Conjoint analysis of voting behaviour: A stated preference experiment employing valence and ideology attributes of candidates

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Abstract

We employ conjoint analysis to understand how voters make decisions when faced with multi-dimensional choices. Respondents are asked to choose between candidates that vary along three valence (education, income and honesty) and two ideological attributes (attitudes toward tax and spending and the rights of same-sex couples). We have administered the conjoint analysis experiment to 186 subjects, resulting in 5022 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. They also show that voters' preference takes the competency form. The marginal impact of valued valence attributes is conditional on the candidate's positions on policy. It is higher where those positions are closer to those of respondents. Finally, when voters are faced with a stark choice between candidate holding different policy views, they are ready to trade a higher valence candidate, with whom they do not share policy views, with a lower valence one with whom they share such views.

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, 2004; Castanheira et al., 2010; Groseclose, 2001; Londregan and Romer, 1993; Schofield, 2003, 2007). The utility U_i of voter i utility associated to a candidate C is therefore represented as

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

where δ_C is the valence attribute of candidate C, while the utility is a negative function of the difference between x_i and x_C, the voter's and the candidate's positions along a policy dimension (Groseclose, 2001). Voters hold homogeneous views with regard to the valence issue; and the policy and valence dimensions have the same saliency. Variants to this standard approach consist of including uncertainty over the valence advantage (Adams and Merrill III, 2009; Londregan and Romer, 1993), multiple policy dimensions (Ansolabehere and Snyder Jr, 2000), and policy-seeking 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. In other words, he considers the case where voters appreciate a candidate's

valence less when her policy position is far from the voter's ideal point. For instance, the competence of a candidate with distant policy opinions has a lower value.

These models are designed to produce expectations about the positioning of politicians on the policy-valence space. As in the general class of Colonel Blotto games, there is no pure-strategy Nash equilibrium when competition is both along policy and valence dimensions.

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 the weight of the valence dimension is strictly greater than zero only for a subset of voters. On the other extreme, 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? 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 tax and spending and the rights of same-sex couples). We have administered the experiment to 186 subjects, resulting in 5022 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. They also show that voters' preference takes the competency form. The marginal impact of valued valence attributes is conditional on the candidate's positions on policy. It is higher where those positions are closer to those of respondents. Finally, when voters are faced with a stark choice between candidate holding different policy views, they are ready to trade a higher valence candidate, with whom they do not share policy views, with 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 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 $\mathrm{C} = \{1, \dots, C\}$ be a set of candidates, $\mathrm{A} = \{1, \dots, A\}$ a set of attributes, and $v_a = (v_a^1, \dots, v_a^2)$ a l-tuple of values of attribute a, where v_a^l is the lth value of attribute a and $l \geq 2$ for $\forall a$. V is the set of all attributes' values and the cth candidate profile is denoted by a column vector of attributes' values $P_c = (v_{1c} \dots v_{ac})'$, where v_{ac} is the value of attribute a for candidate c. For example, there may be five 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-taxation and spending position.

The ideal candidate of a respondent i is represented by the column vector $\Theta_i = (\theta_{i1}, \dots, \theta_{ia})'$, where θ_{ia} is her ideal value of attribute a and $\theta_{ia} \in V$. In a pairwise comparison of candidates' profiles (i.e. $c = 2$), let $Y_i(P_c) \in \{0,1\}$ be the potential binary outcome of respondent i over a candidate with profile P_c. The value of 1 represents that the respondent would choose the cth profile if she got the treatment P_c, while the

value of 0 means that she would not choose such profile. Since respondents must choose one profile in each decision, $\sum_{c=1}^{C} Y_i(P_c) = 1$ for $\forall i$. Employing the weighted Euclidean distance of spatial voting theory (Enelow and Hinich, 1984; Hinich and Munger, 1997: 80), we have therefore,

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

where S_i is a symmetric positive-definite matrix of order A.[1] The diagonal elements in S_i measure the salience attached by respondent i to each attribute, and the off-diagonal elements capture the interaction across attributes. If S_i is an identity matrix, respondent i attaches the same weight to each attribute and preferences are separable across attributes. If the diagonal elements in 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 S_i are different from zero, preferences are nonseparable and attributes interact. Attributes can be positive (negative) complements if a higher level of one attribute makes a respondent wanting more (less) of another attributes.[2] 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 may 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 subfield of economics, such as transport economics, to measure consumer preference, forecast demand and develop new products (Green and Rao, 1971; Green et al., 2001; Hensher et al., 2005; Raghavarao et al., 2010). It has been applied only very recently to research questions in political science (Hainmueller and Hopkins, 2012; Hainmueller et al., 2012).

We have designed a conjoint analysis voting experiment to assess how valence and ideology attributes of candidates affect voters' choice. Respondents are subject to K choice tasks where they have to choose between two generically labelled candidates (candidates A and B). 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. Candidates are characterised by five attributes and each attribute takes three values, that is, $\mathrm{C} = \{1,2\}$, $\mathrm{A} = \{1, \ldots, 5\}$ and $\mathrm{v}_a = (v_{a1}, v_{a2}, v_{a3})$ where $a = 1, \ldots 5$.

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

[2] 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 $\boldsymbol{S}_i$). 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).

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)
Other information	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"

Three attributes are related to valence, while two are related to ideology or policy positions (see Table 1). The literature on valence offers a long list of possible factors, from the strength of the economy (e.g. Anderson, 2000; Butler et al., 1969; Florina, 1977; Lewis-Beck et al., 2008; Palmer and Whitten, 2000), to incumbency (e.g. Enelow and Hinich, 1982; Fiorina, 1981; Londregan and Romer, 1993), issue ownership (e.g Budge and Farlie, 1983; Clarke et al., 2004) and party unity (Clark, 2009).

In light of the formal models reviewed above, we are however more interested in candidate-specific rather than contextual factors, more specifically, in attributes related to competence and integrity (e.g. Funk, 1996, 1999; Kulisheck and Mondak, 1996; McCurley and Mondak, 1995). Rather than attributing directly the level of competence and ability to candidates, which would run the risk of being pleonastic, we employ education and income as valence factors. In several citizen-candidate selection models (Caselli and Morelli, 2004; Galasso and Nannicini, 2011; Messner and Polborn, 2004), they are considered proxies for competence. The education attribute includes three levels of attainment (in Italy they are called *licenza media, diploma superiore, laurea*), while income levels 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.[3] The last valence attribute 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. Candidates also differentiate along policy positions which are derived from the traditional liberal-interventionist economic and liberal-conservative social dimensions (e.g. Benoit and Laver, 2006: 160; Kitschelt, 1994). For the former policy issue, 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 issues are frequently the top priorities of government for Italian public opinion (European Commission, 2010: 24). For the latter policy issue, 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. Other issues, such as abortion and euthanasia, are captured by the liberal-conservative social dimension, but they are less subject to public debate in Italy.

[3] Eurostat. Distribution of income by quantiles, 2009 (Source: SILC)

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 Green (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

A full factorial design is one in which all possible treatment combinations are enumerated (Hensher et al., 2005: 109). With five attributes and three levels per attribute, we have 243 (i.e. 3^5) different treatment combinations or candidate profiles. Since we ask respondents to pairwise compare candidates, the full enumeration of choice tasks amounts to 29,403 combinations. Such a design is clearly unfeasible. We will therefore use only a fraction of these combinations, that is, a fractional factorial design.[4]

The minimum number of treatment combinations is determined by the degrees of freedom we need for 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. The addition of an interaction between two attributes requires the estimation of an additional parameter in case of a linear model and four additional parameters in case of a non-linear model. In other words, if we want to estimate the main effects and, say, two interactions, we required at least eight degrees of freedom for a linear model or nineteen for a non-linear model.

To produce a statistically efficient fractional factorial design, we need an orthogonal set-up where the columns display zero correlation (Hensher et al., 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 degree of freedom (in our case, nineteen for a non-linear model). However, for unlabelled designs, only within-alternative orthogonality needs to be maintained (Hensher et al., 2005: 152). In other words, the education attribute of candidate A across all the choice tasks does not need to be orthogonal to the

[4] The fractional factorial and orthogonal design is most widely used in the conjoint analysis literature. In introducing this method to political science, Hainmueller, Hopkins and Yamamoto (2012) argue for a fully randomized approach. Such approach is perhaps better suited for a public opinion analysis (see Hainmueller and Hopkins, 2012) but less so in the more confined settings of an experimental design.

education attribute of candidate B. Another appreciable feature of an experimental design is that it 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 each 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 et al., 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. This means that potentially we could test efficiently several alternative specifications. 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 et al., 2005: 152).

The core of the experiment consists in twenty-seven choice tasks 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 cognitive burden, but the sequence of tasks is randomized across respondents in order to minimise primacy and recency effects.[5]

The only applications of conjoint analysis in political science is in the field of public opinion (Hainmueller and Hopkins, 2012; Hainmueller et al., 2012). In light of the formal literatures reviewed above, our interest is more circumscribed. We want to analyze how respondents reconcile candidates' valence and policy attributes in their voting choices. Although trade-offs may differ across types, we are less interested in how different types of the respondents prefer different candidates. Given the nature of our inquiry, a set of relatively homogeneous respondents allows us to control for unobservables and to minimize the risk of omitted variable bias at the stage of model estimation. We have therefore involved 186 undergraduate students in the period between February and May 2012. The online survey experiment has been administered by the Opinion Polls Laboratory (*Laboratorio Indagini Demoscopiche*) of the *Università degli Studi di Milano*.

Estimation

To estimate how candidate attributes 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

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

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}), $\boldsymbol{\beta} \circ \boldsymbol{R}_i$ is the Hadamard product of row vectors of betas and socio-

[5] As Hainmueller, Hopkins and Yamamoto (2012) point out, this design requires two further assumptions. First, there is no carryover effect within respondents. The potential outcomes in each trial are independent from the outcomes in other trials, as long as the attributes' values do not change. In other words, the respondents would choose the same candidate in the pairwise comparison of a given trial regardless of the candidate profiles she had seen or would see in the rest of the experiment. Second, there is no profile-order effect. The ordering of profiles does not affect the outcomes in any manner. Differently ordered profiles would produce the exact same outcomes as long as the attributes' values are the same.

demographic and political characteristics[6] of the respondent i, while $\boldsymbol{P}_c$ is the column vector of attributes of candidates.

Valence, ideology and voting

Interest in politics, ideology, saliency and voting

The results of the estimation are reported in the Appendix (Table A). We first analyze if the first three attributes indeed behave like valence issues where voters prefer more to less, and the last two attribute display the features of policy issues that split voters in different groups. Figures 1a to 1c display the marginal effects of attributes of candidates 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. The dots indicate the mean predicted probabilities and the lines the 95% confidence intervals.

<Figures 1a to 1c>

Better educated candidates are more likely to be chosen by respondents that lean towards the left and attach high importance to education.[7] Assuming intermediate values on other attributes,[8] a candidate with a university degree is 33.9 percentage points more likely to win support from a left-wing respondent than one with a junior high school diploma, with a 95% confidence interval from 16.4 to 45.2. Such candidate is not significantly more likely to be chosen by a right-wing respondent. When education is highly valued as an attribute, a candidate with a university degree is 34.2 percentage points more likely to win support, with the estimate ranging between 18 and 44.8, but she would not be preferred if the respondent attached only limited importance to education.

Income does not play any role in affecting choice. If anything, high income is a liability rather than an asset. In a similar model that excludes the interaction between education and policy positions (see Table B in the Appendix – to be included), a low income candidate is actually preferred to a high income one by respondents with left-leaning inclinations, attaching high saliency to this attribute, but only moderately interested in politics.[9] A high income candidate was 14.6 percentage points less likely to be chosen than a low income one.

Indeed, candidates of dubious integrity are heavily penalized. A candidate under investigation is 35.8 percentage points less likely to be chosen than a clean one. If corrupt, the figure increases to 49.8 percentage points. Integrity is an important attribute for the large majority of respondents but, even in this clear-cut case, there are interesting nuances. Respondents that are more right-leaning and only moderately interested in politics are readier to tolerate an investigated candidate when confronted with a clean one that is disliked on other dimensions.[10]

Both economic and social issues clearly split respondents along the left-right axis. Assuming intermediate values on other attributes, a candidate proposing to cut spending and taxation is 38.8 percentage points *less* likely to win support from a left-wing respondent (more so if working and male), and 33.2 percentage points *more* likely to win support from a right-wing respondent than a candidate proposing more taxation and spending.[11] Respondents with less interest in politics, but attaching high relevance to this issue, also

[6] As socio-demographic traits, we included gender, age, nationality, working status and high school education; as political traits, interest in politics, left-right self-placement, and saliency attached to attributes.

[7] They are also full-time students coming from a lyceum.

[8] In computing marginal effects, we also assume that the socio-demographic and political characteristics of respondents that are not object to analysis take the mean or mode value.

[9] They also hold Italian nationality and have studied in a lyceum.

[10] Non-Italian male respondents display greater tolerance as well.

[11] Female full-time students which are less interested in politics but attach importance to this policy prefer candidates maintaining the current levels of taxation and spending.

prefer a status-quo biased than a spendthrift candidate.[12] A candidate arguing that no rights should be recognized to same-sex couples is 50 percentage points *less* likely to win support from a left-wing respondent (more so if Italian and female) and 33 percentage points *more* likely to win support from a right-wing respondent than a candidate proposing the same rights as traditional families. A respondent that considers this issue highly salient also prefers a candidate proposing full rather than partial recognition of rights.

Interaction among education and policy attributes

These results indicate that two attributes capture important valence features while the two policy attributes indeed split voters in different groups. These results are not meant to be generalizable to a larger population. Actually, for the purpose of our inquiry, greater homogeneity on some socio-demographic traits of the sampled respondents allows us to better control for unobservables and to minimize omitted variable bias. We can therefore analyze more neatly how respondents trade-off between attributes (Hensher et al., 2005). For instance, following Groseclose (2001), do preferences take a *competency* form, where voters appreciate a candidate's valence less when her policy position is far from the voter's ideal point?

<Figures 2a and 2b>

The interactions between education, our proxy for competence, and policy positions are displayed in Figures 2a and 2b.[13] If a candidate holds pro-taxation and spending views, she is between 26.7 and 33.7 percentage points *more* likely to be voted if she has a university rather than a junior-high school diploma. If a candidate holds more prudent views, higher education does not provide him with an advantage (see Figure 2a upper panel). Similarly, if a candidate is in favor of granting same-sex couples the same rights as traditional families, she is between 23.9 and 33.8 percentage points *more* likely to be voted if she has a university rather than a junior-high school diploma. If a candidate holds more conservative views, higher education does not provide him with an advantage (see Figure 2b upper panel). In sum, the impact of education on the likelihood of choosing a candidate is conditional on the candidate's positions on policy. It is much higher where those positions are closer to those of our respondents.

Conversely, education becomes important in sanctioning. If a candidate has only a junior high education, respondents are between 35.1 and 35.2 percentage points less likely to support a candidate that wants to cut, rather than to increase, tax and spending. But if she is better educated, respondents are not more likely to prefer a spendthrift over a prudent candidate (see Figure 2a lower panel). Similarly, a candidate that prefers partial rather than full recognition of same-sex couple rights is between 21.3 and 21.4 percentage points less likely to be voted if she has only a junior high school diploma, but she is not penalized if she is better educated (see Figure 2b lower panel). In other words, respondents are more tolerant toward better education candidates, with whom they may not share policy views.

Tragic choices

Candidates with dubious traits frequently run at the elections, and win. We illustrate here the difficult choices that voters face in these circumstances and why these candidates may eventually win office. For our respondents, the ideal candidate has university education, middle income, and a clean sheet; she prefers more taxation and spending and the same rights to same-sex couples. We compare candidates that hold these policy positions, but have lower valence, with higher valence candidates holding different policy

[12] Female full-time students which do not come from a lyceum share this view.

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

views. Figure 3 displays the marginal effects of choosing the latter types of candidates, given the former types; 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. The traits of higher valence candidates are described on the right-hand side of Figure 3; those of lower valence are on the left-hand side. If the marginal effect is lower (higher) than zero, respondents are *less* (more) likely to prefer the higher valence candidate.

The upper panel in Figure 3 lists the starker choices. The alternative higher valence candidates on the right-hand side hold relatively extreme views. They want to cut taxation and spending and to grant no rights to same sex couples. Respondents are 6 percentage points *less* likely to prefer a candidate with this profile than a corrupt one that shares their policy views. The figure increases to 55 percentage points if the candidate in only under investigation. This result is a very notable because it is based on the most common traits on our respondents, who display a fair interest in politics and left-of-center views. Earlier we showed greater tolerance towards candidates with dubious integrity by respondents that are more right-leaning and only moderately interested in politics.[14] Moreover, better education is clearly trumped over if the policy views of a candidate are disliked. Respondents are between 58.8 and 70.6 percentage points *less* likely to prefer such a candidate compared to a less educated one with ideal policies.

The lower panel in Figure 3 lists less stark choices. The alternative higher valence candidates on the right-hand side hold moderate policy views. They want to maintain the level of taxation and spending and to grant some rights to same sex couples. Yet, even in these circumstances, valence plays a key role only in the most blatant case. Respondents are 70.3 percentage points more likely to prefer a clean moderate candidate to a corrupt one who shares their policy views. In the other circumstances, the valence advantage, in terms of integrity or education, is not enough to sway to significantly sway the choices of respondents.

Overall, this analysis indicates the highly conditional impact that valence attributes have on voting behaviour.

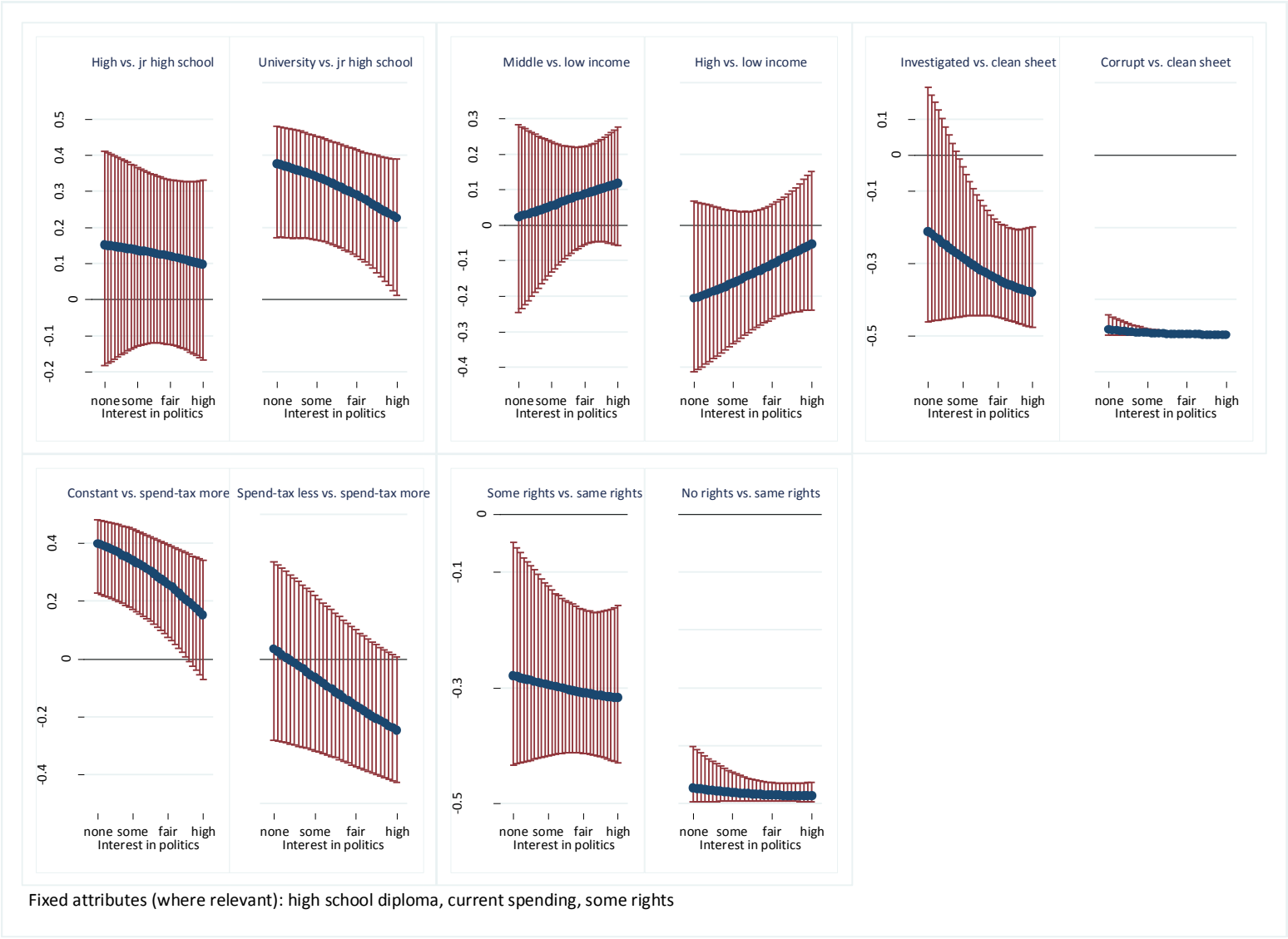
Conclusion

This work provides some initial indications of whether some candidates' attribute do indeed behave like valence issues where voters prefer more to less. Education and integrity clearly display these features. It also shows that voters' preference takes the competency form. The marginal impact of valued valence attributes is conditional on the candidate's positions on policy. It is higher where those positions are closer to those of respondents. Finally, we showed that when voters are faced with a stark choice between candidate holding different policy views, they are ready to trade a higher valence candidate, with whom they do not share policy views, with a lower valence one with whom they share such views.

We are currently replicating this experiment with a similar set of respondents. We may extend to the full population in the medium term, with the use of instrument like Mechanical Turk.

[14] Of course, this is not a statement that we wish to generalize. That was the general attitude of respondents at the time of running the survey. It could well be the opposite in other contexts. What matter for our purposes is the readiness of respondents to trade valence with policy views.

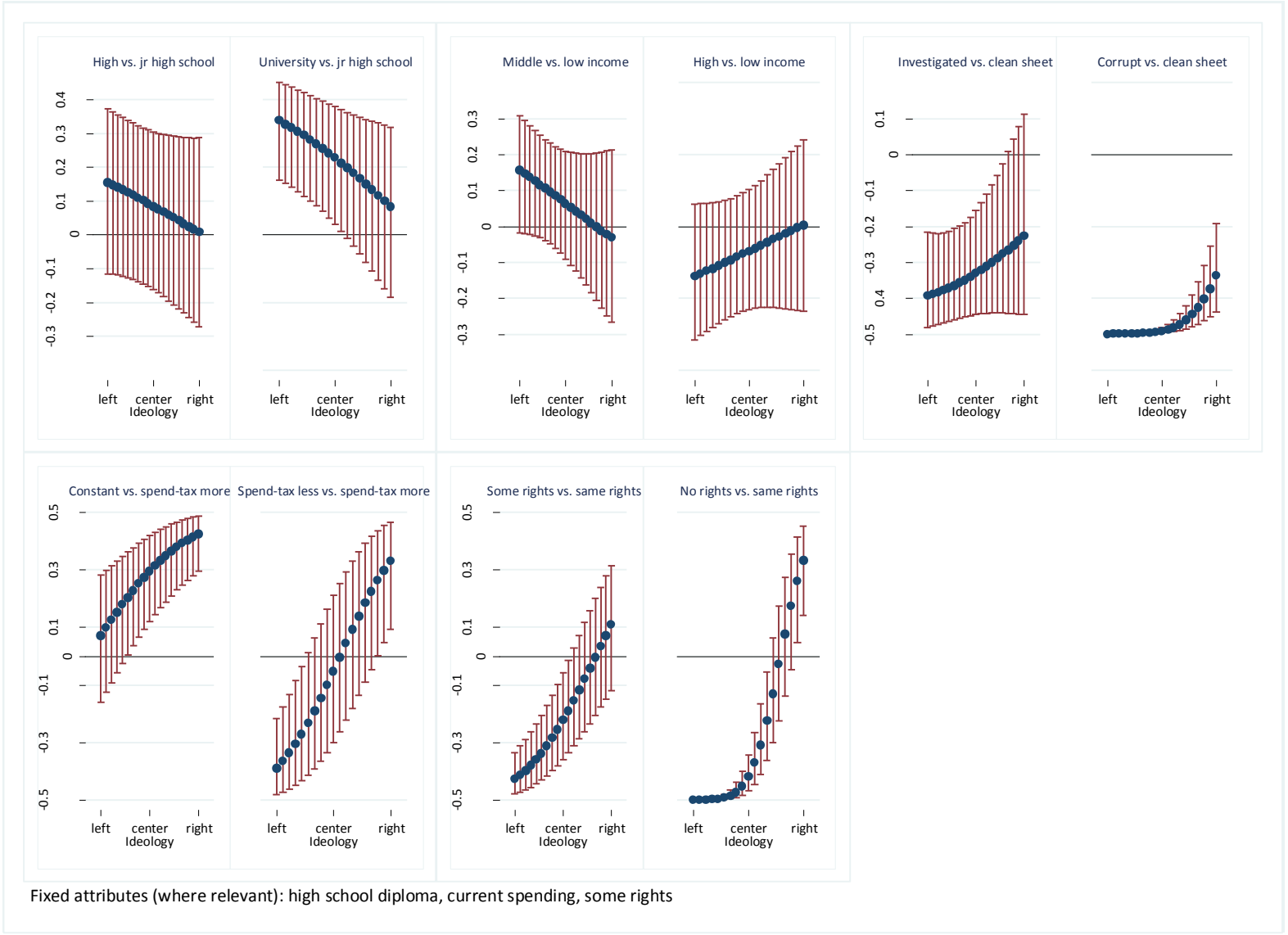
Figure 1a Interest in politics and attributes of candidates



Fixed attributes (where relevant): high school diploma, current spending, some rights

Note: Marginal effects on the probability of voting a candidate with different attributes (horizontal axis) for different levels of interests in politics.

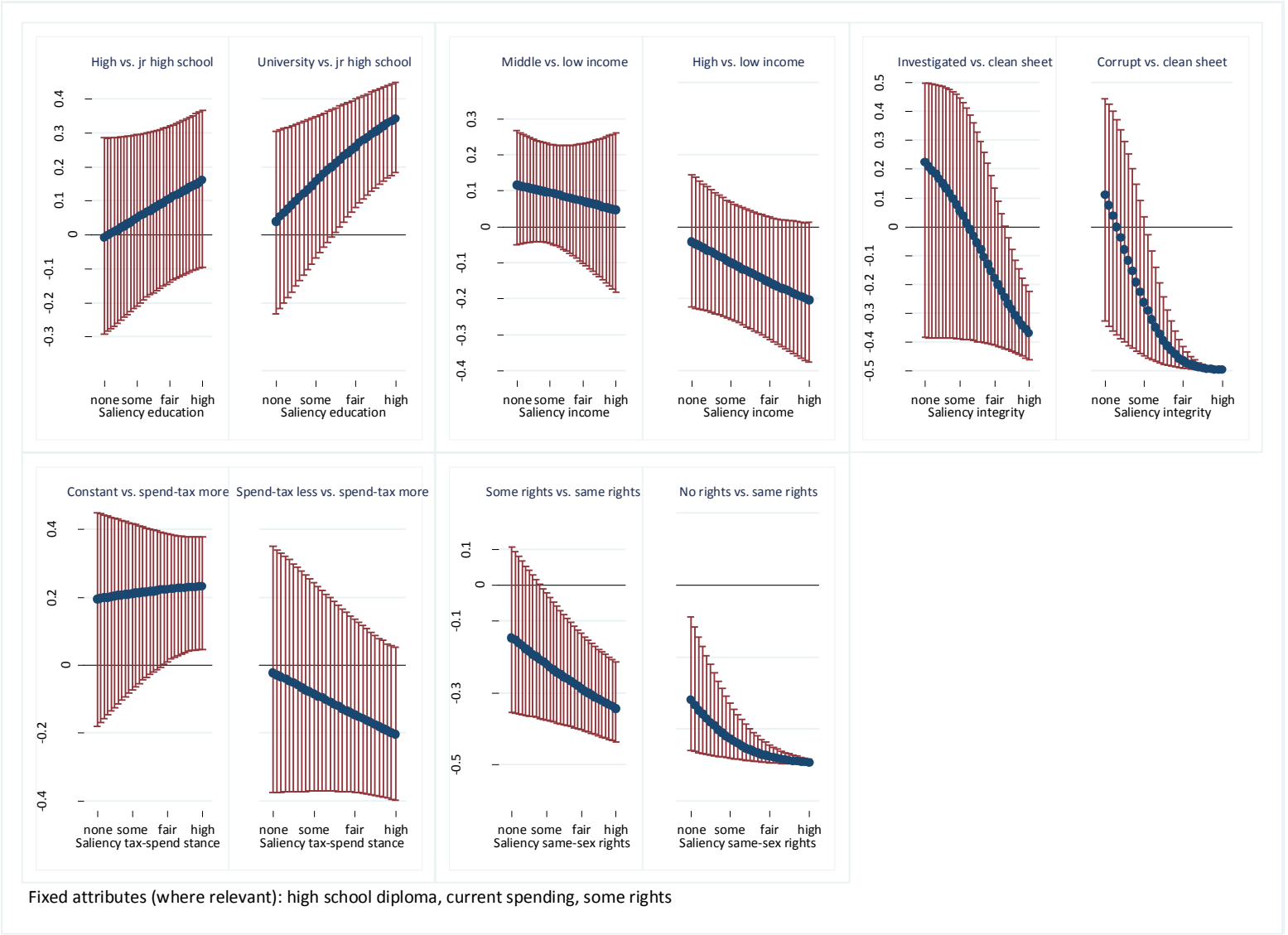
Figure 1b Left-right self-placement and attributes of candidates



Fixed attributes (where relevant): high school diploma, current spending, some rights

Note: Marginal effects on the probability of voting a candidate with different attributes (horizontal axis) for different ideologies.

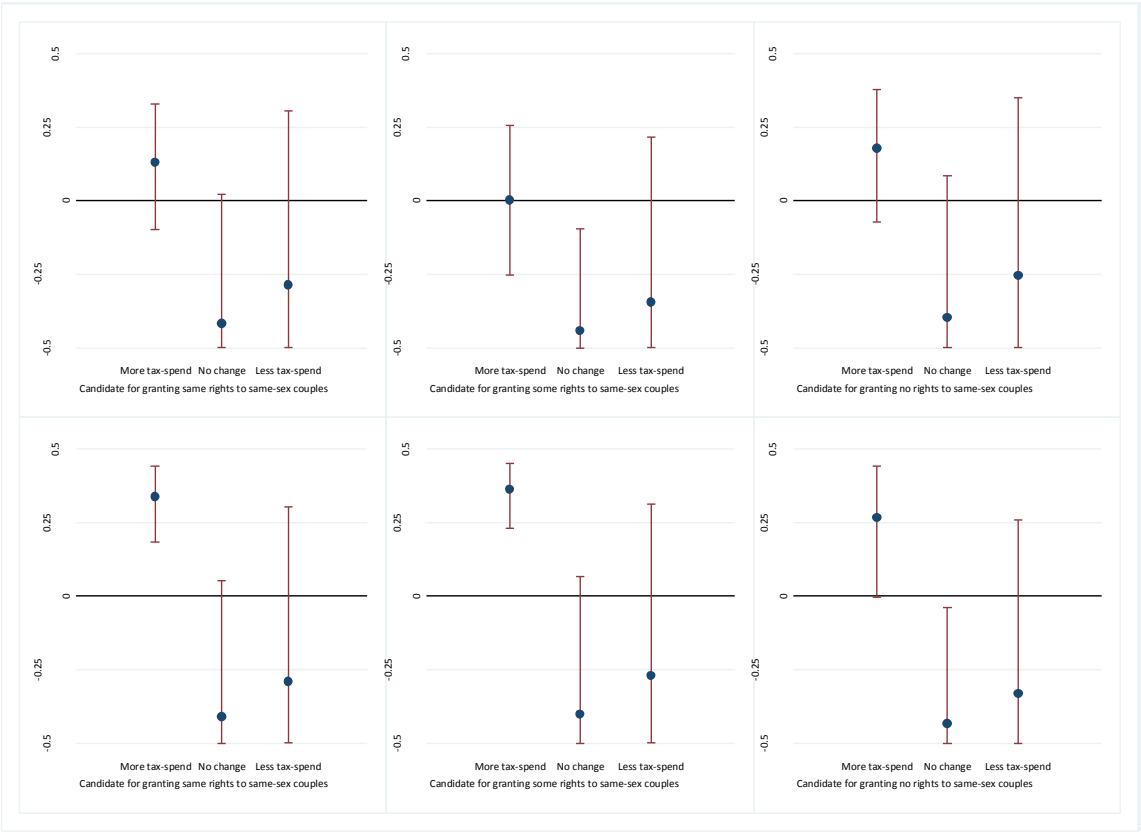
Figure 1c Saliency and attributes of candidates



Fixed attributes (where relevant): high school diploma, current spending, some rights

Note: Marginal effects on the probability of voting a candidate with different attributes (horizontal axis) for different levels of saliency.

Figure 2a Interaction between Education and Views on Taxation and Spending



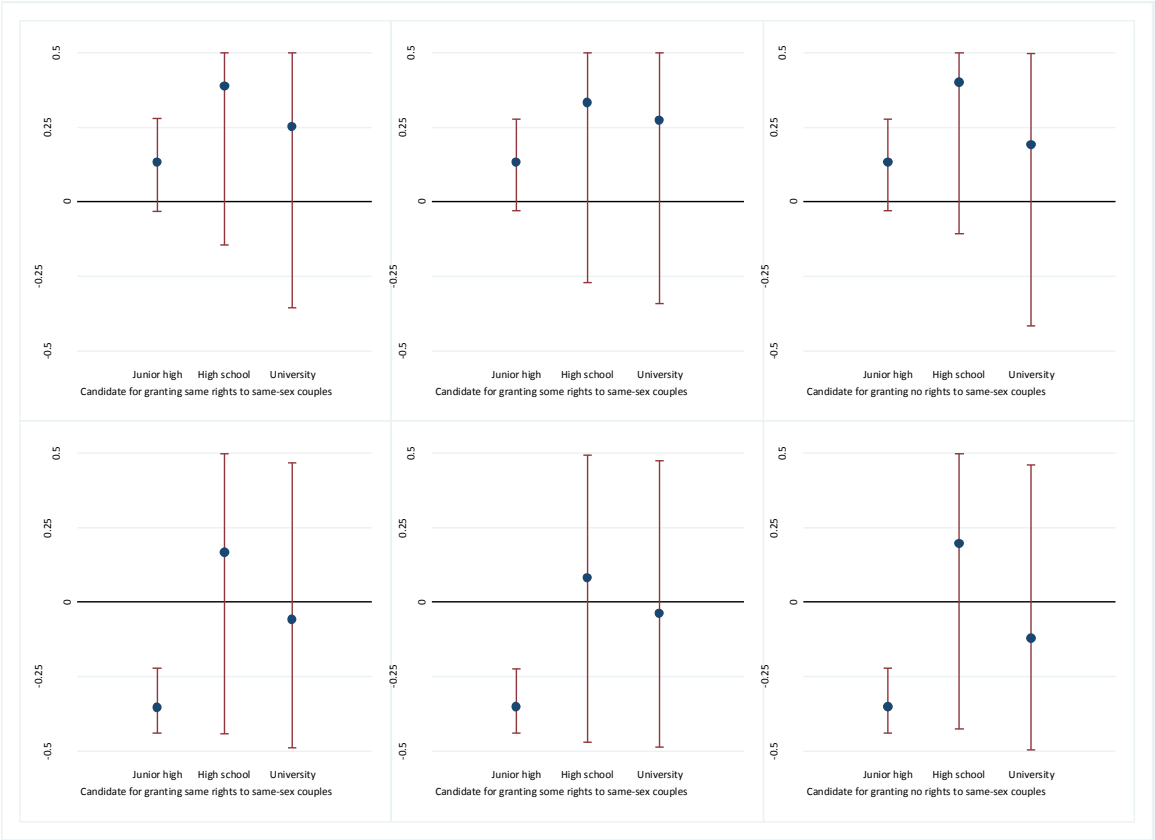
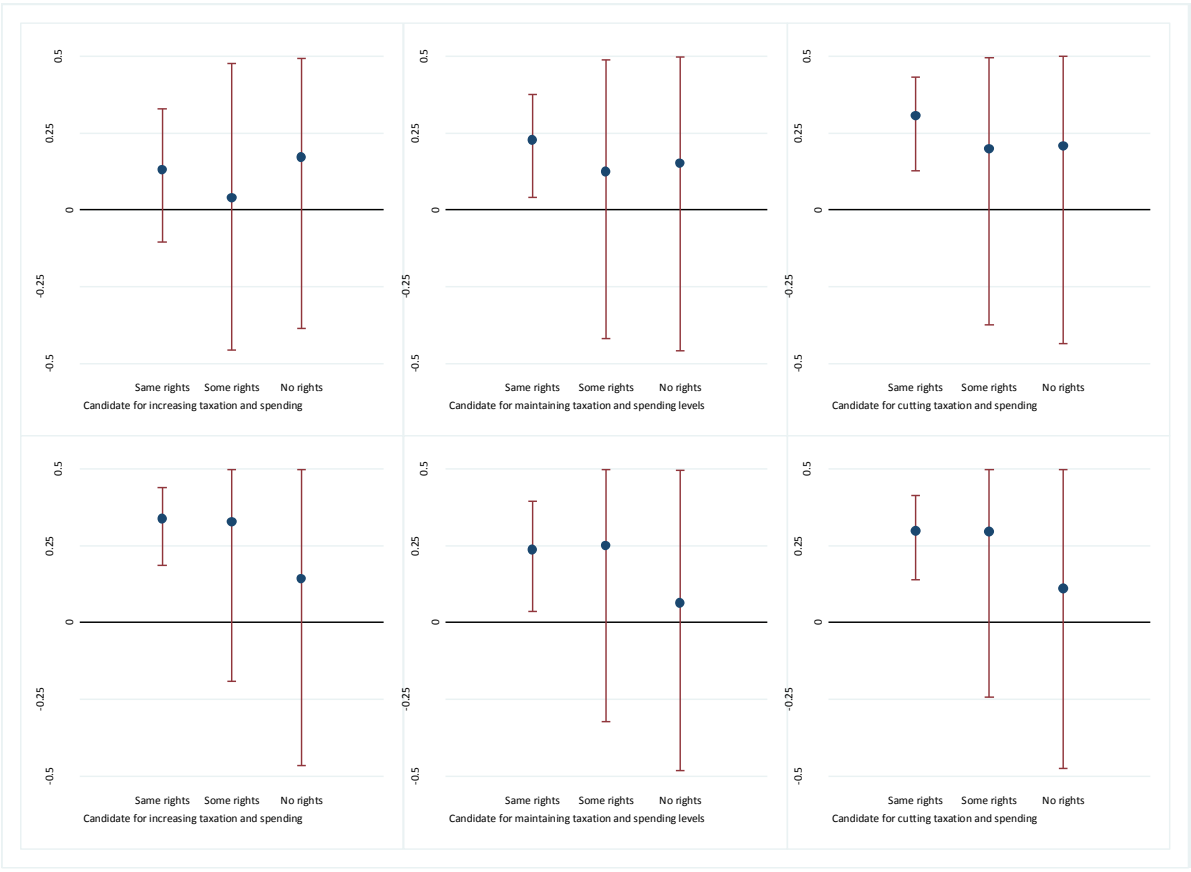


Figure 2b Interaction between Education and Views on Same-sex Couples Rights



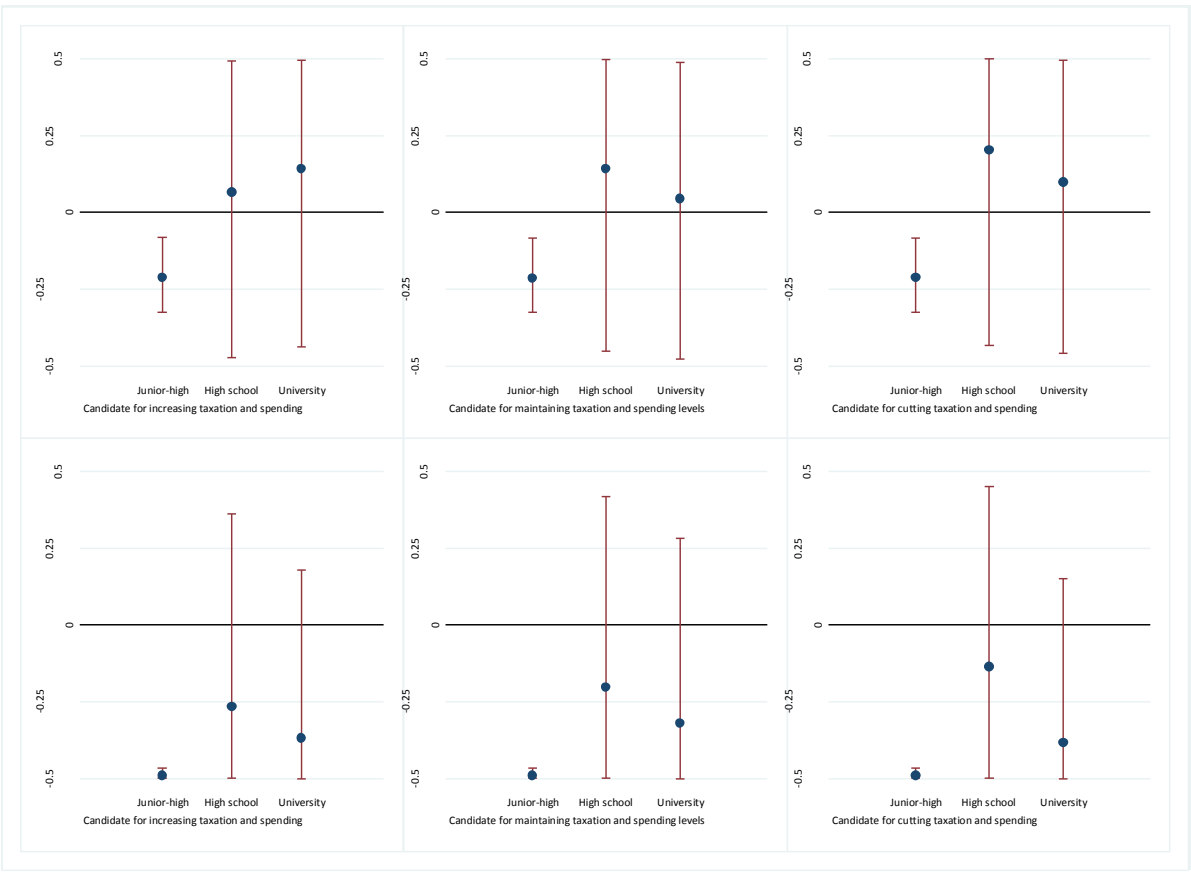
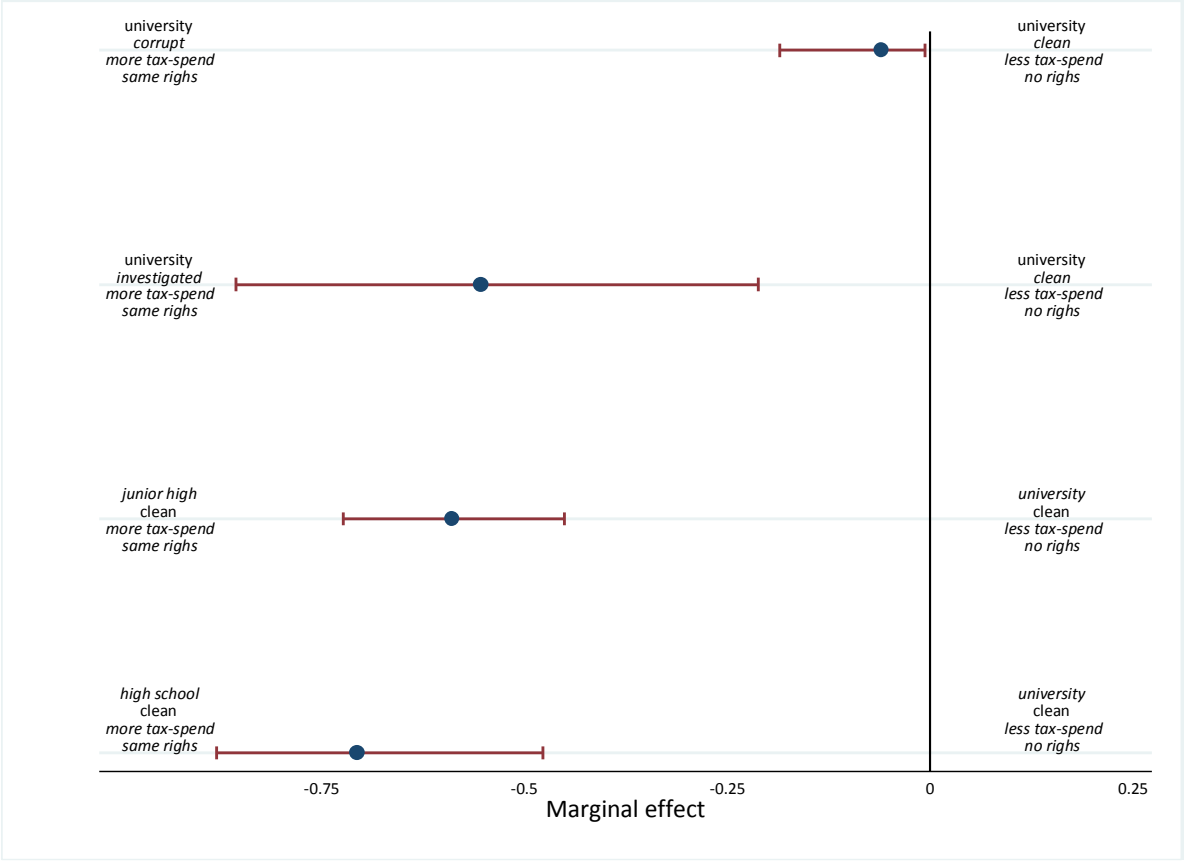
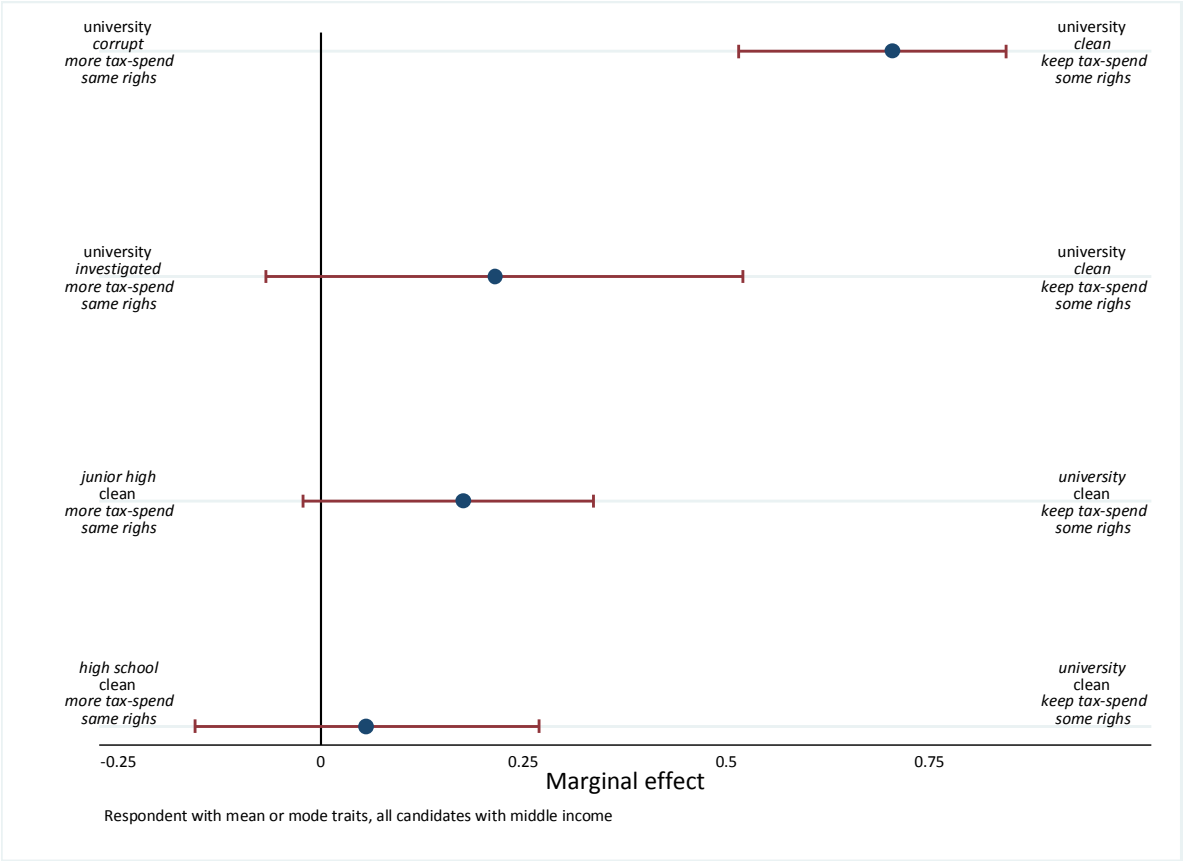


Figure 3 Tragic choices





Respondent with mean or mode traits, all candidates with middle income

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Appendix

TABLE A: Voting, valence and policy attributes

High school diploma	-0.819
	(1.056)
Laurea	0.0236
	(1.007)
Middle income	0.445
	(0.960)
High income	-0.181
	(0.930)
Under investigation	1.672
	(1.992)
No proceedings	1.642
	(1.225)
Keep spend and tax levels	2.968***
	(1.017)
Cut taxes and spending	0.957
	(0.976)
Some rights to same sex couples	-0.713
	(0.839)
No rights to same sex couples	-2.214*
	(1.137)
Interest in politics X High school diploma	-0.0549
	(0.158)
Interest in politics X University degree	-0.209
	(0.149)
Interest in politics X Middle income	0.0840
	(0.156)
Interest in politics X High income	0.150
	(0.152)
Interest in politics X Under investigation	-0.203
	(0.243)
Interest in politics X No proceedings	-0.265*
	(0.147)
Ideology X High school diploma	-0.0444
	(0.0450)
Ideology X University degree	-0.0901**
	(0.0423)
Ideology X Middle income	-0.0560
	(0.0455)
Ideology X High income	0.0424
	(0.0430)
Ideology X Under investigation	0.0747
	(0.0688)
Ideology X No proceedings	0.311***
	(0.0411)
Male X High school diploma	0.0204
	(0.211)

Male X University degree	0.291
	(0.201)
Male X Middle income	-0.146
	(0.210)
Male X High income	-0.193
	(0.205)
Male X Under investigation	0.475
	(0.323)
Male X No proceedings	0.370*
	(0.198)
Age X High school diploma	0.0233
	(0.0316)
Age X University degree	0.0317
	(0.0300)
Age X Middle income	0.00468
	(0.0294)
Age X High income	0.00264
	(0.0285)
Age X Under investigation	0.0187
	(0.0441)
Age X No proceedings	0.0425
	(0.0281)
Italian X High school diploma	-0.144
	(0.412)
Italian X University degree	-0.312
	(0.406)
Italian X Middle income	0.104
	(0.434)
Italian X High income	-0.217
	(0.411)
Italian X Under investigation	-0.837
	(0.653)
Italian X No proceedings	-1.985***
	(0.362)
Student X High school diploma	0.0687
	(0.219)
Student X University degree	0.263
	(0.205)
Student X Middle income	0.187
	(0.209)
Student X High income	0.145
	(0.207)
Student X Under investigation	0.648**
	(0.324)
Student X No proceedings	0.519**
	(0.204)
Lyceum X High school diploma	0.630**
	(0.263)
Lyceum X University degree	0.457*
	(0.239)
Lyceum X Middle income	-0.524**
	(0.250)
Lyceum X High income	-0.421*
	(0.241)
Lyceum X Under investigation	0.0395
	(0.386)

Lyceum X No proceedings	-0.00292
	(0.232)
Saliency X High school diploma	0.152
	(0.115)
Saliency X University degree	0.313***
	(0.118)
Saliency X Middle income	-0.0612
	(0.115)
Saliency X High income	-0.152
	(0.102)
Saliency X Under investigation	-0.683**
	(0.345)
Saliency X No proceedings	-1.110***
	(0.217)
Interest in politics X Maintain tax and spend	-0.319**
	(0.134)
Interest in politics X Cut tax and spend	-0.272**
	(0.132)
Interest in politics X Some same-sex rights	-0.0374
	(0.129)
Interest in politics X No same-sex rights	-0.0806
	(0.159)
Ideology X Maintain tax and spend	0.149***
	(0.0406)
Ideology X Cut tax and spend	0.260***
	(0.0384)
Ideology X Some same-sex rights	0.200***
	(0.0376)
Ideology X No same-sex rights	0.544***
	(0.0478)
Male X Maintain tax and spend	-0.782***
	(0.182)
Male X Cut tax and spend	-0.338*
	(0.180)
Male X Some same-sex rights	0.474***
	(0.173)
Male X No same-sex rights	1.084***
	(0.219)
Age X Maintain tax and spend	-0.0478*
	(0.0271)
Age X Cut tax and spend	-0.0241
	(0.0260)
Age X Some same-sex rights	-0.00447
	(0.0240)
Age X No same-sex rights	-0.00953
	(0.0362)
Italian X Maintain tax and spend	-0.482
	(0.379)
Italian X Cut tax and spend	-0.888**
	(0.381)
Italian X Some same-sex rights	0.380
	(0.350)
Italian X No same-sex rights	-0.739*
	(0.425)
Student X Maintain tax and spend	0.503***
	(0.183)

Student X Cut tax and spend	0.553***
	(0.182)
Student X Some same-sex rights	-0.187
	(0.177)
Student X No same-sex rights	0.231
	(0.225)
Lyceum X Maintain tax and spend	-1.234***
	(0.219)
Lyceum X Cut tax and spend	-0.704***
	(0.206)
Lyceum X Some same-sex rights	0.0907
	(0.206)
Lyceum X No same-sex rights	0.420
	(0.269)
Saliency X Maintain tax and spend	0.0175
	(0.163)
Saliency X Cut tax and spend	-0.168
	(0.153)
Saliency X Some same-sex rights	-0.214**
	(0.0965)
Saliency X No same-sex rights	-0.530***
	(0.129)
High school diploma X Maintain tax and spend	0.287
	(0.269)
High school diploma X Cut tax and spend	0.552
	(0.408)
University degree X Maintain tax and spend	-0.357*
	(0.204)
University degree X Cut tax and spend	-0.153
	(0.214)
High school diploma X Some same-sex rights	-0.335
	(0.292)
High school diploma X No same-sex rights	0.140
	(0.325)
University degree X Some same-sex rights	0.100
	(0.316)
University degree X No same-sex rights	-0.242
	(0.475)
Observations	8,362
Pseudo-R2	0.395
Log-likelihood	-1752
Wald chi2	2292

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1
Dependent variable: Pr(Y=1). Probability of choosing a candidate with given attributes.