**Online Appendix (For Online Publication Only)**

Table A1. Distribution of Cumulative Violation Records for Public and Private PWSs across four violation types.

|  |  |  |
| --- | --- | --- |
|   | Public  | Private |
| MCL Violation | 1,424,341 | 528,512 |
|  | 72.94% | 27.06% |
| Non-MCL Violation | 123,922 | 80,921 |
|   | 60.50% | 39.50% |
| MR Violation | 383,991 | 168,268 |
|  | 69.53% | 30.47% |
| Non-MR Violation | 1,164,272 | 441,165 |
|   | 72.52% | 27.48% |
| TT Violation | 1,529,502 | 592,065 |
|  | 72.09% | 27.91% |
| Non-TT Violation | 18,761 | 17,368 |
|   | 51.93% | 48.07% |
| Health-Related Violation | 1,405,536 | 511,077 |
| 73.33% | 26.67% |
| Non-Health-Related Violation | 142,727 | 98,356 |
| 59.20% | 40.80% |

Note: Numbers indicate the cumulative violation records of each violation type and PWS ownership type across 1988-2017. The percentage below each cumulative violation record represents the cumulative violation committed by each ownership type as a percentage of the total cumulative records of that violation type. Note that the violations are not mutually exclusive. It is possible that a PWS has multiple violations at the same time.

Table A2 Full Regression on Different Types of Violation with State Fixed Effects

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|   | Column (1) | Column (2) | Column (3) | Column (4) |
|   | MCL Violations | MR Violations | TT Violations | H. Related Violations |
| Public | 0.00453\*\*\* | -0.0947\*\*\* | 0.000964\*\*\* | 0.00551\*\*\* |
|  | (0.000365) | (0.00380) | (0.000168) | (0.000413) |
| Other | 0.00418\*\*\* | 0.0849\*\*\* | 0.00362\*\*\* | 0.00780\*\*\* |
|  | (0.000725) | (0.00754) | (0.000334) | (0.000819) |
| Large | -0.0628\*\*\* | -0.170\*\* | -0.0201\*\*\* | -0.0830\*\*\* |
|  | (0.00550) | (0.0572) | (0.00253) | (0.00621) |
| Connections | -1.36e-08 | 0.000000198 | 3.30e-08\*\*\* | 1.94e-08 |
|  | (1.03e-08) | (0.000000107) | (4.75e-09) | (1.17e-08) |
| GW | -0.0132\*\*\* | 0.0541\*\*\* | -0.0238\*\*\* | -0.0370\*\*\* |
|  | (0.000525) | (0.00546) | (0.000242) | (0.000593) |
| Daycare | -0.000540 | 0.0628\*\*\* | 0.00165\*\*\* | 0.00109 |
|  | (0.000683) | (0.00711) | (0.000314) | (0.000772) |
| Whole\_saler | -0.00773\*\*\* | -0.0516\*\*\* | -0.00408\*\*\* | -0.0118\*\*\* |
|  | (0.00124) | (0.0129) | (0.000571) | (0.00140) |
| Primacy\_state | -0.0103\*\*\* | -0.708\*\*\* | -0.00226\*\* | -0.0125\*\*\* |
|  | (0.00183) | (0.0190) | (0.000841) | (0.00206) |
| Primacy\_territory | -0.0434 | -0.0997 | 0.0287 | -0.0147 |
|  | (0.0395) | (0.411) | (0.0182) | (0.0447) |
| CWS | 0.0342\*\*\* | 0.377\*\*\* | 0.00593\*\*\* | 0.0401\*\*\* |
|  | (0.000366) | (0.00380) | (0.000168) | (0.000413) |
| NTNCWS | 0.00797\*\*\* | 0.229\*\*\* | 0.00246\*\*\* | 0.0105\*\*\* |
|  | (0.000469) | (0.00488) | (0.000216) | (0.000530) |
| Pop\_cate\_2 | 0.00237\*\*\* | -0.0609\*\*\* | -0.000913\*\*\* | 0.00144\*\* |
|  | (0.000489) | (0.00508) | (0.000225) | (0.000552) |
| Pop\_cate\_3 | 0.00277\*\* | 0.0434\*\*\* | -0.00309\*\*\* | -0.000251 |
|  | (0.000909) | (0.00946) | (0.000418) | (0.00103) |
| Pop\_cate\_4 | -0.00445\*\*\* | 0.0338\*\* | -0.00395\*\*\* | -0.00837\*\*\* |
|  | (0.00113) | (0.0117) | (0.000518) | (0.00127) |
| Public\*Large | 0.0278\*\*\* | 0.238\*\*\* | 0.0135\*\*\* | 0.0414\*\*\* |
|  | (0.00584) | (0.0608) | (0.00269) | (0.00660) |
| Other\*Large | 0.0276 | 0.0317 | 0.00239 | 0.0300 |
|  | (0.0179) | (0.186) | (0.00823) | (0.0202) |
| Constant | 0.0177\*\*\* | 0.571\*\*\* | 0.0220\*\*\* | 0.0398\*\*\* |
|  | (0.00201) | (0.0209) | (0.000926) | (0.00227) |
| N | 6384636 | 6384636 | 6384636 | 6384636 |
| Controls | Yes | Yes | Yes | Yes |
| Time Fixed Effects | Yes | Yes | Yes | Yes |
| State Fixed Effects | Yes |  Yes | Yes | Yes |

Notes: \*\*\* indicates P<0.001, \*\* indicates P<0.05 and \* indicates P<0.1. The dependent variables in Column (1) to (4) are the number of MCL, MR, TT, and Health-Related violations committed by a PWS in a given year, respectively. Standard errors are in the parentheses below the estimated coefficients. Location fixed effects controlled for are at the state level.

Table A3 Full Regression on Different Types of Violation with Municipality Fixed Effects

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|   | Column (1) | Column (2) | Column (3) | Column (4) |
|   | MCL Violations | MR Violations | TT Violations | H. Related Violations |
| Public | 0.00328\*\*\* | -0.0995\*\*\* | 0.000505\*\* | 0.00379\*\*\* |
|  | (0.000404) | (0.00425) | (0.000186) | (0.000456) |
| Other | -0.000177 | 0.178\*\*\* | 0.00102\*\* | 0.000853 |
|  | (0.000769) | (0.00809) | (0.000355) | (0.000868) |
| Large | -0.0528\*\*\* | -0.0484 | -0.0185\*\*\* | -0.0713\*\*\* |
|  | (0.00588) | (0.0618) | (0.00271) | (0.00664) |
| Connections | -7.14e-09 | 0.000000406\*\* | 4.42e-08\*\*\* | 3.70e-08\* |
|  | (1.32e-08) | (0.000000139) | (6.08e-09) | (1.49e-08) |
| GW | -0.0138\*\*\* | 0.100\*\*\* | -0.0211\*\*\* | -0.0349\*\*\* |
|  | (0.000596) | (0.00626) | (0.000274) | (0.000672) |
| Daycare | -0.00229\*\* | 0.0258\*\*\* | 0.00172\*\*\* | -0.000587 |
|  | (0.000714) | (0.00750) | (0.000329) | (0.000805) |
| Whole\_saler | 0.00293\* | -0.122\*\*\* | -0.000684 | 0.00226 |
|  | (0.00143) | (0.0150) | (0.000657) | (0.00161) |
| Primacy\_state | 0.0172\*\*\* | -0.375\*\*\* | -0.000592 | 0.0167\*\*\* |
|  | (0.00323) | (0.0340) | (0.00149) | (0.00365) |
| Primacy\_territory | 0.0796\*\*\* | 1.034\*\*\* | 0.0395\*\*\* | 0.119\*\*\* |
|  | (0.0119) | (0.125) | (0.00547) | (0.0134) |
| CWS | 0.0345\*\*\* | 0.396\*\*\* | 0.00549\*\*\* | 0.0400\*\*\* |
|  | (0.000400) | (0.00421) | (0.000184) | (0.000452) |
| NTNCWS | 0.00757\*\*\* | 0.259\*\*\* | 0.00272\*\*\* | 0.0103\*\*\* |
|  | (0.000495) | (0.00521) | (0.000228) | (0.000559) |
| Pop\_cate\_2 | 0.00398\*\*\* | -0.0182\*\*\* | -0.00114\*\*\* | 0.00282\*\*\* |
|  | (0.000519) | (0.00546) | (0.000239) | (0.000586) |
| Pop\_cate\_3 | 0.00636\*\*\* | 0.0919\*\*\* | -0.000996\* | 0.00543\*\*\* |
|  | (0.000980) | (0.0103) | (0.000452) | (0.00111) |
| Pop\_cate\_4 | -0.000103 | 0.0876\*\*\* | -0.00105 | -0.00111 |
|  | (0.00121) | (0.0127) | (0.000558) | (0.00137) |
| Public\*Large | 0.0206\*\*\* | 0.121 | 0.0129\*\*\* | 0.0336\*\*\* |
|  | (0.00622) | (0.0654) | (0.00287) | (0.00702) |
| Other\*Large | 0.00909 | -0.315 | 0.00391 | 0.0130 |
|  | (0.0185) | (0.195) | (0.00853) | (0.0209) |
| Constant | -0.00998\*\* | 0.173\*\*\* | 0.0180\*\*\* | 0.00795\* |
|  | (0.00333) | (0.0350) | (0.00153) | (0.00376) |
| N | 6344662 | 6344662 | 6344662 | 6344662 |
| Controls | Yes | Yes | Yes | Yes |
| Time Fixed Effects | Yes | Yes | Yes | Yes |
| Location Fixed Effects | Yes |  Yes | Yes | Yes |

Notes: \*\*\* indicates P<0.001, \*\* indicates P<0.05 and \* indicates P<0.1. Standard errors are in the parentheses below the estimated coefficients. The dependent variables in Column (1) to (4) are the number of MCL, MR, TT, and Health-Related violations committed by a PWS in a given year, respectively. Location fixed effects controlled for are at the Municipal level.

Table A4 Tobit Regression Results of Water Quality Violation based on the Cumulative Violation

|  |  |  |  |
| --- | --- | --- | --- |
|  | Column (1) | Column (2) | Column (3) |
| Panel A: MCL Violation |
| Public | 0.126\*\*\* | 0.0323\*\* | 0.0302\*\* |
|  | (0.0107) | (0.0107) | (0.0107) |
| Other | -0.250\*\*\* | -0.145\*\*\* | -0.146\*\*\* |
|  | (0.0205) | (0.0213) | (0.0213) |
| Large | 0.145\* | 0.198\*\* | -0.440\* |
|  | (0.0678) | (0.0654) | (0.192) |
| Public\*Large |  |  | 0.723\*\*\* |
|  |  |  | (0.203) |
| Other\*Large |  |  | 1.084 |
|  |  |  | (0.567) |
| Constant | -1.163\*\*\* | -1.294\*\*\* | -1.293\*\*\* |
|  | (0.0552) | (0.0689) | (0.0689) |
| N | 366188 | 366188 | 366188 |
| Panel B: MR Violation |
| Public | 0.0203\*\* | -0.0178\*\* | -0.0195\*\* |
|  | (0.00628) | (0.00619) | (0.00620) |
| Other | -0.335\*\*\* | -0.245\*\*\* | -0.246\*\*\* |
|  | (0.0119) | (0.0124) | (0.0124) |
| Large | 0.184\*\*\* | 0.281\*\*\* | -0.177 |
|  | (0.0389) | (0.0373) | (0.101) |
| Public\*Large |  |  | 0.526\*\*\* |
|  |  |  | (0.108) |
| Other\*Large |  |  | 0.818\*\* |
|  |  |  | (0.312) |
| Constant | 0.0740\* | 0.503\*\*\* | 0.504\*\*\* |
|  | (0.0333) | (0.0389) | (0.0389) |
| N | 366188 | 366188 | 366188 |
| Panel C: TT Violation |
| Public | 0.217\*\*\* | 0.0953\*\*\* | 0.0931\*\*\* |
|  | (0.0208) | (0.0207) | (0.0208) |
| Other | -0.457\*\*\* | -0.278\*\*\* | -0.278\*\*\* |
|  | (0.0486) | (0.0507) | (0.0507) |
| Large | -0.0751 | 0.173 | -0.149 |
|  | (0.101) | (0.0979) | (0.263) |
| Public\*Large |  |  | 0.378 |
|  |  |  | (0.282) |
| Other\*Large |  |  | 0.0148 |
|  |  |  | (1.046) |
| Constant | -2.518\*\*\* | -1.023\*\*\* | -1.023\*\*\* |
|  | (0.104) | (0.116) | (0.116) |
| N | 366188 | 366188 | 366188 |
| Panel D: Health-Related Violation |
| Public | 0.134\*\*\* | 0.0432\*\*\* | 0.0415\*\*\* |
|  | (0.00971) | (0.00969) | (0.00970) |
| Other | -0.272\*\*\* | -0.164\*\*\* | -0.165\*\*\* |
|  | (0.0188) | (0.0195) | (0.0195) |
| Large | 0.164\*\* | 0.240\*\*\* | -0.234 |
|  | (0.0587) | (0.0567) | (0.158) |
| Public\*Large |  |  | 0.541\*\* |
|  |  |  | (0.168) |
| Other\*Large |  |  | 0.863 |
|  |  |  | (0.496) |
| Constant | -0.777\*\*\* | -0.491\*\*\* | -0.490\*\*\* |
|  | (0.0503) | (0.0602) | (0.0602) |
| N | 366188 | 366188 | 366188 |
| Controls | Yes | Yes | Yes |
| Location Fixed Effects  |  | Yes | Yes |

Notes: \*\*\* indicates P<0.001, \*\* indicates P<0.05 and \* indicates P<0.1. Standard errors are in the parentheses below the estimated coefficients. The dependent variable is the cumulative number of MCL violations committed by a PWS throughout the period of 1988-2017. Location fixed effects controlled for are at the municipal level.

Table A5 Water System Ownership and Type

|  |  |  |
| --- | --- | --- |
|  | Private | Public |
| CWS | 44,834 | 30,793 |
|  | 59.28% | 40.72% |
| NTNCWS | 32,655 | 10,035 |
|  | 76.49% | 23.51% |
| TNCWS | 172,998 | 25,923 |
|  | 86.97% | 13.03% |
| Total | 250,487 | 66,751 |
|  | 78.96% | 21.04% |

Note: Table A5 illustrates the relationship between PWS ownership and PWS type in the sample used in our analysis. The numbers below counts are percentages. From the table, the percentage of publicly owned PWSs is much greater among CWS than among NTNCWS and TNCWS.