**Supplementary**

**Table S1 Sampling of six provinces in China**

|  |  |  |  |
| --- | --- | --- | --- |
| **Province** | **Geographical region** | **Per capita GDP in 2020** (CNY) | **Rank** |
| Heilongjiang | Northeast | 42432 | 30 |
| Hebei | Central | 48302 | 27 |
| Sichuan | Southwest | 58009 | 16 |
| Hunan | Central | 62537 | 13 |
| Shanghai | Central | 156803 | 2 |
| Guangding | East | 88521 | 7 |

Note: The data comes from the National Bureau of Statistics and covers 31 provinces in mainland China

**Table S2 Variable list of attributes and demographic characteristics**

|  |  |
| --- | --- |
| **variable name** | **explain** |
| residue1 | 80% of normal celery |
| residue2 | 60% of normal celery |
| residue3 | 40% of normal celery |
| residue4 | 20% of normal celery |
| residue5 | No pesticide residues |
| appe1 | Marked mutilation or scarring |
| appe2 | Slight mutilation or scarring |
| appe3 | No mutilation or scarring |
| taste1 | Not as good as normal celery |
| taste2 | Similar to normal celery |
| taste3 | Better than normal celery |
| price\_neg | Price attributes were treated as continuous variables |
| sex | Male=, Female=0 |
|
| agen | 18-29=1, 30-39=2, 40-49=3, 50-=4 |
| culture | Secondary School=1, High School=2 Vocational College=3, Bachelor’s Degree=4 Master’s Degree and Higher=5 |
|
|
|
| perin | 3000 or Less=1, 3000-5000=2 5000-10000=3, 10000-15000=4 15000-20000=5, More Than 20000=6 |
|
|
|
|
| childn | Yes=1, No=0 |
|
| recg | Yes=1, No=0 |
|
| risk | Yes=1, No=0 |
|

**Table S3 Variable list of interactive items**

|  |  |  |  |
| --- | --- | --- | --- |
| **variable name** | **explain** | **variable name** | **explain** |
| sex2 | residue2\*sex | chil2 | residue2\*childn |
| sex3 | residue3\*sex | chil3 | residue3\*childn |
| sex4 | residue4\*sex | chil4 | residue4\*childn |
| sex5 | residue5\*sex | chil5 | residue5\*childn |
| sexa2 | appe2\*sex | chila2 | appe2\*childn |
| sexa3 | appe3\*sex | chila3 | appe3\*childn |
| sext2 | taste2\*sex | chilt2 | taste2\*childn |
| sext3 | taste3\*sex | chilt3 | taste3\*childn |
| sexpp | price\*sex | childp | price\*childn |
| agen2 | residue2\*agen | recg2 | residue2\*recg |
| agen3 | residue3\*agen | recg3 | residue3\*recg |
| agen4 | residue4\*agen | recg4 | residue4\*recg |
| agen5 | residue5\*agen | recg5 | residue5\*recg |
| agena2 | appe2\*agen | recga2 | appe2\*recg |
| agena3 | appe3\*agen | recga3 | appe3\*recg |
| agent2 | taste2\*agen | recgt2 | taste2\*recg |
| agent3 | taste3\*agen | recgt3 | taste3\*recg |
| agepp | pprice\*agen | recgp | price\*recg |
| per2 | residue2\*perin | ris2 | residue2\*risk |
| per3 | residue3\*perin | ris3 | residue3\*risk |
| per4 | residue4\*perin | ris4 | residue4\*risk |
| per5 | residue5\*perin | ris5 | residue5\*risk |
| pera2 | appe2\*perin | risa2 | appe2\*risk |
| pera3 | appe3\*perin | risa3 | appe3\*risk |
| pert2t | taste2\*perin | rist2 | taste2\*risk |
| pert3t | taste3\*perin | rist3 | taste3\*risk |
| perpp | price\*perin | risp | price\*risk |
| cultr2 | residue2\*culture | pro2 | residue2\*province |
| cultr3 | residue3\*culture | pro3 | residue3\*province |
| cultr4 | residue4\*culture | pro4 | residue4\*province |
| cultr5 | residue5\*culture | pro5 | residue5\*province |
| culta2 | appe2\*culture | proa2 | appe2\*province |
| culta3 | appe3\*culture | proa3 | appe3\*province |
| cultt2 | taste2\*culture | prot2 | taste2\*province |
| cultt3 | taste3\*culture | prot3 | taste3\*province |
| cultp | price\*culture | prot4 | price\*province |

**Table S4 Preference heterogeneity analysis with province interaction terms**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Attribute** | **Level** | **Coef.** | **Std. Err.** | **z** | **P>z** |  | **95%CI** | |
|  | **asc** | 1.089 | 0.137 | 7.970 | 0.000 | \*\*\* | 0.821 | 1.357 |
| **Pesticide residual level** | **residual2** | 0.581 | 0.531 | 1.090 | 0.274 |  | -0.459 | 1.622 |
| **residual3** | 0.864 | 0.512 | 1.690 | 0.091 |  | -0.139 | 1.867 |
| **residual4** | 1.379 | 0.519 | 2.660 | 0.008 | \*\* | 0.362 | 2.395 |
| **residual5** | 2.023 | 0.643 | 3.140 | 0.002 | \*\* | 0.762 | 3.284 |
| **Appearance** | **appe2** | 0.914 | 0.347 | 2.640 | 0.008 | \*\* | 0.234 | 1.593 |
| **appe3** | 0.361 | 0.388 | 0.930 | 0.352 |  | -0.399 | 1.120 |
| **Taste** | **taste2** | 0.757 | 0.360 | 2.100 | 0.036 | \* | 0.050 | 1.463 |
| **taste3** | 1.461 | 0.431 | 3.390 | 0.001 | \*\*\* | 0.616 | 2.305 |
| **Price** | **price\_neg** | -0.603 | 0.098 | -6.130 | 0.000 | \*\*\* | -0.796 | -0.410 |
| **Interaction: demographic attributes\*attibute** | | | | | | | | |
| gender\*residue2 | | -0.078 | 0.157 | -0.490 | 0.621 |  | -0.386 | 0.230 |
| age\*residue2 | | -0.115 | 0.094 | -1.220 | 0.221 |  | -0.300 | 0.069 |
| income\*residue2 | | -0.027 | 0.067 | -0.390 | 0.693 |  | -0.159 | 0.105 |
| education\*residue2 | | 0.051 | 0.100 | 0.510 | 0.612 |  | -0.145 | 0.246 |
| child\*residue2 | | 0.118 | 0.170 | 0.690 | 0.488 |  | -0.215 | 0.451 |
| attention\*residue2 | | 0.462 | 0.221 | 2.100 | 0.036 | \* | 0.030 | 0.895 |
| risk\*residue2 | | -0.167 | 0.231 | -0.720 | 0.469 |  | -0.620 | 0.285 |
| province\*residue2 | | -0.015 | 0.052 | -0.290 | 0.769 |  | -0.116 | 0.086 |
| gender\*residue3 | | -0.291 | 0.155 | -1.880 | 0.060 |  | -0.594 | 0.012 |
| age\*residue3 | | -0.189 | 0.093 | -2.030 | 0.043 | \* | -0.371 | -0.006 |
| income\*residue3 | | 0.049 | 0.066 | 0.740 | 0.460 |  | -0.081 | 0.179 |
| education\*residue3 | | 0.074 | 0.095 | 0.770 | 0.440 |  | -0.113 | 0.260 |
| child\*residue3 | | 0.058 | 0.167 | 0.350 | 0.728 |  | -0.269 | 0.386 |
| attention\*residue3 | | 0.369 | 0.213 | 1.730 | 0.083 |  | -0.048 | 0.786 |
| risk\*residue3 | | 0.360 | 0.226 | 1.590 | 0.111 |  | -0.082 | 0.802 |
| province\*residue3 | | -0.061 | 0.050 | -1.210 | 0.227 |  | -0.160 | 0.038 |
| gender\*residue4 | | -0.268 | 0.155 | -1.730 | 0.084 |  | -0.571 | 0.036 |
| age\*residue4 | | -0.159 | 0.094 | -1.700 | 0.090 |  | -0.342 | 0.025 |
| income\*residue4 | | 0.028 | 0.067 | 0.420 | 0.677 |  | -0.103 | 0.158 |
| education\*residue4 | | 0.145 | 0.097 | 1.500 | 0.134 |  | -0.045 | 0.335 |
| child\*residue4 | | -0.075 | 0.168 | -0.450 | 0.652 |  | -0.404 | 0.253 |
| attention\*residue4 | | 0.680 | 0.213 | 3.190 | 0.001 | \*\*\* | 0.262 | 1.098 |
| risk\*residue4 | | 0.141 | 0.226 | 0.630 | 0.531 |  | -0.301 | 0.583 |
| province\*residue4 | | -0.077 | 0.051 | -1.530 | 0.127 |  | -0.177 | 0.022 |
| gender\*residue5 | | -0.526 | 0.196 | -2.690 | 0.007 | \*\* | -0.909 | -0.143 |
| age\*residue5 | | -0.157 | 0.118 | -1.330 | 0.182 |  | -0.388 | 0.074 |
| income\*residue5 | | 0.131 | 0.084 | 1.570 | 0.117 |  | -0.033 | 0.296 |
| education\*residue5 | | -0.062 | 0.121 | -0.510 | 0.609 |  | -0.300 | 0.176 |
| child\*residue5 | | -0.058 | 0.212 | -0.270 | 0.784 |  | -0.473 | 0.357 |
| attention\*residue5 | | 0.643 | 0.270 | 2.380 | 0.017 | \* | 0.114 | 1.173 |
| risk\*residue5 | | 0.538 | 0.284 | 1.900 | 0.058 |  | -0.018 | 1.094 |
| province\*residue5 | | -0.093 | 0.064 | -1.460 | 0.145 |  | -0.218 | 0.032 |
| gender\*appearance2 | | 0.053 | 0.103 | 0.520 | 0.603 |  | -0.148 | 0.254 |
| age\*appearance2 | | -0.113 | 0.062 | -1.820 | 0.069 |  | -0.235 | 0.009 |
| income\*appearance2 | | 0.024 | 0.044 | 0.540 | 0.587 |  | -0.063 | 0.111 |
| education\*appearance2 | | 0.001 | 0.064 | 0.020 | 0.984 |  | -0.125 | 0.128 |
| child\*appearance2 | | -0.248 | 0.112 | -2.220 | 0.027 | \* | -0.467 | -0.029 |
| attention\*appearance2 | | -0.315 | 0.145 | -2.180 | 0.030 | \* | -0.599 | -0.031 |
| risk\*appearance2 | | 0.010 | 0.151 | 0.060 | 0.949 |  | -0.287 | 0.307 |
| province\*appearance2 | | -0.038 | 0.034 | -1.120 | 0.262 |  | -0.104 | 0.028 |
| gender\*appearance3 | | 0.128 | 0.114 | 1.120 | 0.263 |  | -0.096 | 0.352 |
| age\*appearance3 | | -0.117 | 0.069 | -1.700 | 0.089 |  | -0.252 | 0.018 |
| income\*appearance3 | | 0.025 | 0.049 | 0.500 | 0.616 |  | -0.072 | 0.121 |
| education\*appearance3 | | 0.153 | 0.072 | 2.130 | 0.034 | \* | 0.012 | 0.294 |
| child\*appearance3 | | -0.073 | 0.124 | -0.590 | 0.558 |  | -0.316 | 0.170 |
| attention\*appearance3 | | -0.429 | 0.160 | -2.680 | 0.007 | \*\* | -0.743 | -0.115 |
| risk\*appearance3 | | 0.242 | 0.170 | 1.430 | 0.153 |  | -0.090 | 0.575 |
| province\*appearance3 | | -0.045 | 0.037 | -1.190 | 0.233 |  | -0.118 | 0.029 |
| gender\*taste2 | | -0.002 | 0.106 | -0.010 | 0.988 |  | -0.210 | 0.207 |
| age\*taste2 | | -0.035 | 0.064 | -0.550 | 0.582 |  | -0.160 | 0.090 |
| income\*taste2 | | 0.006 | 0.046 | 0.120 | 0.904 |  | -0.084 | 0.095 |
| education\*taste2 | | 0.057 | 0.066 | 0.860 | 0.391 |  | -0.073 | 0.187 |
| child\*taste2 | | -0.072 | 0.115 | -0.620 | 0.533 |  | -0.298 | 0.154 |
| attention\*taste2 | | -0.020 | 0.150 | -0.130 | 0.893 |  | -0.315 | 0.275 |
| risk\*taste2 | | -0.140 | 0.159 | -0.880 | 0.377 |  | -0.452 | 0.171 |
| province\*taste2 | | -0.042 | 0.035 | -1.190 | 0.232 |  | -0.110 | 0.027 |
| gender\*taste3 | | -0.185 | 0.129 | -1.430 | 0.153 |  | -0.438 | 0.069 |
| age\*taste3 | | -0.212 | 0.078 | -2.720 | 0.007 | \*\* | -0.365 | -0.059 |
| income\*taste3 | | 0.094 | 0.056 | 1.690 | 0.092 |  | -0.015 | 0.204 |
| education\*taste3 | | 0.054 | 0.080 | 0.680 | 0.498 |  | -0.103 | 0.211 |
| child\*taste3 | | -0.185 | 0.140 | -1.320 | 0.186 |  | -0.460 | 0.089 |
| attention\*taste3 | | -0.080 | 0.183 | -0.440 | 0.661 |  | -0.439 | 0.278 |
| risk\*taste3 | | -0.203 | 0.194 | -1.050 | 0.294 |  | -0.583 | 0.176 |
| province\*taste3 | | 0.003 | 0.042 | 0.080 | 0.937 |  | -0.080 | 0.086 |
| gender\*price | | 0.073 | 0.018 | 4.150 | 0.000 | \*\*\* | 0.039 | 0.108 |
| age\*price | | 0.021 | 0.010 | 2.050 | 0.040 | \* | 0.001 | 0.042 |
| income\*price | | 0.007 | 0.008 | 0.940 | 0.346 |  | -0.008 | 0.022 |
| education\*price | | 0.012 | 0.010 | 1.180 | 0.239 |  | -0.008 | 0.032 |
| child\*price | | 0.012 | 0.019 | 0.630 | 0.528 |  | -0.026 | 0.050 |
| attention\*price | | 0.080 | 0.025 | 3.230 | 0.001 | \*\*\* | 0.032 | 0.129 |
| risk\*price | | 0.082 | 0.026 | 3.140 | 0.002 | \*\* | 0.031 | 0.133 |
| province\*price | | 0.017 | 0.006 | 3.030 | 0.002 | \*\* | 0.006 | 0.028 |

**The syntax of preference estimation**

mixlogit choice, rand(asc residue2 residue3 residue4 residue5 appe2 appe3 taste2 taste3 price\_neg)group(gid)id(NO)ln(2)nrep(4000)

est save dce\_mixl\_4000,replace

nlcom (mean\_price\_neg:-1\*exp([Mean]\_b[price\_neg]+0.5\*[SD]\_b[price\_neg]^2))(sd\_price\_neg: exp([Mean]\_b[price\_neg]+0.5\*[SD]\_b[price\_neg]^2)\*sqrt(exp([SD]\_b[price\_neg]^2)-1))

**The syntax of preference heterogeneity estimation**

mixlogit choice sex2 agen2 per2 cultr2 chil2 recg2 ris2 sex3 agen3 per3 cultr3 chil3 recg3 ris3 sex4 agen4 per4 cultr4 chil4 recg4 ris4 sex5 agen5 per5 cultr5 chil5 recg5 ris5 sexa2 agena2 pera2 culta2 chila2 recga2 risa2 sexa3 agena3 pera3 culta3 chila3 recga3 risa3 sext2 agent2 pert2 cultt2 chilt2 recgt2 rist2 sext3 agent3 pert3 cultt3 chilt3 recgt3 rist3 sexp agep perp cultp childp recgp risp,rand(asc residue2 residue3 residue4 residue5 appe2 appe3 taste2 taste3 price\_neg)group(gid)id(NO)ln(1)nrep(4000)

**The syntax of WTP estimation**

mixlogitwtp choice,group(gid) id(NO) price(price\_neg) rand(asc residue2 residue3 residue4 residue5 appe2 appe3 taste2 taste3) ln(1)nrep(4000)

nlcom(mean\_price\_neg:-1\*exp([Mean]\_b[price\_neg]+0.5\*[SD]\_b[price\_neg]^2))(sd\_price\_neg:exp([Mean]\_b[price\_neg]+0.5\*[SD]\_b[price\_neg]^2)\*sqrt(exp([SD]\_b[price\_neg]^2)-1))