with candidate attributes because they do not display within-group variance, i.e. they do not vary across profiles.

VALENCE, IDEOLOGY AND VOTING

The results of the estimation are reported in the Appendix (Table A). In this section, we first assess whether the attributes we selected behave as expected. Next, we evaluate whether the preferences of respondents take the competency form. Finally, we analyze how respondents trade off profiles of candidates in their voting decisions. The online appendix includes diagnostic tests.

The Behavior of Valence and Policy Attributes in Voting Decisions

Do the first three attributes indeed behave like valence issues where voters prefer more to less? Do the last two attributes display the features of policy issues that split voters in different groups? In other words, do the core assumptions underpinning formal models of policy-valence based electoral competition hold? Are the measures of valence used in recent formal and empirical analyses valid? Figures 1a to 1c display the marginal effects of different attributes on the probability that respondents vote for a particular candidate, at different levels of respondents' interest in politics, left-right self-placement and issue saliency (see the online appendix for similar figures on the remaining traits).[8] For instance, the upper-left panel in Figure 1a displays on the vertical axis the

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[7] As socio-demographic traits, we include gender, age, nationality, working status and high school education; as political traits, interest in politics, left-right self-placement, and saliency attached to attributes. Lastly, we include an indicator variable for respondents participating in 2013.

[8] Marginal effect plots are produced following Brambor, Clark and Golder (2006) and the STATA code available at https://files.nyu.edu/mrg217/public/interaction.html#code. These effects are bounded between -0.5 and 0.5 because we set the non-varying attributes at the baseline levels. Had we set them at different levels, the effects would have been confounded by the interactions between

marginal effect on the probability that respondents vote for a candidate with a high school diploma, compared to one with a junior high school diploma, at different levels of interest in politics declared by the respondents. The dots indicate the mean predicted probabilities and the lines the 95% confidence intervals. The bottom right panel is a histogram of respondents' traits.

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respondent characteristics and such attributes. The asymmetric confidence intervals in Figure 3 and Figures A6 to A9 in the online appendix result from the interactions among profile attribute levels.

FIGURE 1a *Marginal effects of candidate attributes at different levels of respondents' interest in politics*
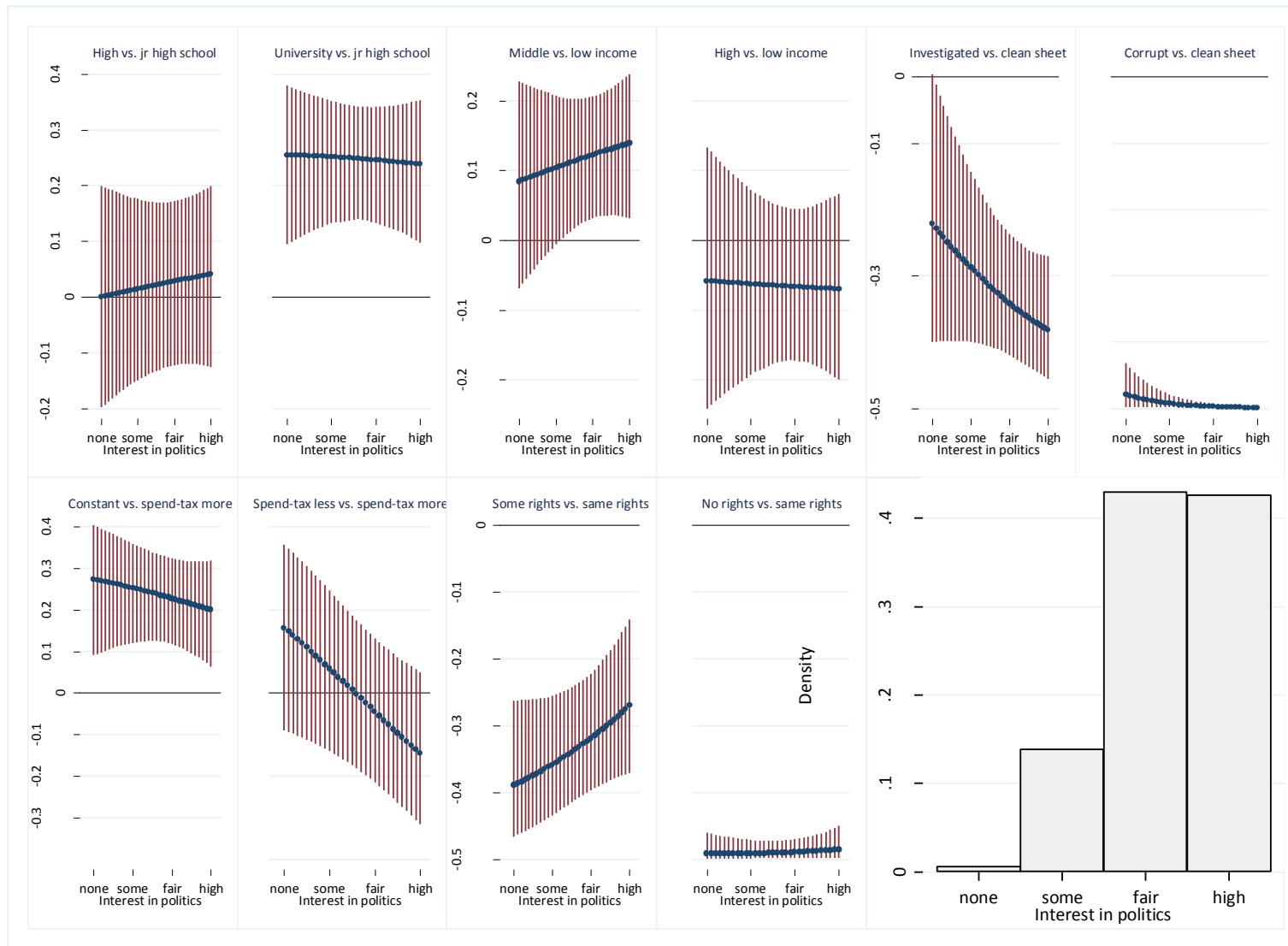
Note: Non-varying attributes are set at their baseline values (junior high school diploma, low income, clean, more taxation and spending, same rights to same sex-couples)

FIGURE 1b *Marginal effects of candidate attributes at respondents' different left-right self-placements*
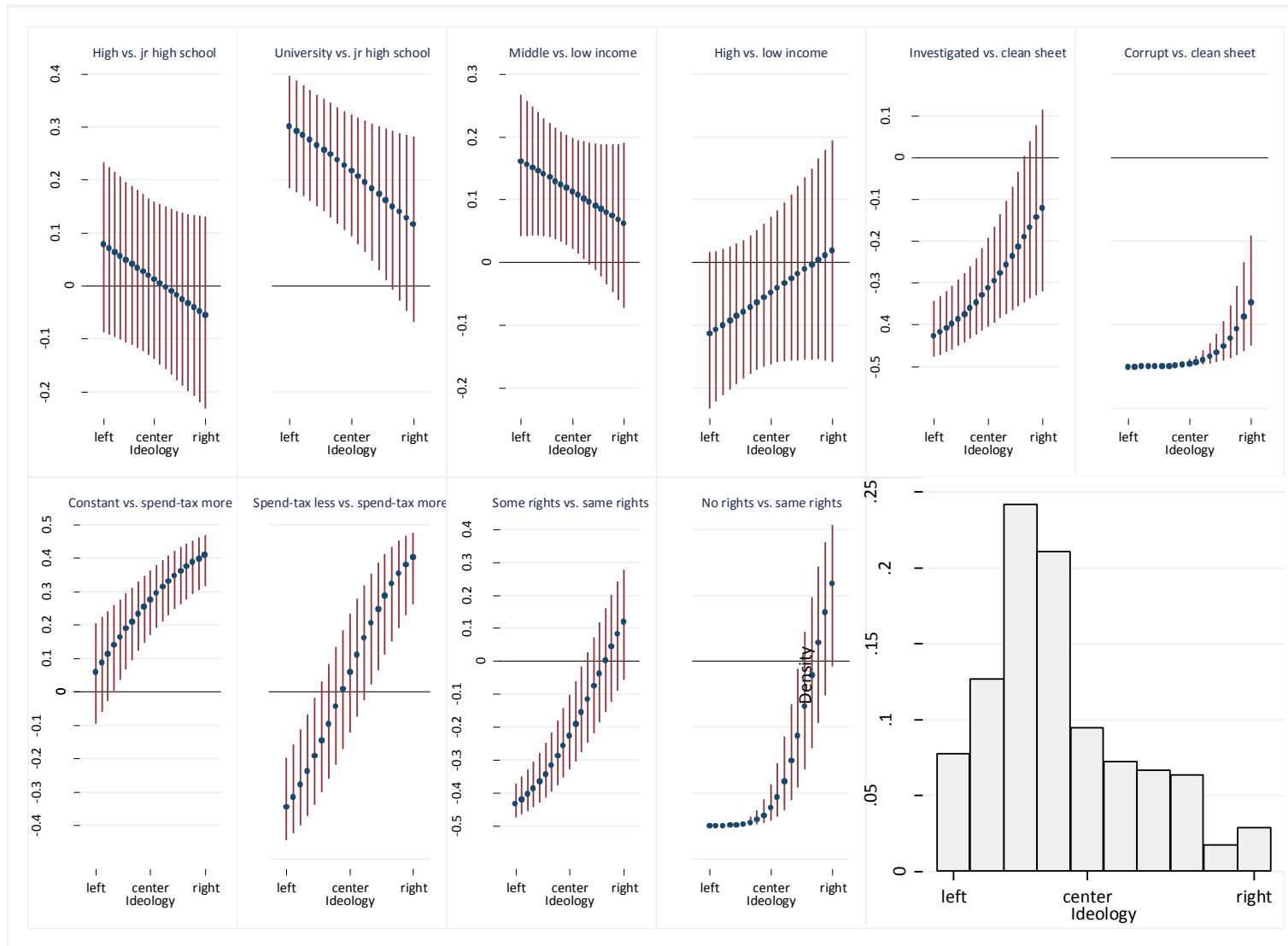
Note: Non-varying attributes are set at their baseline values (junior high school diploma, low income, clean, more taxation and spending, same rights to same sex-couples)

FIGURE 1c *Marginal effects of candidate attributes at different levels of respondents' saliency attached to attribute*
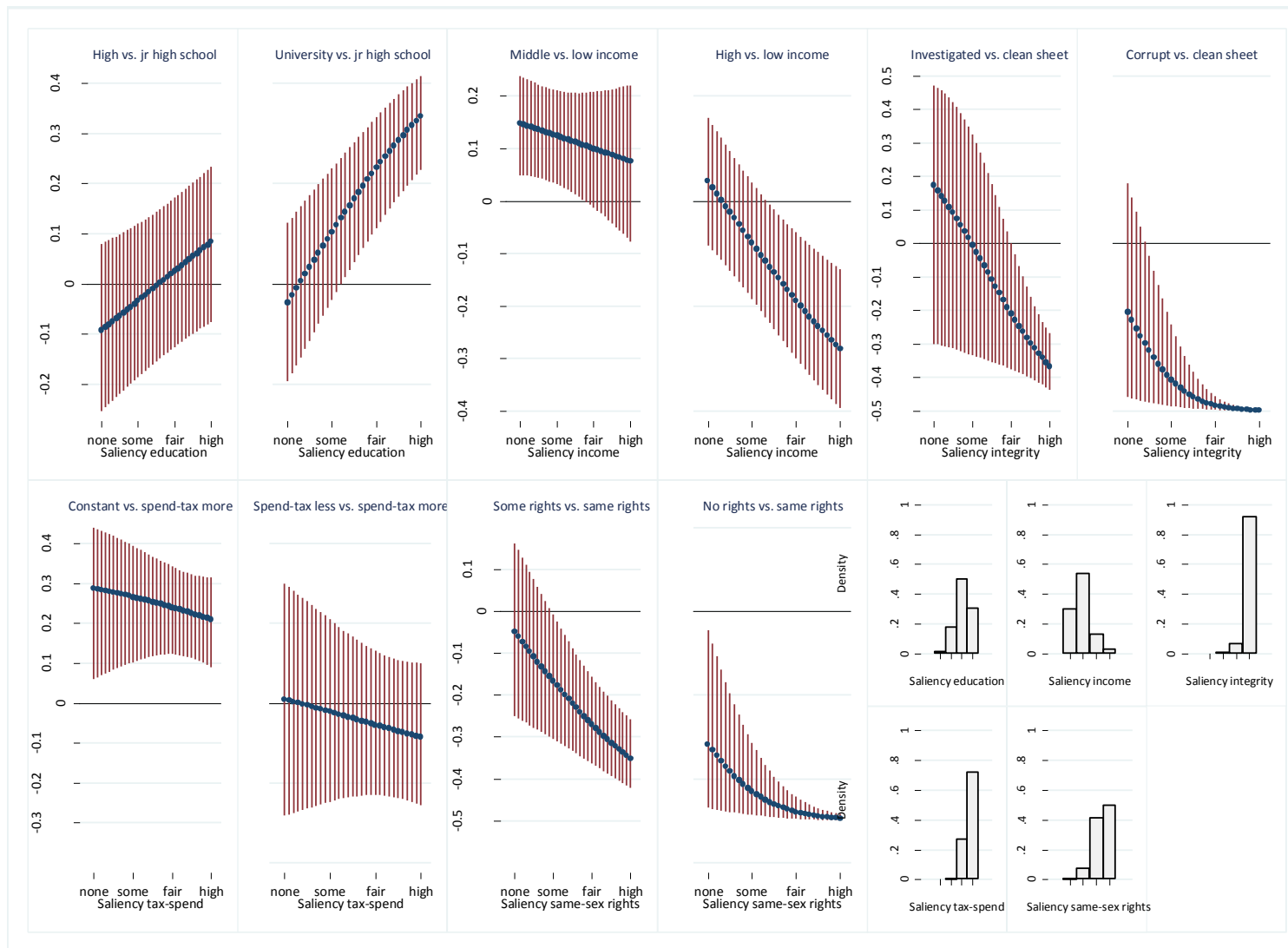
Note: Non-varying attributes are set at their baseline values (junior high school diploma, low income, clean, more taxation and spending, same rights to same sex-couples)

To a large extent, education behaves like a valence attribute. For almost any respondent trait, a university educated candidate is significantly more likely to be preferred over a candidate with only a junior high school diploma. For instance, assuming intermediate values for other traits,[9] respondents are between 23.8 and 25.5 percentage points more likely to choose the former profile, for any level of declared interest in politics (with 95% confidence intervals ranging from 9.7 to 37.9 percentage points). Right, center or left-leaning respondents are between 16.2 and 30.2 percentage points more likely to support such a candidate, with estimates ranging between 1.1 and 39.7 points. If education is considered an important attribute, a candidate with a university degree is between 23.2 and 33.5 percentage points more likely to win support, with the estimate ranging between 11.1 and 41.5 points. Yet, there are some nuances. Better educated candidates are not significantly preferred over less educated ones by respondents that are either strongly right-leaning or attach limited importance to education. These subjects make up 22.8 percent of the respondent pool. Nevertheless, like in the candidate experiment of Hainmueller, Hopkins and Yamamoto (2014), the overall valence features of education are evident.

The same cannot be said for income. Middle income candidates are slightly advantaged over low income ones, especially if respondents are left-leaning and interested in politics.[10] But, noticeably, this is also true for subjects that attach limited relevance to this attribute. More importantly, rich candidates are not significantly preferred over poor ones, for any respondent trait. If anything, high income is a liability rather than an asset. Respondents that attribute fair or high importance to income are between 18.9 and 28.2 percentage points *less* likely to prefer a rich over a poor candidate. These results resonate well with those of Hainmueller, Hopkins and Yamamoto (2014) where middle-income matters, slightly, to win contests but high-income candidates are rated lower.

[9] In computing marginal effects, we keep the respondents' socio-demographic and political traits, which are not object to analysis, to their mean or modal values.

[10] Full time students and Italian nationals also display this behaviour.

Far from being an indicator of ability, or even competence in office (cf. Caselli and Morelli 2004, 775; Galasso and Nannicini 2011, 79), high income is seen quite suspiciously by our respondents.[11]

The last, somewhat obvious, result is that the valence behavior of the integrity attribute is beyond doubt. For any respondent trait, a clean candidate is significantly more likely to be preferred over a corrupt one. Even nuances are quite minor. Respondents, which are either strongly right-leaning or display no interest in politics,[12] are indifferent between candidates that are clean and those that are under investigation, but these subjects make up only 9.5 percent of the respondent pool.

Contrast this with the opinions of candidates on spending and taxation. Figure 1b illustrates that respondents are neatly split along the left-right axis. A candidate proposing to cut spending and taxation is 34.6 percentage points *less* likely to win support from a left-wing respondent and 40.3 percentage points *more* likely to win support from a right-wing respondent, than a candidate proposing more spending and taxation. Consequently, moderately positioned candidates are favored over extremely positioned ones for most values of respondent traits, of course, with the exception of strongly left- or right-leaning subjects.

The issue of rights for same-sex couples behaves in a similar way, though less neatly. A candidate arguing for no rights to same-sex couples is 50 percentage points *less* likely to win support from a left-wing respondent and 23.4 percentage points *more* likely to win support from a right-wing respondent, than a candidate proposing the same rights as traditional families (the latter value is significant at the 90 percent confidence interval). Still, for most values of respondent traits, except ideology, candidates arguing for equality of treatment are preferred to candidates willing to recognize only some rights. The young age of the respondents mostly likely explains these liberal views (e.g. Bartels 2013). Having established the valence behavior of education and integrity and

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[11] Moreover, candidates that have high income and are corrupt face the harshest penalties.

[12] Non-Italian respondents as well.

the policy behavior of the positions on taxation and spending and on the rights of same-sex couples, we move on to analyze how participants trade-off between these attributes.

*Evidence of a* Competency *Form: Interaction among Education and Policy Attributes*

Is it plausible to assume that valence is a separable component that is simply added to a standard policy-based dimension as most formal models of electoral competition do? Or do valence and policy attribute interact, perhaps taking what Groseclose (2001) calls a *competency* form? In other words, do voters attach less value to valence when a candidate's policy position differs from their own?

Figure 2 illustrates the marginal effects of different levels of educational attainment, our proxy for competence, on the probability that a typical respondent[13] votes for a particular candidate policy profile (the online appendix includes the complementary Figures A4 and A5 on the marginal effects of policy positions). For instance, the top three panels display the marginal effects on the probability that a typical respondent votes for a candidate with a high school diploma, compared to one with a junior high school diploma, across the nine combinations of policy profiles. In this case, higher education does not have much of an effect.

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[13] Our typical respondent is an Italian female full-time student with a fair interest in politics and left-of-center views. She is twenty-one years old, comes from a lyceum and attaches high saliency to the integrity and spending dimensions, fair saliency to education and couples' rights, and some importance to income.

FIGURE 2 *Competency form: the interaction between education and policy positions*
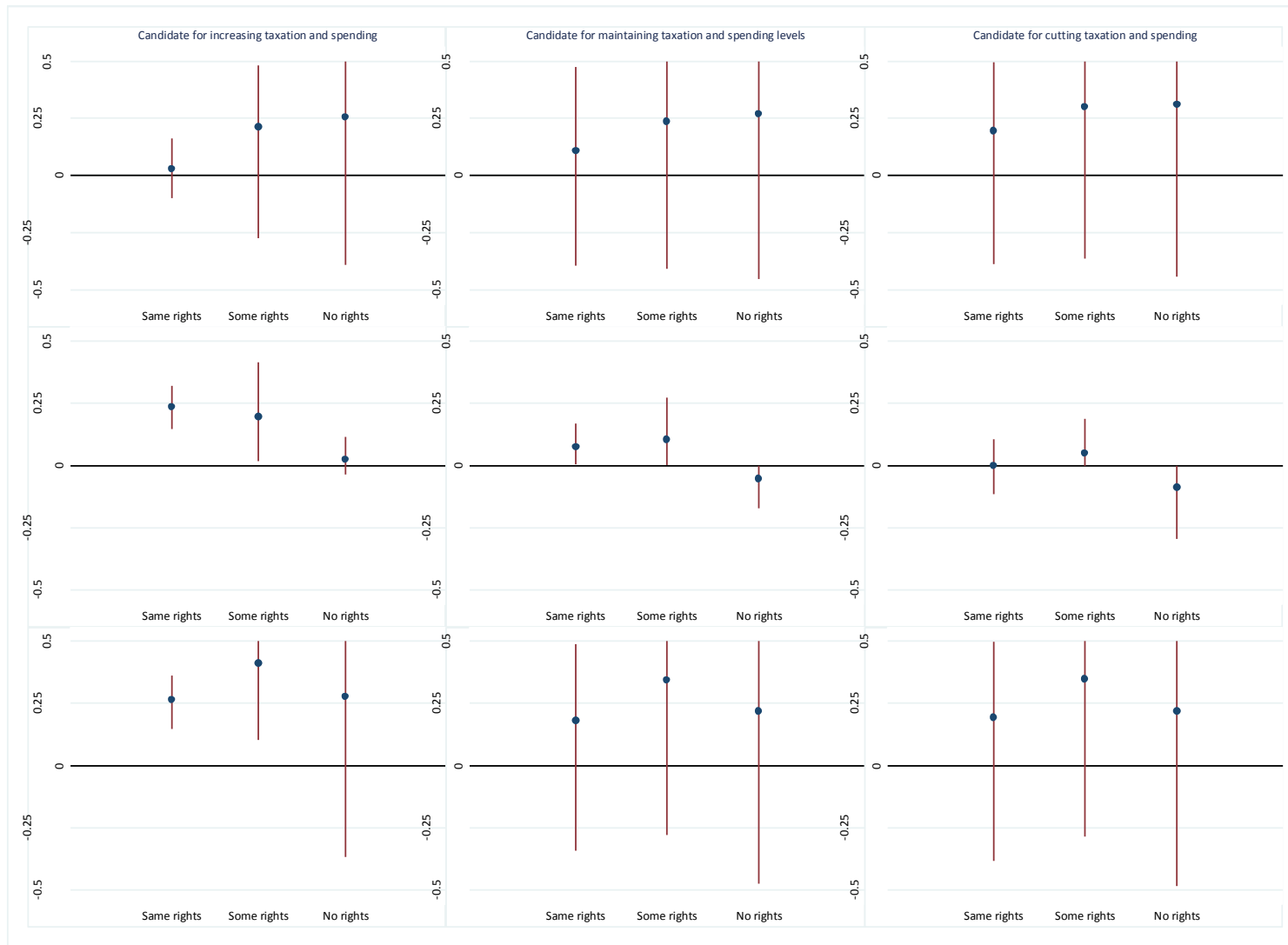
Note: Non-varying attributes are set at their baseline values (low income, clean)

Consider now the left panels in the second and third rows of Figure 2. Candidates, who support spending and at least some rights for same-sex couples, are between 20 and 23.4 percentage points more likely to be chosen if they have a university degree, rather than a high school diploma. These figures increase to 26.4 and 42.6 points respectively when university education is compared to a junior high school diploma. Conversely, if a candidate opposes the recognition of rights to same-sex couples, there is no level of education that is going to make him more palatable. This policy is strongly opposed by our typical respondent. Hence, the marginal gains from higher education vanish when policy distance increases – the key trait of Groseclose's (2001) competency form.

As the right panel in the second row of Figure 2 illustrates, higher education can even become a liability. A university educated candidate is 9.5 percentage points *less* likely to be chosen than a candidate with a high school diploma if, in addition to opposing rights for same-sex couples, he supports spending cuts as well (the estimate varies between 31 and 0.04 points). These two positions are strongly disliked by our typical respondent[14] and higher competence is actually perceived as worrisome in this case.

For intermediate profiles, our typical respondent trades between candidate attributes depending on their levels. Consider a candidate supporting full recognition of rights (left column of Figure A4). If he opposes spending, higher education does not increase his chances of being selected. If he supports cuts, and he is poorly educated, he is between 30.9 and 35.4 percentage points less likely to be chosen than a pro-spending or pro-status quo candidate.

Take now a candidate supporting partial recognition. In case of a status-quo position on spending, a university education gives a candidate a 10.9 percentage point increase in the likelihood of being preferred compared to a high school diploma (centre panel in Figure 2). In case of a pro-cuts

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[14] There is no level of education (or stance on the rights issue) that makes a pro-cuts candidate more appealing than a pro-status quo one (bottom row of Figure A4), and a no-rights position is comprehensively penalized (second and third rows of Figure A5).

position, a university education gives a 40.9 percentage point increase compared to a junior high school diploma (right panel in the third row).

In other words, the preferences of our typical respondents are finely balanced with intermediate profiles. If a candidate is for partial recognition but has only a junior high school diploma, a pro-status quo fiscal attitude makes him 35.3 percentage points more likely to be chosen than a spendthrift one (top row of Figure A4). Poor education makes our respondents wary of profligacy. But this does not extend necessarily to rights issues. If a candidate is pro-spending but poorly educated, a full-recognition stance makes him still 15.5 percentage points more likely to be chosen than a partial-recognition position (top row of Figure A5).

The trade-offs can indeed get quite complicated to understand in these intermediate profiles. Nevertheless, what is important to take away from this section are the significant interactions between valence and policy attributes as envisaged by Groseclose's (2001) competency form. This emerges more clearly on the dimension of same-sex couple rights. An F-test for the joint significance of the interaction terms rejects the null hypothesis that the effects of university education are identical across attribute levels (p-value $\approx$ 0.003). Moreover, the null hypothesis cannot be rejected when comparing candidates that support full and partial recognition (p-value $\approx$ 0.38), while it is easily rejected when comparing candidates that support full and no recognition (p-value $\approx$ 0.005). These results appear to indicate positive complementarity, in line with the findings of J. Green and Hobolt (2008) and Buttice and Stone (2012). On the spending dimension, since respondents hold a moderate position, this dynamics does not emerge as clearly.

However, which attributes ultimately prevail when respondents are confronted with awkward choices? We move to this question in the next section where we finally pull in integrity - the archetypal valence attribute.

Policy Trumping Valence in Awkward Choices

Candidates with dubious traits frequently run at the elections, and win. In citizen-candidates models, this outcome results from an oversupply of low-quality candidates due to limited electoral competition or a failure to coordinate by high-quality citizens (e.g. Caselli and Morelli 2004; Myerson 1993). The ideal candidate of our typical respondent has indeed a university education and a clean sheet, though, notice, only a middle income. Respondents also typically prefer full recognition of rights and oppose spending cuts. This candidate profile trumps over all the alternatives,[15] but are respondents more likely to sacrifice valence or policy attributes when confronted with awkward choices? How do voters choose if a high quality candidate is on offer, but his policy views are far from their ideal?

Figure 3 lists, on the left-hand side, profiles of candidates supporting full recognition of rights and opposing spending cuts, but falling short in terms of valence. Their educational attainment is lower or there are issues concerning their integrity. The candidates on the right-hand side are university educated and honest, but they are pro-cuts and against the recognition of rights. Figure 3 displays the marginal effects of choosing the latter candidates, given the former; in other words, the changes in the probability of preferring a high valence candidate with different policy views over a lower valence candidate with ideal policy views. If the marginal effect is lower (higher) than zero, respondents are less (more) likely to prefer the higher valence candidate.

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[15] More precisely, the typical respondent is significantly more likely to prefer a profile with these traits over one with at least one different trait - with one small caveat. Keeping constant the other ideal traits, a university educated candidate is preferred to one with a high school diploma only at a 90 percent confidence interval. Note that the typical respondent is indifferent between a pro-status quo and a pro-spending candidate. These policy positions resonate well with Bartels' (2013) analysis, considering the young age of the respondents.

Policy clearly trumps valence in these awkward choices. Even in the most difficult situation of deciding between a corrupt candidate that shares her policy views and a clean one that does not, our typical respondent is between 2.9 and 4.9 percentage points more likely to prefer the corrupt over the honest (despite the fact that such respondent assigns to integrity the highest average saliency, compared to the other four attributes). These figures increase to 48.7 and 56.2 points respectively if the candidate is only under investigation.

Better education is even more emphatically disregarded. Respondents are between 62.3 and 82.9 percentage points more likely to prefer less educated candidates with ideal policy views than better educated ones with disliked policy positions.

These results hold even when taking left, center or (more weakly) right-wing respondents, with their political interest and saliency traits at the mode or mean value of their subsets (see Figures A7 to A9 in the online appendix). In awkward choices, centrist voters trump valence for policy as well (cf. Galasso and Nannicini 2011).

FIGURE 3 *Awkward choices*
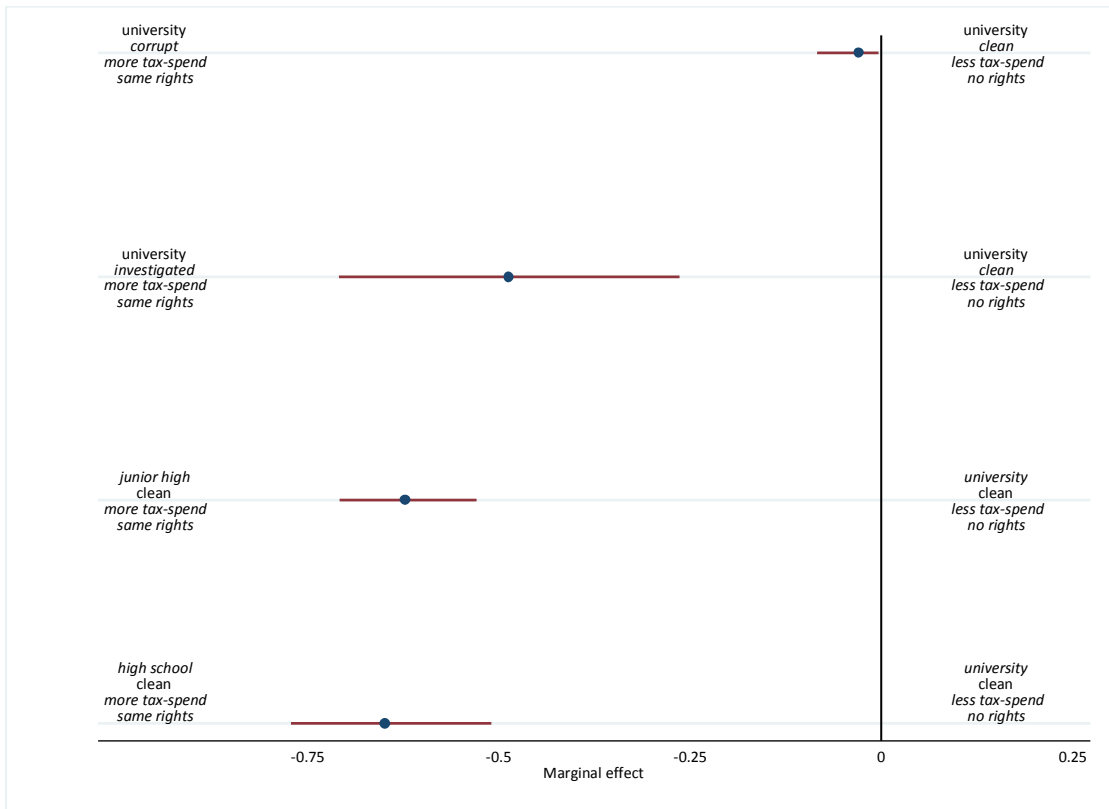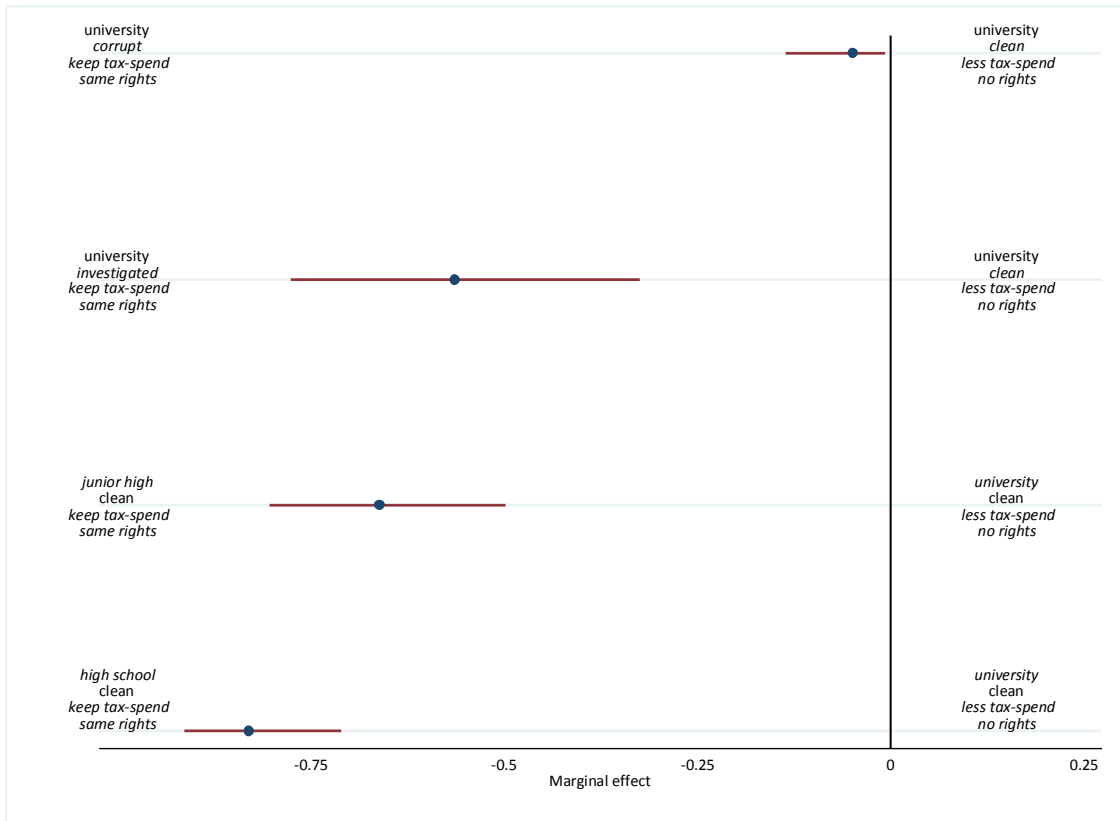
Note: Respondent with mean or modal traits, all candidates with middle income.

CONCLUSION

Valence comes out somewhat tarnished from this exercise. To most scholars, it is not surprising that income is far from being perceived as an indicator of valence. We suspect that this is unrelated to the characteristics of our respondent pool, so more careful thought is required. Because high income is unlikely to be rewarded electorally (and it could be even a liability), the allocation of higher income candidates to marginal seats found by Galasso and Nannicini (2011) may be related to different selection mechanisms.

Moreover, despite being considered primarily as a simple additive component to voters' utility, valence influences voting behaviour only conditionally. Education - a plausible proxy for competence - interacts with candidates' policies displaying traits of positive complementary, especially along the same-sex rights dimension where our respondents hold a strong equal-rights position. In line with recent studies of voting behaviour that have found more extensive valence voting under ideological convergence (Buttice and Stone 2012; J. Green and Hobolt 2008), we show that the effect of university education increases as candidates' and respondents' policy opinions converge. Education may even be a liability for profiles that combine particularly disliked policy positions. On the spending dimension however, our respondents take a moderate position and perhaps there is not enough ideological dispersion to allow positive or negative complementary to materialize.

Further, integrity, the archetypal valence attribute, may be ignored. Our typical respondent prefers a corrupt, but socially and economically progressive, candidate to a clean, but conservative, one. In other words, policy trumps valence in awkward situations and this apply across all types of respondents, regardless of their political traits. Integrity, being assigned the highest mean saliency across the five attributes by most respondents, is disregarded in awkward settings.

This is not to say that, at the margin, a valence advantage is irrelevant. It may shape both the incentives of citizens to enter the electoral competition as well as the positioning of politicians in

the policy-valence space. However, valence could indeed be relegated to the backstage in countries like Italy which displays comparatively high levels of public dissensus on social and economic values and an appreciable association between partisan attachment and these values (see Bartels 2013, 50). Polarization could therefore be a fertile breeding ground for low valence politicians. In these settings, the selection of party candidates through primaries may enhance valence-based competition at the expense of policy-based competition, while selection by party elites may produce the opposite.

In conclusion, even though the similarity of some findings with the candidate conjoint experiment of Hainmueller, Hopkins, and Yamamoto (2014) is of some comfort, these results need corroboration beyond the confined settings of an experiment. This is a worthy objective of future research.

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APPENDIX

TABLE A. *Voting, valence and policy attributes*

Variables	Estimate (s.e.)	Variables	Estimate (s.e.)
Attributes of candidates		*Interactions between attributes*	
High school diploma	0.231		
	(0.552)		
University degree	0.307	High school diploma × Maintain tax and spend	0.479***
	(0.661)		(0.128)
Middle income	0.581	High school diploma × Cut tax and spend	0.690***
	(0.486)		(0.221)
High income	0.793	University degree × Maintain tax and spend	0.087
	(0.535)		(0.113)
Under investigation	0.518	University degree × Cut tax and spend	0.023
	(1.184)		(0.124)
No proceedings	0.355	High school diploma × Some same-sex rights	-0.470***
	(1.153)		(0.164)
Keep spend and tax levels	0.300	High school diploma × No same-sex rights	-0.189
	(0.787)		(0.183)
Cut taxes and spending	-0.840	University degree × Some same-sex rights	-0.151
	(0.946)		(0.173)
Some rights to same sex couples	-1.501**	University degree × No same-sex rights	-0.731***
	(0.634)		(0.261)
No rights to same sex couples	-3.302***		
	(1.028)		
Socio-demographic and political traits			
Interest in politics × High school diploma	0.035	Ideology × High school diploma	-0.039
	(0.092)		(0.026)
Interest in politics × University degree	-0.02	Ideology × University degree	-0.063**
	(0.097)		(0.03)
Interest in politics × Middle income	0.049	Ideology × Middle income	-0.029
	(0.08)		(0.025)
Interest in politics × High income	-0.009	Ideology × High income	0.038
	(0.104)		(0.029)

Interest in politics × Under investigation	-0.202	Ideology × Under investigation	0.132***
	(0.138)		(0.043)
Interest in politics × No proceedings	-0.346**	Ideology × No proceedings	0.326***
	(0.143)		(0.043)
Interest in politics × Maintain tax and spend	-0.078	Ideology × Maintain tax and spend	0.136***
	(0.109)		(0.033)
Interest in politics × Cut tax and spend	-0.269**	Ideology × Cut tax and spend	0.269***
	(0.118)		(0.040)
Interest in politics × Some same-sex rights	0.172	Ideology × Some same-sex rights	0.205***
	(0.107)		(0.029)
Interest in politics × No same-sex rights	0.088	Ideology × No same-sex rights	0.515***
	(0.172)		(0.048)
Male × High school diploma	-0.179	Age × High school diploma	-0.017*
	(0.133)		(0.01)
Male × University degree	-0.043	Age × University degree	-0.011
	(0.140)		(0.011)
Male × Middle income	0.023	Age × Middle income	-0.011
	(0.119)		(0.014)
Male × High income	0.087	Age × High income	-0.005
	(0.135)		(0.011)
Male × Under investigation	0.426**	Age × Under investigation	0.014
	(0.212)		(0.017)
Male × No proceedings	0.391*	Age × No proceedings	0.023
	(0.202)		(0.027)
Male × Maintain tax and spend	-0.305*	Age × Maintain tax and spend	0.01
	(0.157)		(0.017)
Male × Cut tax and spend	0.098	Age × Cut tax and spend	0.009
	(0.177)		(0.021)
Male × Some same-sex rights	0.339**	Age × Some same-sex rights	0.018
	(0.151)		(0.014)
Male × No same-sex rights	0.975***	Age × No same-sex rights	0.015
	(0.278)		(0.022)
Italian × High school diploma	-0.105	Student × High school diploma	0.026
	(0.281)		(0.123)
Italian × University degree	-0.163	Student × University degree	0.198
	(0.387)		(0.132)
Italian × Middle income	0.023	Student × Middle income	0.151

	(0.195)		(0.117)
Italian × High income	-0.294	Student × High income	-0.014
	(0.232)		(0.131)
Italian × Under investigation	-0.307	Student × Under investigation	0.425*
	(0.424)		(0.220)
Italian × No proceedings	-1.057***	Student × No proceedings	0.295
	(0.389)		(0.223)
Italian × Maintain tax and spend	-0.083	Student × Maintain tax and spend	0.187
	(0.313)		(0.165)
Italian × Cut tax and spend	-0.405	Student × Cut tax and spend	0.265
	(0.342)		(0.193)
Italian × Some same-sex rights	0.421	Student × Some same-sex rights	-0.132
	(0.356)		(0.155)
Italian × No same-sex rights	0.117	Student × No same-sex rights	-0.139
	(0.680)		(0.270)
Lyceum × High school diploma	0.008	Saliency education × High school diploma	0.152**
	(0.148)		(0.062)
Lyceum × University degree	0.067	Saliency education × University degree	0.362***
	(0.149)		(0.07)
Lyceum × Middle income	-0.140	Saliency income × Middle income	-0.065
	(0.119)		(0.071)
Lyceum × High income	-0.123	Saliency income × High income	-0.300***
	(0.143)		(0.082)
Lyceum × Under investigation	0.278	Saliency honesty × Under investigation	-0.565**
	(0.249)		(0.233)
Lyceum × No proceedings	0.001	Saliency honesty × No proceedings	-0.807***
	(0.232)		(0.185)
Lyceum × Maintain tax and spend	-0.546***	Saliency tax-spend × Maintain tax and spend	-0.093
	(0.181)		(0.123)
Lyceum × Cut tax and spend	-0.224	Saliency tax-spend × Cut tax and spend	-0.084
	(0.204)		(0.136)
Lyceum × Some same-sex rights	0.016	Saliency same-sex rights × Some same-sex rights	-0.309***
	(0.168)		(0.095)
Lyceum × No same-sex rights	0.308	Saliency same-sex rights × No same-sex rights	-0.552***
	(0.280)		(0.152)

Control

Survey 2013 × High school diploma	-0.151		

	(0.119)		
Survey 2013 × University degree	-0.228*		
	(0.132)		
Survey 2013 × Middle income	0.026		
	(0.110)		
Survey 2013 × High income	0.016		
	(0.122)	Observations	18,704
Survey 2013 × Under investigation	0.015	Pseudo-R2	0.368
	(0.196)	Log-likelihood	-4100
Survey 2013 × No proceedings	-0.122	Wald chi2	1647
	(0.198)		
Survey 2013 × Maintain tax and spend	0.076		
	(0.150)		
Survey 2013 × Cut tax and spend	0.203		
	(0.172)		
Survey 2013 × Some same-sex rights	0.027		
	(0.144)		
Survey 2013 × No same-sex rights	-0.02		
	(0.254)		

Note: Conditional logit model. *** $p<0.01$, ** $p<0.05$, * $p<0.1$. Dependent variable: Pr(Y=1). Probability of choosing a candidate with given attributes. Standard errors are clustered by respondent.