**Appendix: How individuals’ social characteristics impact the likelihood to waste a vote – Evidence from Great Britain, Germany and France**

## ***Appendix 1*: Descriptive statistics of all variables used in Table 1.**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Variable** | **Type** | **Minimum** | **Maximum** | **Mean** | **SD** |
| wasted vote | Binary  | 0 ”not wasted” | 1 “wasted” | 0.29 | 0.46 |
| education  | Binary | 0 “no university degree” | 1 “university degree” | 0.22 | 0.41 |
| income quintile | Ordinal |  |  | 3.07 | 1.41 |
| sex = women | binary | 0 “men” | 1 “women” | 0.50 | 0.50 |
| cohort | Ordinal | 1 “born after 1989” | 9 “born before 1920” | 4.68 | 1.72 |
| political knowledge | Ordinal | 0 “no correct responses” | 4 “only correct responses” | 2.40 | 1.17 |
| closeness to a party | Binary | 0 “close to a party” | 1 “not close to a party” | 0.71 | 0.52 |
| voting makes a difference | Ordinal | 1 “who people vote for won’t make a difference” | 5 “who people vote for can make a difference” | 3.90 | 1.11 |
| left-right self-placement | Ordinal | 0 “left” | 10 “right” | 4.80 | 2.26 |
| degree of urbanization | Ordinal | 1 “rural area or village” | 4 “large town or city” | 2.28 | 1.10 |
| closeness of race 1 (gap in %) | Absolute | 0 “no gap” | 72.33 “largest observed gap” | 13.26 | 12.73 |
| closeness of race 2 (gap in %) | Absolute | 0 “no gap” | 46.40 “largest observed gap” | 10.96 | 8.99 |
| sincere preferences for major party | Binary | 0 “no sincere preference for major party” | 1 “no sincere preference for major party” | 0.71 | 0.45 |
| sincere preference for minor party | Binary | 0 “no sincere preference for minor party” | 1 “no sincere preference for minor party” | 0.62 | 0.48 |

*Annotations*: Figures refer to the 6468 observations included in Model 1 in Table 1.

## ***Appendix 2*: Robustness tests with additional control variables and alternative model specifications**

If not mentioned differently, all tests are logistic regression models with demographic probability weights and election fixed effects. Tests 1 to 3 include different operationalizations and functional forms of the effect of the level of education. Test 4 includes age instead of cohort groups, while Test 5 specifies the relationship between cohort and the chance to waste a vote as a curvilinear relationship. In this manner, we consider the large set of scholarly work that has been particularly attentive to the influence of age, generations and period on the development in aggregate turnout across time (Flammang 1985; Franklin 2004; Gallego 2009; Wass 2007). Studies on the United States and Europe have established a curvilinear relationship between age and turnout: The likelihood to vote increases once voters are in their early life-cycle and in their 40s and 50s while it declines among more senior citizens (Fieldhouse et al. 2007; Wolfinger and Rosenstone 1980). We test whether a similar pattern persists for (in-)effective voting. Test 6 shows the results of a multi-level logistic regression with districts nested in countries, standard errors clustered at the district level, and election fixed effects.

## ***Table A.1:*** Logistic regression of social characteristics on the likelihood to waste a vote in Germany, France and Great Britain (Test 1, alternative operationalization of education).

|  |  |  |  |
| --- | --- | --- | --- |
|  | Test 1.1 | Test 1.2 | Test 1.3 |
|  | b/(SE) | b/(SE) | b/(SE) |
|  |  |  |  |
| education (continuous) | 1.0201 | 0.9903 | 1.0097 |
|  | (0.0229) | (0.0281) | (0.0390) |
| income quintile | 0.9426\*\* | 0.9339\*\* | 1.0008 |
|  | (0.0260) | (0.0323) | (0.0504) |
| sex = women | 0.8539\*\* | 0.7615\*\*\* | 0.9759 |
|  | (0.0561) | (0.0623) | (0.1028) |
| cohort | 0.8830\*\*\* | 0.8845\*\*\* | 0.9608 |
|  | (0.0185) | (0.0232) | (0.0336) |
|  |  |  |  |
| ***individual-level controls*** |  |  |  |
| political knowledge | 1.0722\*\* | 1.0878\*\* | 1.0951\* |
|  | (0.0333) | (0.0420) | (0.0571) |
| closeness to a party | 0.8047\*\*\* | 0.9650 | 0.4968\*\*\* |
|  | (0.0540) | (0.0820) | (0.0536) |
| voting makes a difference | 0.9135\*\*\* | 0.9484 | 0.8417\*\*\* |
|  | (0.0266) | (0.0348) | (0.0390) |
| left-right self-placement (squared) | 0.9882\*\*\* | 0.9896\*\*\* | 0.9870\*\*\* |
|  | (0.0019) | (0.0025) | (0.0025) |
|  |  |  |  |
| ***district-level controls*** |  |  |  |
| degree of urbanization | 1.0191 | 0.9957 | 1.0797 |
|  | (0.0315) | (0.0371) | (0.0521) |
| closeness of race 1 (gap in %) | 1.0007 | 0.9924\* | 1.0020 |
|  | (0.0037) | (0.0045) | (0.0070) |
| closeness of race 2 (gap in %) | 0.9679\*\*\* | 0.9528\*\*\* | 0.9793\*\* |
|  | (0.0046) | (0.0059) | (0.0084) |
| Observations | 6433 | 4051 | 4595 |

*Annotations:* Logistic regression with election fixed effects. Displaying exponentiated coefficients. With \* *p* < 0.10, \*\* *p* < 0.05, \*\*\* *p* < 0.01. The first column includes all respondents; the second one only those that have a sincere preference for a minor party, the third one only those that have sincere preference for a major party. Respondents might like a minor and major party equally, so that they can be included twice.

***Table A.2:*** Logistic regression of social characteristics on the likelihood to waste a vote in Germany, France and Great Britain (Test 2, education as nominal scaled variable).

|  |  |  |  |
| --- | --- | --- | --- |
|  | Test 2.1 | Test 2.2 | Test 2.3 |
|  | b/(SE) | b/(SE) | b/(SE) |
|  |  |  |  |
| education = incomplete  | 0.8447 | 0.9950 | 1.0261 |
|  primary | (0.6343) | (0.7808) | (0.3350) |
| education = primary  | 0.8901 | 0.8892 | 0.9568 |
|  completed | (0.6563) | (0.6667) | (0.2454) |
| education = incomplete  | 0.8951 | 1.0316 | 0.9533 |
|  secondary | (0.6475) | (0.7509) | (0.1606) |
| education = secondary  | 0.8586 | 0.9100 | 0.9221 |
|  completed | (0.6293) | (0.6742) | (0.2183) |
| education = post-secondary  | 1.0015 | 1.1814 | 1.1903 |
|  trade/vocational school | (0.7341) | (0.8797) | (0.2570) |
| education = university under- | 0.8484 | 0.8666 | 0.9810 |
|  graduate incomplete | (0.6224) | (0.6443) | (0.1889) |
| education = university graduate complete | 0.9939 | 0.9666 | 1.0000 |
|  | (0.7262) | (0.7138) | (.) |
| income quintile | 0.9424\*\* | 0.9322\*\* | 0.9987 |
|  | (0.0261) | (0.0324) | (0.0496) |
| sex = women | 0.8562\*\* | 0.7650\*\*\* | 0.9792 |
|  | (0.0562) | (0.0625) | (0.1028) |
| cohort | 0.8810\*\*\* | 0.8832\*\*\* | 0.9582 |
|  | (0.0192) | (0.0238) | (0.0328) |
|  |  |  |  |
| ***individual-level controls*** |  |  |  |
| political knowledge | 1.0729\*\* | 1.0906\*\* | 1.0979\* |
|  | (0.0334) | (0.0423) | (0.0577) |
| closeness to a party | 0.8049\*\*\* | 0.9696 | 0.4964\*\*\* |
|  | (0.0540) | (0.0819) | (0.0534) |
| voting makes a difference | 0.9140\*\*\* | 0.9485 | 0.8421\*\*\* |
|  | (0.0266) | (0.0348) | (0.0391) |
| left-right self-placement (squared) | 0.9881\*\*\* | 0.9896\*\*\* | 0.9871\*\*\* |
|  | (0.0019) | (0.0025) | (0.0025) |
|  |  |  |  |
| ***district-level controls*** |  |  |  |
| degree of urbanization | 1.0181 | 0.9980 | 1.0820 |
|  | (0.0316) | (0.0373) | (0.0528) |
| closeness of race 1 (gap in %) | 1.0007 | 0.9923\* | 1.0021 |
|  | (0.0037) | (0.0045) | (0.0070) |
| closeness of race 2 (gap in %) | 0.9678\*\*\* | 0.9529\*\*\* | 0.9792\*\* |
|  | (0.0046) | (0.0059) | (0.0084) |
| Observations | 6433 | 4051 | 4595 |

*Annotations:* Logistic regression with election fixed effects. Displaying exponentiated coefficients. With \* *p* < 0.10, \*\* *p* < 0.05, \*\*\* *p* < 0.01. The first column includes all respondents; the second one only those that have a sincere preference for a minor party, the third one only those that have sincere preference for a major party. Respondents might like a minor and major party equally, so that they can be included twice.

***Table A.3:*** Logistic regression of social characteristics on the likelihood to waste a vote in Germany, France and Great Britain (Test 3, alternative operationalization of education, log-form).

|  |  |  |  |
| --- | --- | --- | --- |
|  | Test 3.1 | Test 3.2 | Test 3.3 |
|  | b/(SE) | b/(SE) | b/(SE) |
|  |  |  |  |
| education (continuous,  | 1.1192 | 0.9542 | 1.0492 |
|  logarithmic) | (0.1591) | (0.1757) | (0.2503) |
| income quintile | 0.9431\*\* | 0.9332\*\* | 1.0015 |
|  | (0.0259) | (0.0322) | (0.0506) |
| sex = women | 0.8541\*\* | 0.7613\*\*\* | 0.9761 |
|  | (0.0561) | (0.0623) | (0.1028) |
| cohort | 0.8833\*\*\* | 0.8847\*\*\* | 0.9608 |
|  | (0.0187) | (0.0234) | (0.0332) |
|  |  |  |  |
| ***individual-level controls*** |  |  |  |
| political knowledge | 1.0723\*\* | 1.0873\*\* | 1.0954\* |
|  | (0.0334) | (0.0422) | (0.0574) |
| closeness to a party | 0.8047\*\*\* | 0.9651 | 0.4968\*\*\* |
|  | (0.0540) | (0.0819) | (0.0536) |
| voting makes a difference | 0.9135\*\*\* | 0.9484 | 0.8416\*\*\* |
|  | (0.0266) | (0.0348) | (0.0390) |
| left-right self-placement (squared) | 0.9882\*\*\* | 0.9896\*\*\* | 0.9870\*\*\* |
|  | (0.0019) | (0.0025) | (0.0025) |
|  |  |  |  |
| ***district-level controls*** |  |  |  |
| degree of urbanization | 1.0194 | 0.9954 | 1.0799 |
|  | (0.0315) | (0.0370) | (0.0522) |
| closeness of race 1 (gap in %) | 1.0007 | 0.9924\* | 1.0020 |
|  | (0.0037) | (0.0045) | (0.0070) |
| closeness of race 2 (gap in %) | 0.9678\*\*\* | 0.9528\*\*\* | 0.9793\*\* |
|  | (0.0046) | (0.0059) | (0.0084) |
| Observations | 6433 | 4051 | 4595 |

*Annotations:* Logistic regression with election fixed effects. Displaying exponentiated coefficients. With \* *p* < 0.10, \*\* *p* < 0.05, \*\*\* *p* < 0.01. The first column includes all respondents; the second one only those that have a sincere preference for a minor party, the third one only those that have sincere preference for a major party. Respondents might like a minor and major party equally, so that they can be included twice.

***Table A.4:*** Logistic regression of social characteristics on the likelihood to waste a vote in Germany, France and Great Britain (Test 4, age instead of cohort).

|  |  |  |  |
| --- | --- | --- | --- |
|  | Test 4.1 | Test 4.2 | Test 4.3 |
|  | b/(SE) | b/(SE) | b/(SE) |
|  |  |  |  |
| education = university degree | 1.0403 | 0.9182 | 0.9951 |
|  | (0.0825) | (0.0900) | (0.1306) |
| income quintile | 0.9463\*\* | 0.9376\* | 1.0005 |
|  | (0.0259) | (0.0324) | (0.0477) |
| sex = women | 0.8520\*\* | 0.7635\*\*\* | 0.9725 |
|  | (0.0559) | (0.0623) | (0.1022) |
| age | 0.9869\*\*\* | 0.9876\*\*\* | 0.9947 |
|  | (0.0021) | (0.0026) | (0.0035) |
|  |  |  |  |
| ***individual-level controls*** |  |  |  |
| political knowledge | 1.0770\*\* | 1.0893\*\* | 1.0983\* |
|  | (0.0331) | (0.0417) | (0.0563) |
| closeness to a party | 0.8014\*\*\* | 0.9600 | 0.4938\*\*\* |
|  | (0.0538) | (0.0816) | (0.0531) |
| voting makes a difference | 0.9137\*\*\* | 0.9470 | 0.8429\*\*\* |
|  | (0.0265) | (0.0346) | (0.0390) |
| left-right self-placement (squared) | 0.9883\*\*\* | 0.9897\*\*\* | 0.9870\*\*\* |
|  | (0.0019) | (0.0025) | (0.0025) |
|  |  |  |  |
| ***district-level controls*** |  |  |  |
| degree of urbanization | 1.0210 | 0.9969 | 1.0811 |
|  | (0.0315) | (0.0371) | (0.0515) |
| closeness of race 1 (gap in %) | 1.0004 | 0.9921\* | 1.0017 |
|  | (0.0037) | (0.0045) | (0.0070) |
| closeness of race 2 (gap in %) | 0.9676\*\*\* | 0.9525\*\*\* | 0.9792\*\* |
|  | (0.0046) | (0.0059) | (0.0084) |
| Observations | 6457 | 4278 | 4868 |

*Annotations:* Logistic regression with election fixed effects. Displaying exponentiated coefficients. With \* *p* < 0.10, \*\* *p* < 0.05, \*\*\* *p* < 0.01. The first column includes all respondents; the second one only those that have a sincere preference for a minor party, the third one only those that have sincere preference for a major party. Respondents might like a minor and major party equally, so that they can be included twice.

***Table A.5:*** Logistic regression of social characteristics on the likelihood to waste a vote in Germany, France and Great Britain (Test 5, alternative specification of the effect of cohort).

|  |  |  |  |
| --- | --- | --- | --- |
|  | Test 5.1 | Test 5.2 | Test 5.3 |
|  | b/(SE) | b/(SE) | b/(SE) |
|  |  |  |  |
| education = university degree | 1.0500 | 0.9307 | 1.0086 |
|  | (0.0832) | (0.0909) | (0.1323) |
| income quintile | 0.9439\*\* | 0.9362\* | 1.0054 |
|  | (0.0261) | (0.0326) | (0.0479) |
| sex = women | 0.8490\*\* | 0.7604\*\*\* | 0.9730 |
|  | (0.0556) | (0.0619) | (0.1019) |
| cohort (squared) | 0.9868\*\*\* | 0.9879\*\*\* | 0.9967 |
|  | (0.0023) | (0.0029) | (0.0040) |
|  |  |  |  |
| ***individual-level controls*** |  |  |  |
| political knowledge | 1.0712\*\* | 1.0832\*\* | 1.0916\* |
|  | (0.0328) | (0.0413) | (0.0558) |
| closeness to a party | 0.7987\*\*\* | 0.9577 | 0.4892\*\*\* |
|  | (0.0536) | (0.0814) | (0.0526) |
| voting makes a difference | 0.9158\*\*\* | 0.9495 | 0.8444\*\*\* |
|  | (0.0266) | (0.0347) | (0.0390) |
| left-right self-placement (squared) | 0.9883\*\*\* | 0.9898\*\*\* | 0.9869\*\*\* |
|  | (0.0019) | (0.0025) | (0.0025) |
|  |  |  |  |
| ***district-level controls*** |  |  |  |
| degree of urbanization | 1.0255 | 1.0004 | 1.0832\* |
|  | (0.0315) | (0.0372) | (0.0514) |
| closeness of race 1 (gap in %) | 1.0006 | 0.9923\* | 1.0018 |
|  | (0.0037) | (0.0045) | (0.0070) |
| closeness of race 2 (gap in %) | 0.9678\*\*\* | 0.9527\*\*\* | 0.9794\*\* |
|  | (0.0046) | (0.0059) | (0.0084) |
| Observations | 6468 | 4067 | 4621 |

*Annotations:* Logistic regression with election fixed effects. Displaying exponentiated coefficients. With \* *p* < 0.10, \*\* *p* < 0.05, \*\*\* *p* < 0.01. The first column includes all respondents; the second one only those that have a sincere preference for a minor party, the third one only those that have sincere preference for a major party. Respondents might like a minor and major party equally, so that they can be included twice.

***Table A.6:*** Multi-level logistic regression of social characteristics on the likelihood to waste a vote in Germany, France and Great Britain (Test 6).

|  |  |  |  |
| --- | --- | --- | --- |
|  | Test 6.1 | Test 6.2 | Test 6.3 |
|  | b/(SE) | b/(SE) | b/(SE) |
|  |  |  |  |
| education = university degree | 1.0991 | 0.9756 | 1.0784 |
|  | (0.0781) | (0.1432) | (0.1954) |
| income quintile | 0.9501\*\* | 0.9435 | 0.9817 |
|  | (0.0236) | (0.0368) | (0.0491) |
| sex = women | 0.8546\*\* | 0.7539\*\*\* | 0.9835 |
|  | (0.0534) | (0.0759) | (0.0911) |
| cohort | 0.8642\*\*\* | 0.8619\*\*\* | 0.9293\*\*\* |
|  | (0.0258) | (0.0265) | (0.0252) |
|  |  |  |  |
| ***individual-level controls*** |  |  |  |
| political knowledge | 1.0781 | 1.1091 | 1.0972\* |
|  | (0.0511) | (0.0771) | (0.0580) |
| closeness to a party | 0.7702\*\*\* | 0.9222 | 0.5059\*\*\* |
|  | (0.0370) | (0.1237) | (0.0778) |
| voting makes a difference | 0.9302\*\* | 0.9876 | 0.8559\*\*\* |
|  | (0.0314) | (0.0379) | (0.0208) |
| left-right self-placement (squared) | 0.9856\*\*\* | 0.9856\*\*\* | 0.9869\*\*\* |
|  | (0.0041) | (0.0032) | (0.0034) |
|  |  |  |  |
| ***district-level controls*** |  |  |  |
| degree of urbanization | 1.0124 | 0.9945 | 1.0277 |
|  | (0.0311) | (0.0316) | (0.0253) |
| closeness of race 1 (gap in %) | 1.0019 | 0.9925 | 0.9950 |
|  | (0.0080) | (0.0071) | (0.0032) |
| closeness of race 2 (gap in %) | 0.9657\*\*\* | 0.9482\*\*\* | 0.9642\*\*\* |
|  | (0.0086) | (0.0144) | (0.0108) |
| Observations | 6468 | 4067 | 4621 |

*Annotations:* Multi-level logistic regression with districts nested in countries. Displaying exponentiated coefficients. With \* *p* < 0.10, \*\* *p* < 0.05, \*\*\* *p* < 0.01. The first column includes all respondents; the second one only those that have a sincere preference for a minor party, the third one only those that have sincere preference for a major party. Respondents might like a minor and major party equally, so that they can be included twice.

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