Supplemental online material

for

# Serving the Public as Civil Servants or Citizens? Public Employees' Exposure to Public Participation, Job Satisfaction, and Volunteering

This Supplemental online material includes:

S1. Survey Sampling, Administration, and Weighting;

S2. Bivariate Correlation Matrix;

S3. Zero-inflation and Overdispersion;

S4. Common Method Variance Analysis;

S5. Robustness Check for Model Results without Control Variables;

S6. Alternative Models Diagnostics Comparison;

S7. Robustness Check for Hurdle Negative Binomial Model Results by Comparing to Alternative Model Specifications;

S8. Robustness Check for Selection Bias;

S9. Endogeneity Check Results.

S1. Survey Sampling, Administration, and Weighting

This cross-sectional survey, conducted in 2018, represents the fifth wave of a multi-year research project on public managers in local governments. Previous waves were conducted in 2010, 2012, 2014, and 2016. The initial sampling frame was developed in 2010 based on city population and has been updated across the subsequent waves. For the 2018 survey, the research team used this existing sampling frame, incorporating updates from the prior waves.

In spring 2018, the research team reviewed city department websites to verify whether the public managers who had been sampled in earlier surveys were still serving in the same positions. They updated contact and demographic information for individuals who had changed positions and confirmed existing information for those who remained. When information was not available online, the researchers contacted municipal offices directly to confirm the information of department directors across five departments.

The distribution of cities in the sampling frame is heavily skewed toward smaller cities: 84% are small-sized cities (population 25,000–100,000), while only 16% are medium-sized cities (population 100,000–250,000). Given that larger cities typically have more resources and capacity to support citizen engagement and that residents in larger cities are generally more likely to engage in civic activities, the research team employed a stratified probability sampling strategy to develop sample frame. The research team selected a census of all medium-sized cities (n = 184) and drew a proportional sample of 316 small-sized cities.

Among the small-sized cities, the proportional sample included:

- 59% from cities with populations between 25,000 and 50,000,
- 28% from cities with populations between 50,000 and 75,000, and
- 13% from cities with populations between 75,000 and 100,000.

Table S1.1 below presents a detailed breakdown of the sampling strategy used to select the

500 cities included in this study.

Table S1.1. Sampling Strategy

| City types | City population | Number of cities | Proportion over all cities | Proportion in small-size cities strata* | Number of sampling cities | Proportion of sampling small-size cities in strata | Total sample |
|---|---|---|---|---|---|---|---|
| Small-size (25k-100k) | 25-50k | 591 | 50% | 59% | 186 | 59% | 186 |
| | 50-75k | 278 | 23% | 28% | 88 | 28% | 88 |
| | 75-100k | 133 | 11% | 13% | 42 | 13% | 42 |
| Medium-size (100k-250k) | 100k-125k | 68 | 6% | | | | 68 |
| | 125-150k | 37 | 3% | | | | 37 |
| | 150-175k | 23 | 2% | | | | 23 |
| | 175-200k | 28 | 2% | | | | 28 |
| | 200-225k | 18 | 2% | | | | 18 |
| | 225k-250k | 10 | 1% | | | | 10 |
| Totals | | 1186 | 100% | 100% | 316 | 100% | 500 |

*There are 1002 small-size cities in total.

The survey was administered online using Sawtooth Software®. Before sending survey invitation to public managers through email, the research team verified the validity of email addresses with PING. A pre-notification email was sent on April 6th, 2018 to notify sampled public managers that they would soon receive a survey invitation. An email invitation (including unique ID, passwords, and hyperlink to the survey) was sent on April 18th, 2018. To boost response rate, six reminder emails were sent at ten-day intervals between April 30th to June 27th, 2018. Additionally, follow-up phone calls were made to nonrespondents between the fourth and final reminders. The survey was closed on August 7th, 2018. After removing invalid email addresses (i.e., undeliverable emails during PING check and email communication) and ineligible managers (i.e., those who retired or left their positions), the final valid sample consist of 2,178 eligible managers.

Survey data were weighted to correct for differences between the sampled individuals and the population within each city population stratum used in the stratified probability sampling

design. The research team calculated sampling weights by comparing the proportion of targeted individuals in each city size grouping within the population to the proportion of sampled individuals from those groupings in the final sample. Table S1.2 presents the rationale and calculation of these sampling weights. The sampling weights were applied in all statistical modeling in this study to ensure representativeness and reduce potential bias.

Table S1.2. Weighting Process

| City types | Weighting factor (city population) | # targeted individual in the population | % population | # sampled individual | % sample | Weight (%population / % sample) | # cities in population | # sampled cities | Sampling weight |
|---|---|---|---|---|---|---|---|---|---|
| Small-size (25k-100k) | 25-50k | 2955 | 0.498313659 | 930 | 0.372 | 1.33955285 | 591 | 186 | 3.177419 |
| | 50-75k | 1390 | 0.234401349 | 440 | 0.176 | 1.33182585 | 278 | 88 | 3.159091 |
| | 75-100k | 665 | 0.112141653 | 210 | 0.084 | 1.33501967 | 133 | 42 | 3.166667 |
| Medium-size (100k-250k) | 100-125k | 340 | 0.057335582 | 340 | 0.136 | 0.42158516 | 68 | 68 | 1 |
| | 125-150k | 185 | 0.031197302 | 185 | 0.074 | 0.42158516 | 37 | 37 | 1 |
| | 150-175k | 115 | 0.019392917 | 115 | 0.046 | 0.42158516 | 23 | 23 | 1 |
| | 175-200k | 140 | 0.023608769 | 140 | 0.056 | 0.42158516 | 28 | 28 | 1 |
| | 200-225k | 90 | 0.015177066 | 90 | 0.036 | 0.42158516 | 18 | 18 | 1 |
| | 225-250k | 50 | 0.008431703 | 50 | 0.02 | 0.42158516 | 10 | 10 | 1 |
| Totals | | 5930 | 100% | 2500 | 100% | | 1186 | 500 | |

S2. Bivariate Correlation Matrix

Table S2. Bivariate Correlation Matrix

| Variables | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 Volunteer hours | 1 | | | | | | | | | | | | | | | | |
| 2 Volunteer diversity | 0.40*** | 1 | | | | | | | | | | | | | | | |
| 3 Public participation exposure | 0.09* | 0.08* | 1 | | | | | | | | | | | | | | |
| 4 Job satisfaction | 0.16* | 0.13 | 0.17 | 1 | | | | | | | | | | | | | |
| 5 Working experience in public sector | 0.01 | -0.01 | 0.01 | 0.17* | 1 | | | | | | | | | | | | |
| 6 Education | 0.04 | 0.01 | 0.15*** | 0.07 | -0.11** | 1 | | | | | | | | | | | |
| 7 Salary | 0.01 | 0.03 | 0.10* | 0.30*** | 0.27*** | 0.21*** | 1 | | | | | | | | | | |
| 8 Age | -0.01 | -0.07 | -0.04 | 0.14 | 0.67*** | -0.10* | 0.20*** | 1 | | | | | | | | | |
| 9 Parental status | -0.07 | -0.03 | 0.03 | -0.03 | -0.50*** | 0.11** | -0.21*** | -0.67*** | 1 | | | | | | | | |
| 10 Gender (1=female, 0 = male) | -0.13*** | -0.01 | 0.05 | -0.09 | -0.15*** | 0.05 | -0.14*** | -0.07 | 0.07 | 1 | | | | | | | |
| 11 Race: white (1=white, 0=other) | -0.09* | -0.02 | -0.02 | 0.05 | 0.06 | -0.08 | 0.04 | -0.05 | -0.02 | -0.01 | 1 | | | | | | |
| 12 Department size | 0.09* | 0.18*** | 0.15*** | 0.14 | 0.13*** | 0.05 | 0.15*** | 0.11*** | -0.21*** | -0.10* | -0.06 | 1 | | | | | |
| 13 Department types: Mayor's office (1=yes, 0=no) | 0.01 | -0.01 | 0.20*** | 0.19** | 0.05 | 0.16*** | 0.20*** | 0.02 | -0.02 | -0.06 | -0.01 | 0.14*** | 1 | | | | |
| 14 Department types: Community Development (1=yes, 0=no) | -0.004 | -0.02 | 0.03 | -0.17* | -0.10* | 0.07 | -0.15*** | 0.02 | -0.01 | 0.10* | -0.06 | -0.12*** | -0.25*** | 1 | | | |
| 15 Department types: Parks and Recreation (1=yes, 0=no) | 0.05 | 0.05 | -0.05 | -0.06 | 0.04 | -0.05 | -0.08 | -0.01 | 0.07 | 0.09* | -0.01 | 0.02 | -0.22*** | -0.28*** | 1 | | |
| 16 Department types: Police (1=yes, 0=no) | 0.11** | 0.12*** | -0.03 | 0.12 | 0.21*** | -0.12*** | 0.03 | -0.04 | -0.09* | -0.22*** | 0.01 | 0.08* | -0.22*** | -0.29*** | -0.25*** | 1 | |
| 17 Department types: Finance (1=yes, 0=no) | -0.17*** | -0.15*** | -0.13*** | -0.07 | -0.19*** | -0.06 | 0.03 | 0.001 | 0.06 | 0.07 | 0.08 | -0.11* | -0.22*** | -0.28*** | -0.24*** | -0.25*** | 1 |
| 18 City-level NGO density (per 10,000 population) | -0.07 | -0.002 | 0.01* | -0.05 | 0.01 | -0.03 | -0.12** | -0.01 | -0.02 | -0.03 | 0.06 | 0.04 | -0.004 | 0.04 | -0.005 | -0.017 | -0.02 |

*Note: *p<0.05, **p<0.01, ***p<0.005. Spearman correlation analysis is used as it does not require variables to conform to a normal distribution and does not require a linear relationship between variables.*

S3. Zero-inflation and Overdispersion

The two indicators of the dependent variable, *volunteering hours* and *volunteering diversity*, are count variables that take nonnegative integer values. They exhibit a right-skewed distribution with excessive zero values (see figure S3). Among the respondents, 22.5% reported volunteering zero hours in a typical week, while 15.5% did not volunteer for any external organization. Most respondents volunteer between zero and two hours in a typical week and engage with zero to three types of organizations. A small proportion of respondents contribute more hours or participate in various organizations. Both *volunteering hours* and *volunteering diversity* show over-dispersion in their distribution. This is evident as the variance of *volunteering hours* (15.8) exceeds its mean (3.3), and the variance of *volunteering diversity* (1.6) exceeds its mean (1.5).

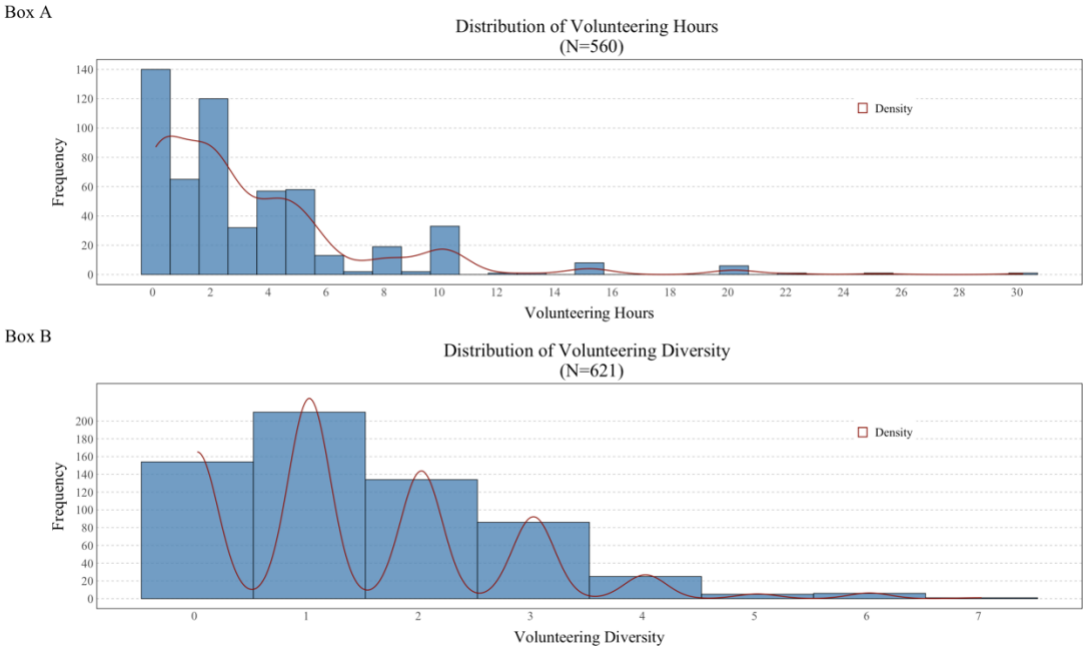


Figure S3. Distribution of dependent variables: volunteering hours and volunteering diversity

S4. Common Method Variance Analysis

This study incorporates several strategies to minimize common method variance (CMV) and social desirability bias (Podsakoff et al. 2003). First, during the survey design phase, survey questions related to public participation, job satisfaction, and volunteering were placed in different sections of the questionnaire. Only job satisfaction items are psychologically perceptual constructs, while the items concerning public participation and volunteering encourage respondents to reflect on the objective reality of their behaviors and organizations. The physical separation of questions makes it unlikely that respondents will connect their answers across these three constructs. Second, survey items relevant to public participation, job satisfaction, and volunteering are well-tested and commonly used in research, ensuring measurement validity. Third, the research team collected the data as an independent, third-party research institution without collaborating with local authorities, promising data confidentiality and respondents' anonymity. Fourth, I include data from other institutional sources, including department types, city population, and city-level NGO density, to reduce bias stemming from CMV.

I conduct Harman's one-factor analysis as a *post hoc* remedy to check CMV. All survey items used in measurement were included in the test. I used the both Principal Components Analysis and Principal Axis Factoring method to detect five latent factors. Results show that the proportion of variance explained by the first latent factor is 24% or 35% (see table S4), which indicates that the factor only explains 24% or 35% of variance in these survey items. Problematic common method variance only occurs when the single factor accounts for more than 50% of the variance among the survey items. The result indicates that no general single factor accounts for 50% or more of the variance among all survey items in the dataset (Fuller et al. 2016). Thus, the test result indicates that common method variance is not a significant concern for this study.

Table S4 Proportion of Variance Explained by Latent Factors

| Proportion of variance explained | Latent factor 1 | Latent factor 2 | Latent factor 3 | Latent factor 4 | Latent factor 5 |
|---|---|---|---|---|---|
| Principal Components Analysis | 0.24 | 0.23 | 0.21 | 0.18 | 0.14 |
| Principal Axis Factor | 0.35 | 0.29 | 0.20 | 0.09 | 0.06 |

*Note: Both Principal Components Analysis(PCA) and Principal Axis Factor (PAF) method was utilized to extract five latent factor. All variables are standardized. The included variables are volunteering hours, volunteering diversity, two items for exposure to public participation, three items for job satisfaction, work experience in public sector, education, salary, age, gender, race: white, department size.*

## S5. Robustness Check for Model Results without Control Variables

### Table S5 Model Results without Control Variables

| Outcome Variable | Volunteering Hours | | Volunteering Diversity | | Volunteering Hours | | Volunteering Diversity | | Volunteering Hours | | Volunteering Diversity | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Count model | Baseline | Model 1: Controls | Baseline | Model 2: Controls | Baseline | Model 3: Controls | Baseline | Model 4: Controls | Baseline | Model 5: Controls | Baseline | Model 6: Controls |
| Public participation | 1.08* (1.01, 1.16) | 1.09* (1.02, 1.16) | 1.17*** (1.10, 1.24) | 1.13*** (1.06, 1.21) | | | | | 0.71 (0.26, 1.93) | 7.19** (1.99, 26.01) | 3.18 (0.60, 16.79) | 23.11** (2.97, 180.01) |
| Job satisfaction | | | | | 0.93 (0.75, 1.16) | 0.76** (0.62, 0.92) | 1.82*** (1.34, 2.47) | 1.50** (1.07, 2.10) | 0.70 (0.40, 1.22) | 1.64 (0.83, 3.21) | 2.71* (1.02, 7.20) | 5.98** (1.92, 18.68) |
| Public Participation × Job Satisfaction | | | | | | | | | 1.12 (0.91, 1.39) | 0.70** (0.54, 0.92) | 0.83 (0.58, 1.17) | 0.53** (0.35, 0.82) |
| Constant | 3.00*** (2.50, 3.60) | 1.87 (0.75, 4.66) | 0.97 (0.81, 1.17) | 0.58 (0.23, 1.47) | 4.34** (1.58, 11.96) | 1.77 (0.49, 6.36) | 0.08*** (0.02, 0.33) | 0.26 (0.03, 2.49) | 9.37 (0.69, 127.54) | 0.04 (0.00, 1.37) | 0.01* (0.00, 0.63) | 0.00*** (0.00, 0.07) |
| Zero-hurdle model | | | | | | | | | | | | |
| Public participation | 1.3** (1.13, 1.50) | 1.20* (1.03, 1.41) | 1.08 (0.95, 1.23) | 0.98 (0.83, 1.17) | | | | | 2.34 (0.14, 39.30) | 42.57* (1.14, 1804.20) | 23.68* (1.26, 443.37) | 103.82* (1.40, 10461.20) |
| Job satisfaction | | | | | 4.08*** (2.52, 6.60) | 4.06*** (2.35, 7.22) | 1.18 (0.75, 1.84) | 2.63** (1.39, 5.12) | 5.28* (1.20, 23.27) | 21.3** (3.53, 141.70) | 5.04* (1.20, 21.11) | 20.16** (2.64, 171.13) |
| Public Participation × Job Satisfaction | | | | | | | | | 0.85 (0.46, 1.56) | 0.44* (0.20, 0.96) | 0.53* (0.29, 0.99) | 0.37* (0.14, 0.93) |
| Constant | 1.65** (1.17, 2.33) | 13.73* (1.67, 115.88) | 2.56*** (1.84, 3.57) | 70.74*** (6.96, 753.24) | 0.01*** (0.00, 0.05) | 0.06 (0.00, 3.37) | 1.46 (0.19, 11.31) | 148.81* (1.20, $23.56\times10^3$) | 0.00 (0.00, 1.10) | 0.00* (0.00, 0.39) | 0.00* (0.00, 0.81) | 0.00 (0.00, 390.77) |
| Control variables | No | Yes | No | Yes | No | Yes | No | Yes | No | Yes | No | Yes |
| Observation | 524 | 499 | 581 | 519 | 173 | 166 | 187 | 173 | 160 | 154 | 173 | 161 |
| R2 (R2 adjusted) | 0.064 (0.060) | 0.396 (0.377) | 0.010 (0.007) | 0.068 (0.040) | 0.064 (0.053) | 0.330 (0.263) | 0.014 (0.003) | 0.142 (0.060) | 0.154 (0.132) | 0.386 (0.310) | 0.037 (0.014) | 0.154 (0.053) |

Note: 95% Confidence Interval in parentheses. *p < 0.05, **p < 0.01, ***p < 0.001. To ensure comparability of coefficients across models, , I report the incidence rate ratio as coefficient for each model. In models 1 and 2, although the magnitude of association change slightly between baseline models and models with covariates, the direction of association on variables of interests does not change, and their association are still significant. In model 3' count model model 4' zero-hurdle model, the association of job satisfaction and volunteering outcomes become significant after controlling covariates. In model 5 and model 6's count model, the interacting effect become significant after controlling covariates. All the results indicate that the findings are robust.

## S6. Alternative Models Diagnostics Comparison

Table S6.1 Models Diagnostics Comparison for Model 1

| Model 1 (N=499) | Expected zero | Ratio | Dispersion | $R^2$ ($R^2$ adjusted) | Log-likelihood | Akaike's information criterion (AIC) |
|---|---|---|---|---|---|---|
| OLS | 8 | 16.25 | 31.782 | 0.091 (0.055) | -1392.063 | 2816.126 |
| Logistics | 108 | 1.204 | 2.376 | 0.074 | -568.203 | 1166.405 |
| Poisson | 236 | 0.551 | 0.583 | 0.07 | -1094.521 | 2219.042 |
| NB | 112 | 1.161 | 2.432 | 0.182 | -2630.932 | 5293.863 |
| Zero-inflated Poisson | 120 | 1.083 | 4.699 | 0.247 (0.224) | -2898.954 | 5857.908 |
| Zero-inflated NB | 121 | 1.074 | 2.427 | 0.432 (0.415) | -2568.306 | 5198.612 |
| Hurdle Poisson | 121 | 1.074 | 4.702 | 0.247 (0.224) | -2900.36 | 5860.719 |
| Model 1: Hurdle NB | 121 | 1.074 | 2.584 | 0.396 (0.377) | -2580.471 | 5222.943 |

Note: This table presents a diagnostics comparison of alternative models for Model 1, which examines the effect of public participation on volunteering hours using a Hurdle Negative Binomial regression, with additional covariates controlled. "NB" denotes Negative Binomial model. The table reports model diagnostics including the number of expected zeros, the ratio of expected to observed zeros, dispersion statistics, $R^2$ (and adjusted $R^2$ where applicable), log-likelihood, and AIC. The observed number of zero value in dependent variable in the analyzed dataset for Model 1 is 131. The expected number of zeros is estimated based on each model's fitted values, and the ratio represents the expected zeros divided by the observed zeros. Diagnostics results show that Hurdle NB is better and desirable.

Table S6.2 Models Diagnostics Comparison for Model 2

| Model 2 (N=519) | Expected zero | Ratio | Dispersion | R2 (R2 adjusted) | Log-likelihood | Akaike's information criterion (AIC) |
|---|---|---|---|---|---|---|
| OLS | 69 | 2.058 | 3.037 | 0.092 (0.067) | -838.245 | 1708.49 |
| Logistics | 110 | 1.291 | 2.395 | 0.077 | -499.075 | 1028.151 |
| Poisson | 119 | 1.193 | 2.009 | 0.194 | -1761.102 | 3552.204 |
| NB | 200 | 0.71 | 2.009 | 0.194 | -1761.108 | 3554.216 |
| Zero-inflated Poisson | 119 | 1.193 | 4.994 | 0.023 (0.004) | -1787.986 | 3615.973 |
| Zero-inflated NB | 123 | 1.154 | 1.913 | 0.104 (0.077) | -1719.913 | 3491.827 |
| Hurdle Poisson | 97 | 1.464 | 2.37 | 0.068 (0.040) | -1709.857 | 3479.713 |
| Model 2: Hurdle NB | 97 | 1.464 | 2.375 | 0.068 (0.040) | -1709.858 | 3481.716 |

Note: This table presents a diagnostics comparison of alternative models for Model 2, which examines the effect of public participation on volunteering diversity using a Hurdle Negative Binomial regression, with additional covariates controlled. "NB" denotes Negative Binomial model. The table reports model diagnostics including the number of expected zeros, the ratio of expected to observed zeros, dispersion statistics, $R^2$ (and adjusted $R^2$ where applicable), log-likelihood, and AIC. The observed number of zero value in dependent variable in the analyzed dataset for Model 2 is 142. The expected number of zeros is estimated based on each model's fitted values, and the ratio represents the expected zeros divided by the observed zeros. Diagnostics results show that Hurdle NB is better and desirable.

Table S6.3 Models Diagnostics Comparison for Model 3

| Model 3 (N=166) | Expected zero | Ratio | Dispersion | R2 (R2 adjusted) | Log-likelihood | Akaike's information criterion (AIC) |
|---|---|---|---|---|---|---|
| OLS | 10 | 4.1 | 12.446 | 0.190 (0.114) | -376.374 | 784.747 |
| Logistics | 36 | 1.139 | 2.844 | 0.171 | -183.449 | 396.898 |
| Poisson | 21 | 1.952 | 4.817 | 0.666 | -830.358 | 1690.717 |
| NB | 48 | 0.854 | 2.493 | 0.445 | -783.949 | 1599.897 |
| Zero-inflated Poisson | 44 | 0.932 | 2.997 | 0.321 (0.254) | -733.813 | 1527.626 |
| Zero-inflated NB | 42 | 0.976 | 2.351 | 0.283 (0.237) | -697.724 | 1575.959 |
| Hurdle Poisson | 43 | 0.953 | 3.131 | 0.316 (0.247) | -730.575 | 1521.149 |
| Model 3: Hurdle NB | 43 | 0.953 | 2.945 | 0.330 (0.263) | -729.287 | 1520.574 |

Note: This table presents a diagnostics comparison of alternative models for Model 3, which examines the effect of job satisfaction on volunteering hours using a Hurdle Negative Binomial regression, with additional covariates controlled. "NB" denotes Negative Binomial model. The table reports model diagnostics including the number of expected zeros, the ratio of expected to observed zeros, dispersion statistics, $R^2$ (and adjusted $R^2$ where applicable), log-likelihood, and AIC. The observed number of zero value in dependent variable in the analyzed dataset for Model 3 is 41. The expected number of zeros is estimated based on each model's fitted values, and the ratio represents the expected zeros divided by the observed zeros. Diagnostics results show that Hurdle NB is better and desirable.

Table S6.4 Models Diagnostics Comparison for Model 4

| Model 4 (N=173) | Expected zero | Ratio | Dispersion | R2 (R2 adjusted) | Log-likelihood | Akaike's information criterion (AIC) |
|---|---|---|---|---|---|---|
| OLS | 29 | 1.517 | 2.584 | 0.204 (0.133) | -255.694 | 543.387 |
| Logistics | 37 | 1.189 | 2.471 | 0.24 | -154.396 | 338.792 |
| Poisson | 50 | 0.88 | 1.851 | 0.402 | -560.506 | 1151.013 |
| NB | 74 | 0.595 | 1.85 | 0.402 | -560.509 | 1153.019 |
| Zero-inflated Poisson | 51 | 0.863 | 1.93 | 0.107 (0.064) | -570.082 | 1172.165 |
| Zero-inflated NB | 51 | 0.863 | 1.942 | 0.107 (0.064) | -570.082 | 1174.165 |
| Hurdle Poisson | 39 | 1.128 | 2.498 | 0.142 (0.060) | -501.589 | 1063.178 |
| Model 4: Hurdle NB | 39 | 1.128 | 2.516 | 0.142 (0.060) | -501.589 | 1065.179 |

Note: This table presents a diagnostics comparison of alternative models for Model 4, which examines the effect of job satisfaction on volunteering diversity using a Hurdle Negative Binomial regression, with additional covariates controlled. "NB" denotes Negative Binomial model. The table reports model diagnostics including the number of expected zeros, the ratio of expected to observed zeros, dispersion statistics, $R^2$ (and adjusted $R^2$ where applicable), log-likelihood, and AIC. The observed number of zero value in dependent variable in the analyzed dataset for Model 3 is 44. The expected number of zeros is estimated based on each model's fitted values, and the ratio represents the expected zeros divided by the observed zeros. Diagnostics results show that Hurdle NB is better and desirable.

Table S6.5 Models Diagnostics Comparison for Model 5

| Model 5 (N=154) | Expected zero | Ratio | Dispersion | R2 (R2 adjusted) | Log-likelihood | Akaike's information criterion (AIC) |
|---|---|---|---|---|---|---|
| OLS | 11 | 3.455 | 11.242 | 0.226 (0.136) | -338.119 | 712.237 |
| Logistics | 33 | 1.152 | 2.891 | 0.177 | -172.403 | 378.805 |
| Poisson | 22 | 1.727 | 4.292 | 0.721 | -745.411 | 1524.821 |
| NB | 47 | 0.809 | 2.44 | 0.538 | -716.054 | 1468.108 |
| Zero-inflated Poisson | 38 | 1 | 3.271 | 0.375 (0.297) | -653.413 | 1374.825 |
| Zero-inflated NB | 38 | 1 | 3.299 | 0.375 (0.297) | -653.413 | 1376.825 |
| Hurdle Poisson | 41 | 0.927 | 2.883 | 0.386 (0.310) | -651.126 | 1370.252 |
| Model 5: Hurdle NB | 41 | 0.927 | 2.907 | 0.386 (0.310) | -651.126 | 1372.252 |

Note: This table presents a diagnostics comparison of alternative models for Model 5, which examines the interacting effect of public participation and job satisfaction on volunteering hours using a Hurdle Negative Binomial regression, with additional covariates controlled. "NB" denotes Negative Binomial model. The table reports model diagnostics including the number of expected zeros, the ratio of expected to observed zeros, dispersion statistics, $R^2$ (and adjusted $R^2$ where applicable), log-likelihood, and AIC. The observed number of zero value in dependent variable in the analyzed dataset for Model 5 is 38. The expected number of zeros is estimated based on each model's fitted values, and the ratio represents the expected zeros divided by the observed zeros. Diagnostics results show that Hurdle NB is better and desirable.

Table S6.6 Models Diagnostics Comparison for Model 6

| Model 6 (N=161) | Expected zero | Ratio | Dispersion | R2 (R2 adjusted) | Log-likelihood | Akaike's information criterion (AIC) |
|---|---|---|---|---|---|---|
| OLS | 28 | 1.464 | 2.52 | 0.233 (0.148) | -232.693 | 501.387 |
| Logistics | 35 | 1.171 | 2.539 | 0.258 | -145.531 | 325.062 |
| Poisson | 49 | 0.837 | 1.872 | 0.451 | -519.292 | 1072.584 |
| NB | 71 | 0.577 | 1.872 | 0.451 | -519.296 | 1074.591 |
| Zero-inflated Poisson | 48 | 0.854 | 1.897 | 0.113 (0.067) | -534.37 | 1100.74 |
| Zero-inflated NB | 48 | 0.854 | 1.91 | 0.113 (0.067) | -534.373 | 1102.746 |
| Hurdle Poisson | 38 | 1.079 | 2.776 | 0.154 (0.053) | -459.3 | 986.601 |
| Model 6: Hurdle NB | 38 | 1.079 | 2.798 | 0.154 (0.053) | -459.3 | 988.601 |

Note: This table presents a diagnostics comparison of alternative models for Model 5, which examines the interacting effect of public participation and job satisfaction on volunteering diversity using a Hurdle Negative Binomial regression, with additional covariates controlled. "NB" denotes Negative Binomial model. The table reports model diagnostics including the number of expected zeros, the ratio of expected to observed zeros, dispersion statistics, $R^2$ (and adjusted $R^2$ where applicable), log-likelihood, and AIC. The observed number of zero value in dependent variable in the analyzed dataset for Model 6 is 41. The expected number of zeros is estimated based on each model's fitted values, and the ratio represents the expected zeros divided by the observed zeros. Diagnostics results confirm that Hurdle NB is better and desirable.

S7. Robustness Check for Hurdle Negative Binomial Model Results by Comparing to Alternative Model Specifications

Table S7.1 Model Specifications on Effect of Public Participation on Volunteering Hours

| | OLS | Logistic | Poisson | NB | ZI Poisson | | ZINB | | H Poisson | Model 1: HNB |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Count model | ZI model | Count model | ZI model | Count model | Count model |
| Public participation | 0.30 | 1.20* | 1.10*** | 1.13** | 1.06** | 0.84* | 1.09** | 0.67* | 1.06** | 1.09* |
| | (-0.06, 0.66) | (1.03, 1.41) | (1.06, 1.13) | (1.06, 1.21) | (1.03, 1.10) | (0.71, 0.99) | (1.02, 1.17) | (0.47, 0.97) | (1.03, 1.10) | (1.02, 1.16) |
| Work experience in public sector | -0.04 | 0.98 | 0.99*** | 0.99** | 0.99** | 1.03 | 0.99 | 1.09** | 0.99** | 0.99 |
| | (-0.10, 0.01) | (0.95, 1.00) | (0.98, 0.99) | (0.98, 1.00) | (0.99, 1.00) | (1.00, 1.05) | (0.98, 1.00) | (1.03, 1.15) | (0.99, 1.00) | (0.98, 1.00) |
| Education | 0.33 | 1.01 | 1.11*** | 1.12 | 1.14*** | 1.08 | 1.29*** | 4.51*** | 1.13*** | 1.19** |
| | (-0.28, 0.93) | (0.78, 1.31) | (1.05, 1.18) | (0.99, 1.26) | (1.07, 1.22) | (0.81, 1.44) | (1.15, 1.45) | (2.06, 9.86) | (1.06, 1.20) | (1.06, 1.35) |
| Salary | -0.29 | 1.13 | 0.91*** | 0.89** | 0.86*** | 0.82* | 0.81*** | 0.42*** | 0.86*** | 0.83*** |
| | (-0.66, 0.08) | (0.97, 1.32) | (0.88, 0.95) | (0.82, 0.96) | (0.83, 0.89) | (0.70, 0.98) | (0.75, 0.87) | (0.28, 0.64) | (0.83, 0.90) | (0.76, 0.89) |
| Gender: Female | -0.81* | 0.59** | 0.76*** | 0.75*** | 0.86** | 1.65** | 0.78** | 2.05 | 0.86** | 0.81* |
| | (-1.60, -0.02) | (0.42, 0.82) | (0.70, 0.82) | (0.64, 0.88) | (0.79, 0.94) | (1.15, 2.38) | (0.67, 0.92) | (0.80, 5.25) | (0.79, 0.94) | (0.69, 0.95) |
| Age | 0.03 | 0.99 | 1.01* | 1.01 | 1.01*** | 1.02 | 1.02* | 1.08* | 1.01** | 1.01* |
| | (-0.05, 0.10) | (0.96, 1.02) | (1.00, 1.01) | (0.99, 1.02) | (1.01, 1.02) | (0.98, 1.05) | (1.00, 1.03) | (1.00, 1.18) | (1.01, 1.02) | (1.00, 1.03) |
| Parenting status | -0.43 | 0.58* | 0.86* | 0.84 | 1.01 | 1.80* | 0.92 | 3.99* | 1.01 | 0.94 |
| | (-1.70, 0.83) | (0.34, 1.00) | (0.76, 0.98) | (0.66, 1.06) | (0.89, 1.15) | (1.00, 3.24) | (0.73, 1.15) | (1.02, 15.51) | (0.89, 1.15) | (0.74, 1.19) |
| Race: White | -1.13* | 0.40** | 0.74*** | 0.75** | 0.85** | 2.58** | 0.84 | 8.71** | 0.85** | 0.88 |
| | (-2.22, -0.05) | (0.21, 0.70) | (0.67, 0.81) | (0.61, 0.92) | (0.78, 0.94) | (1.33, 5.02) | (0.70, 1.01) | (1.83, 41.56) | (0.77, 0.94) | (0.73, 1.06) |
| Department size | 0.01* | 1.01 | 1.00*** | 1.00* | 1.00*** | 0.99 | 1.00 | 0.98* | 1.00*** | 1.00 |
| | (0.00, 0.02) | (1.00, 1.02) | (1.00, 1.00) | (1.00, 1.00) | (1.00, 1.00) | (0.98, 1.00) | (1.00, 1.00) | (0.96, 1.00) | (1.00, 1.00) | (1.00, 1.00) |
| Department: Community Development | 0.11 | 0.77 | 1.03 | 1.02 | 1.07 | 1.42 | 1.00 | 172.62 | 1.07 | 1.07 |
| | (-0.99, 1.20) | (0.46, 1.27) | (0.92, 1.15) | (0.82, 1.26) | (0.95, 1.20) | (0.78, 2.59) | (0.82, 1.21) | (0.00, $4.10\times10^{13}$) | (0.95, 1.20) | (0.86, 1.32) |
| Department: Finance | -0.40 | 0.34*** | 0.85* | 0.82 | 1.16* | 3.53*** | 1.13 | 4774.64 | 1.16* | 1.18 |
| | (-1.60, 0.80) | (0.20, 0.57) | (0.75, 0.97) | (0.65, 1.04) | (1.02, 1.33) | (1.92, 6.48) | (0.88, 1.45) | (0.00, $11.08\times10^{15}$) | (1.01, 1.32) | (0.93, 1.51) |
| Department: Parks and Recreation | 0.34 | 1.30 | 1.11 | 1.10 | 1.04 | 0.79 | 1.14 | 420.41 | 1.04 | 1.06 |
| | (-0.79, 1.48) | (0.75, 2.24) | (0.99, 1.24) | (0.88, 1.37) | (0.92, 1.17) | (0.41, 1.52) | (0.93, 1.40) | (0.00, $9.86\times10^{13}$) | (0.92, 1.17) | (0.86, 1.32) |
| Department: Police | 1.41* | 0.62 | 1.51*** | 1.49** | 1.73*** | 2.05* | 1.94*** | 4915.16 | 1.72*** | 1.85*** |
| | (0.20, 2.62) | (0.36, 1.06) | (1.35, 1.69) | (1.18, 1.88) | (1.54, 1.95) | (1.10, 3.82) | (1.55, 2.42) | (0.00, $11.47\times10^{15}$) | (1.53, 1.93) | (1.47, 2.32) |
| City-level NGO density | -0.03 | 1.02 | 0.99* | 0.99 | 0.99** | 0.98 | 0.99 | 1.05 | 0.99** | 0.99 |
| | (-0.11, 0.05) | (0.99, 1.06) | (0.98, 1.00) | (0.98, 1.01) | (0.98, 1.00) | (0.94, 1.02) | (0.98, 1.01) | (0.97, 1.13) | (0.97, 1.00) | (0.97, 1.00) |
| Constant | 3.03 | 13.73* | 3.04*** | 2.88* | 2.24** | 0.04** | 1.23 | 0.00 | 2.37*** | 1.87 |
| | (-1.84, 7.91) | (1.67, 115.88) | (1.91, 4.83) | (1.14, 7.29) | (1.39, 3.63) | (0.00, 0.37) | (0.51, 2.94) | (0.00, 412.48) | (1.47, 3.82) | (0.75, 4.66) |

Note: 95% Confidence Interval in parentheses. *p < 0.05, **p < 0.01, ***p < 0.001. "NB" denotes Negative Binomial model. "ZI" denotes Zero-inflated. "H" denotes Hurdle. To ensure comparability of coefficients across models, I report odds ratio for logistic regression model and incidence rate ratio for Poisson, NB, ZI Poisson, ZINB, Hurdle Poisson, and Hurdle NB. The analysis is based on 499 observations. The results of zero-hurdle models for H Poisson and HNB are the same as the logistic regression model result. The results indicate that, after accounting for zero-inflation and overdispersion, there is significant association between volunteering hours and public participation in count and zero-inflated models of Hurdle NB, compared to OLS. The finding on variables of interests from the Hurdle NB model is robust compared to those from other regression models.

Table S7.2 Model Specifications on Effect of Public Participation on Volunteering Diversity

| | OLS | Logistic | Poisson | NB | ZI Poisson | | ZINB | | H Poisson | Model 2: HNB |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Count model | ZI model | Count model | ZI model | Count model | Count model |
| Public participation | 0.09 | 0.98 | 1.06* | 1.06* | 1.11*** | 159.04 | 1.11*** | 161.91 | 1.13*** | 1.13*** |
| | (-0.02, 0.20) | (0.83, 1.17) | (1.01, 1.12) | (1.01, 1.12) | (1.05, 1.16) | (0.61, 41.50×10$^3$) | (1.05, 1.16) | (0.62, 42.42×10$^3$) | (1.06, 1.21) | (1.06, 1.21) |
| Work experience in | -0.02* | 0.94*** | 0.99** | 0.99** | 1.00 | 3.94* | 1.00 | 3.94* | 1.00 | 1.00 |
| public sector | (-0.03, -0.00) | (0.91, 0.96) | (0.98, 1.00) | (0.98, 1.00) | (1.00, 1.01) | (1.15, 13.48) | (1.00, 1.01) | (1.15, 13.55) | (0.99, 1.01) | (0.99, 1.01) |
| Education | -0.04 | 0.74* | 0.97 | 0.97 | 0.97 | 20.20 | 0.97 | 20.20 | 1.03 | 1.03 |
| | (-0.23, 0.14) | (0.55, 0.99) | (0.90, 1.06) | (0.90, 1.06) | (0.89, 1.05) | (0.63, 644.54) | (0.89, 1.05) | (0.64, 644.54) | (0.92, 1.15) | (0.92, 1.15) |
| Salary | 0.05 | 1.21* | 1.03 | 1.03 | 1.01 | 0.26 | 1.01 | 0.26 | 1.00 | 1.00 |
| | (-0.06, 0.16) | (1.02, 1.43) | (0.98, 1.09) | (0.98, 1.09) | (0.96, 1.06) | (0.06, 1.22) | (0.96, 1.06) | (0.06, 1.21) | (0.93, 1.08) | (0.93, 1.08) |
| Gender: Female | 0.11 | 0.89 | 1.07 | 1.07 | 1.03 | 7149.15* | 1.03 | 7362.80* | 1.20* | 1.20* |
| | (-0.13, 0.35) | (0.62, 1.28) | (0.96, 1.20) | (0.96, 1.20) | (0.92, 1.15) | (3.53, 14.46×10$^6$) | (0.92, 1.15) | (3.62, 14.96×10$^6$) | (1.03, 1.40) | (1.03, 1.40) |
| | 0 | 1.00 | 1.00 | 1.00 | 0.99 | 0.65 | 0.99 | 0.65 | 1.01 | 1.01 |
| Age | (-0.02, 0.03) | (0.96, 1.03) | (0.99, 1.01) | (0.99, 1.01) | (0.98, 1.00) | (0.35, 1.21) | (0.98, 1.00) | (0.35, 1.20) | (0.99, 1.02) | (0.99, 1.02) |
| | -0.1 | 0.6 | 0.93 | 0.93 | 0.89 | 0.27 | 0.89 | 0.27 | 1.08 | 1.08 |
| Parenting status | (-0.48, 0.29) | (0.33, 1.10) | (0.78, 1.11) | (0.78, 1.11) | (0.75, 1.06) | (0.00, 464.20) | (0.75, 1.06) | (0.00, 473.37) | (0.84, 1.37) | (0.84, 1.37) |
| Race: White | -0.12 | 0.87 | 0.93 | 0.93 | | | | | 0.95 | 0.95 |
| | (-0.45, 0.21) | (0.48, 1.48) | (0.81, 1.08) | (0.81, 1.08) | | | | | (0.79, 1.15) | (0.79, 1.15) |
| Department size | 0.00* | 1.04*** | 1.00** | 1.00** | 1.00*** | 0.04 | 1.00*** | 0.04 | 1.00 | 1.00 |
| | (0.00, 0.01) | (1.02, 1.06) | (1.00, 1.00) | (1.00, 1.00) | (1.00, 1.00) | (0.00, 1.26) | (1.00, 1.00) | (0.00, 1.25) | (1.00, 1.00) | (1.00, 1.00) |
| Department: | | | | | | | | | | |
| Community | -0.18 | 0.69 | 0.89 | 0.89 | | | | | 0.88 | 0.88 |
| Development | (-0.51, 0.15) | (0.40, 1.15) | (0.76, 1.03) | (0.76, 1.03) | | | | | (0.72, 1.09) | (0.72, 1.09) |
| Department: Finance | -0.58** | 0.30*** | 0.64*** | 0.64*** | | | | | 0.65*** | 0.65** |
| | (-0.94, -0.22) | (0.17, 0.51) | (0.53, 0.76) | (0.53, 0.76) | | | | | (0.50, 0.84) | (0.50, 0.84) |
| Department: Parks | 0.11 | 1.56 | 1.07 | 1.07 | | | | | 1.01 | 1.01 |
| and Recreation | (-0.24, 0.45) | (0.85, 2.84) | (0.92, 1.25) | (0.92, 1.25) | | | | | (0.82, 1.24) | (0.82, 1.24) |
| Department: Police | 0.32 | 0.75 | 1.23* | 1.23* | | | | | 1.48*** | 1.48*** |
| | (-0.04, 0.69) | (0.42, 1.32) | (1.05, 1.44) | (1.05, 1.44) | | | | | (1.20, 1.82) | (1.20, 1.82) |
| City-level NGO | 0.00 | 0.98 | 1.00 | 1.00 | 1.00 | 0.65 | 1.00 | 0.65 | 1.01 | 1.01 |
| density | (-0.02, 0.02) | (0.94, 1.01) | (0.99, 1.01) | (0.99, 1.01) | (0.99, 1.01) | (0.33, 1.30) | (0.99, 1.01) | (0.32, 1.30) | (1.00, 1.02) | (1.00, 1.02) |
| | 1.64* | 70.74*** | 1.68 | 1.68 | 1.90** | 0*** | 1.90** | 0*** | 0.58 | 0.58 |
| Constant | (0.16, 3.12) | (6.96, 753.24) | (0.85, 3.33) | (0.85, 3.33) | (1.04, 3.47) | (0.00, 0.01) | (1.04, 3.47) | (0.00, 0.01) | (0.23, 1.47) | (0.23, 1.47) |

Note: 95% Confidence Interval in parentheses. *p < 0.05, **p < 0.01, ***p < 0.001. "NB" denotes Negative Binomial model. "ZI" denotes Zero-inflated. "H" denotes Hurdle. To ensure comparability of coefficients across models, I report odds ratio for logistic regression model and incidence rate ratio for Poisson, NB, ZI Poisson, ZINB, Hurdle Poisson, and Hurdle NB. The analysis is based on 519 observations. The results of zero-hurdle models for H Poisson and HNB are the same as the logistic regression model result. ZI Poisson and ZINB are reduced model without Race and department type covariates because the full models produce error for predicting standard error and p-value. Thus, they are less desirable than hurdle model. The results of zero-inflated models for H Poisson and HNB are the same as the logistic regression model result. The results indicate that, after accounting for zero-inflation and overdispersion, there is significant association between volunteering diversity and public participation in count model of Hurdle NB, compared to OLS. The finding on variables of interests from the Hurdle NB model is robust and preferable compared to those from other regression models.

Table S7.3 Model Specifications on Effect of Job Satisfaction on Volunteering Hours

| | OLS | Logistic | Poisson | NB | ZI Poisson | | ZINB | | H Poisson | Model 3: HNB |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Count model | ZI model | Count model | ZI model | Count model | Count model |
| Job satisfaction | 0.36 | 4.06*** | 1.16 | 1.24 | 0.79* | 0.18*** | 0.75* | 0.04*** | 0.77** | 0.76** |
| | (-0.45, 1.16) | (2.35, 7.22) | (0.99, 1.35) | (0.99, 1.55) | (0.65, 0.95) | (0.09, 0.38) | (0.60, 0.95) | (0.01, 0.24) | (0.65, 0.92) | (0.62, 0.92) |
| Work experience in | -0.02 | 1.02 | 0.99 | 0.99 | 0.98* | 0.97 | 1 | 0.93** | 0.98** | 0.98** |
| public sector | (-0.08, 0.04) | (0.98, 1.06) | (0.98, 1.00) | (0.98, 1.01) | (0.97, 0.99) | (0.92, 1.02) | (0.98, 1.01) | (0.87, 0.99) | (0.97, 0.99) | (0.97, 1.00) |
| Education | 0.32 | 1.12 | 1.11 | 1.12 | 1.21** | 1.18 | 1.14 | 1.95 | 1.20** | 1.20** |
| | (-0.32, 0.95) | (0.72, 1.72) | (1.00, 1.25) | (0.95, 1.32) | (1.07, 1.37) | (0.60, 2.33) | (0.98, 1.32) | (0.75, 5.06) | (1.06, 1.36) | (1.05, 1.37) |
| Salary | 0.3 | 1.44* | 1.14** | 1.14* | 1.05 | 0.70 | 1.10 | 0.78 | 1.05 | 1.05 |
| | (-0.16, 0.76) | (1.06, 1.97) | (1.05, 1.25) | (1.01, 1.29) | (0.93, 1.19) | (0.40, 1.22) | (0.97, 1.25) | (0.45, 1.34) | (0.95, 1.16) | (0.94, 1.17) |
| Gender: Female | -0.69 | 1.32 | 0.7*** | 0.69** | 0.59*** | 0.46 | 0.55*** | 0.56 | 0.55*** | 0.55*** |
| | (-1.54, 0.16) | (0.74, 2.41) | (0.59, 0.83) | (0.54, 0.87) | (0.47, 0.73) | (0.15, 1.44) | (0.43, 0.70) | (0.14, 2.17) | (0.45, 0.68) | (0.44, 0.68) |
| | -0.02 | 0.92** | 0.99 | 0.99 | 1.02** | 1.12*** | 1 | 1.21*** | 1.02** | 1.02* |
| Age | (-0.10, 0.07) | (0.87, 0.98) | (0.98, 1.01) | (0.97, 1.01) | (1.01, 1.04) | (1.04, 1.21) | (0.98, 1.02) | (1.05, 1.40) | (1.01, 1.04) | (1.00, 1.04) |
| | -0.99 | 0.3* | 0.7* | 0.69 | 1.09 | 5.48** | 0.89 | 11.6** | 1 | 1.01 |
| Parenting status | (-2.50, 0.52) | (0.11, 0.87) | (0.53, 0.92) | (0.46, 1.03) | (0.79, 1.51) | (1.33, 22.53) | (0.62, 1.30) | (1.11, 121.17) | (0.73, 1.38) | (0.71, 1.42) |
| Race: White | -0.1 | 0.48 | 0.97 | 0.96 | 1.06 | 2.03 | | | 1.09 | 1.07 |
| | (-1.35, 1.16) | (0.15, 1.32) | (0.79, 1.20) | (0.70, 1.31) | (0.85, 1.31) | (0.54, 7.60) | | | (0.87, 1.36) | (0.84, 1.37) |
| Department size | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.98 | 1 | 1 |
| | (-0.01, 0.02) | (0.99, 1.02) | (1.00, 1.00) | (1.00, 1.01) | (1.00, 1.00) | (0.99, 1.02) | (1.00, 1.01) | (0.94, 1.02) | (1.00, 1.00) | (1.00, 1.00) |
| Department: Community | 0.16 | 1.95 | 1.07 | 1.17 | 1.03 | 0.82 | | | 1.01 | 1 |
| Development | (-1.04, 1.37) | (0.79, 4.80) | (0.86, 1.33) | (0.85, 1.62) | (0.73, 1.46) | (0.07, 9.55) | | | (0.79, 1.31) | (0.76, 1.32) |
| Department: Finance | -0.93 | 0.43* | 0.58*** | 0.62** | 0.86 | 3.83 | | | 0.85 | 0.84 |
| | (-2.20, 0.34) | (0.18, 0.98) | (0.44, 0.77) | (0.43, 0.88) | (0.62, 1.19) | (0.61, 24.00) | | | (0.62, 1.16) | (0.60, 1.17) |
| Department: Parks | 0.54 | 1.6 | 1.27* | 1.28 | 1.26 | 0.99 | | | 1.26 | 1.26 |
| and Recreation | (-0.72, 1.80) | (0.63, 4.07) | (1.02, 1.59) | (0.93, 1.76) | (0.96, 1.65) | (0.12, 8.36) | | | (0.99, 1.61) | (0.97, 1.64) |
| Department: Police | 1.42 | 1.09 | 1.61*** | 1.64** | 1.85*** | 1.89 | | | 1.84*** | 1.83*** |
| | (0.15, 2.69) | (0.43, 2.78) | (1.30, 1.98) | (1.20, 2.23) | (1.44, 2.37) | (0.28, 12.92) | | | (1.46, 2.32) | (1.43, 2.35) |
| City-level NGO | -0.04 | 1.01 | 0.98 | 0.98 | 0.98 | 0.98 | 0.97* | 0.82** | 0.98 | 0.98 |
| density | (-0.14, 0.06) | (0.94, 1.08) | (0.96, 1.00) | (0.96, 1.01) | (0.96, 1.00) | (0.89, 1.08) | (0.95, 1.00) | (0.69, 0.98) | (0.96, 1.00) | (0.96, 1.00) |
| | | | | | | 2.06 | | 17.31 | | |
| | -0.21 | 0.06 | 0.79 | 0.68 | 1.34 | (0.00, | 5.28* | (0.03, | 1.60 | 1.77 |
| Constant | (-6.30, 5.87) | (0.00, 3.37) | (0.26, 2.34) | (0.14, 3.18) | (0.35, 5.10) | 4175.65) | (1.33, 20.95) | $10.28\times10^3$) | (0.50, 5.14) | (0.49, 6.36) |

Note: 95% Confidence Interval in parentheses. *p < 0.05, **p < 0.01, ***p < 0.001. "NB" denotes Negative Binomial model. "ZI" denotes Zero-inflated. "H" denotes Hurdle. To ensure comparability of coefficients across models, I report odds ratio for logistic regression model and incidence rate ratio for Poisson, NB, ZI Poisson, ZINB, Hurdle Poisson, and Hurdle NB. The analysis is based on 166 observations. The results of zero-hurdle models for H Poisson and HNB are the same as the logistic regression model result. ZI Poisson and ZINB are reduced specifications that exclude race and department type due to estimation issues. Specifically, the full models failed to produce standard errors and p-values. Thus, these models are less desirable compared to hurdle model. The results of zero-inflated models for H Poisson and HNB are the same as the logistic regression model result. The results indicate that, after accounting for zero-inflation and overdispersion, there is significant association between volunteering hours and job satisfaction in count and zero-inflated models of Hurdle NB, compared to OLS. The finding on variables of interests from the Hurdle NB model is robust and preferable compared to those from other regression models.

Table S7.4 Model Specifications on Effect of Job Satisfaction on Volunteering Diversity

| | OLS | Logistic | Poisson | NB | ZI Poisson | | ZINB | | H Poisson | Model 4: HNB |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Count model | ZI model | Count model | ZI model | Count model | Count model |
| Job satisfaction | 0.37 | 2.63** | 1.37** | 1.37** | 1.32** | 4.43 | 1.32** | 4.44 | 1.50* | 1.50* |
| | (0.01, 0.73) | (1.39, 5.12) | (1.12, 1.70) | (1.12, 1.70) | (1.09, 1.61) | (0.28, 69.43) | (1.09, 1.61) | (0.28, 69.62) | (1.07, 2.10) | (1.07, 2.10) |
| Work experience in public sector | 0 | 0.9*** | 1 | 1 | | | | | 1.03* | 1.03* |
| | (-0.03, 0.02) | (0.85, 0.95) | (0.98, 1.01) | (0.98, 1.01) | | | | | (1.00, 1.05) | (1.00, 1.05) |
| Education | -0.03 | 0.44** | 0.98 | 0.98 | 1.02 | $52.76\times10^{8}$ | 1.02 | $19.52\times10^{8}$ | 1.22 | 1.22 |
| | (-0.31, 0.25) | (0.24, 0.75) | (0.84, 1.13) | (0.84, 1.13) | (0.89, 1.19) | (0.00, ∞) | (0.89, 1.19) | (0.00, ∞) | (0.98, 1.52) | (0.98, 1.52) |
| Salary | 0.03 | 0.94 | 1.03 | 1.03 | 1.03 | 0.96 | 1.03 | 0.96 | 1.07 | 1.07 |
| | (-0.18, 0.24) | (0.64, 1.36) | (0.92, 1.15) | (0.92, 1.15) | (0.93, 1.14) | (0.17, 5.54) | (0.93, 1.14) | (0.17, 5.53) | (0.90, 1.28) | (0.90, 1.28) |
| Gender: Female | -0.03 | 0.87 | 0.96 | 0.96 | 0.82 | 0.00 | 0.82 | 0 | 0.8 | 0.8 |
| | (-0.41, 0.35) | (0.45, 1.70) | (0.78, 1.18) | (0.78, 1.18) | (0.67, 1.00) | (0.00, ∞) | (0.67, 1.00) | (0.00, ∞) | (0.58, 1.11) | (0.58, 1.11) |
| Age | -0.02 | 0.96 | 0.98 | 0.98 | 0.97*** | 0.19* | 0.97*** | 0.19* | 0.97* | 0.97* |
| | (-0.06, 0.01) | (0.90, 1.03) | (0.96, 1.00) | (0.96, 1.00) | (0.96, 0.98) | (0.04, 0.95) | (0.96, 0.98) | (0.04, 0.95) | (0.93, 1.00) | (0.93, 1.00) |
| Parenting status | -0.08 | 0.26* | 0.92 | 0.92 | | | | | 1.43 | 1.43 |
| | (-0.75, 0.60) | (0.08, 0.89) | (0.64, 1.31) | (0.64, 1.31) | | | | | (0.85, 2.42) | (0.85, 2.42) |
| Race: White | -0.46 | 0.96 | 0.74* | 0.74* | | | | | 0.61** | 0.61** |
| | (-1.02, 0.10) | (0.28, 2.71) | (0.58, 0.97) | (0.58, 0.97) | | | | | (0.44, 0.86) | (0.44, 0.86) |
| Department size | 0.01* | 1.15*** | 1.00*** | 1.00*** | 1.00*** | 0.00 | 1.00*** | 0.00 | 1.00* | 1.00* |
| | (0.00, 0.01) | (1.08, 1.23) | (1.00, 1.01) | (1.00, 1.01) | (1.00, 1.01) | (0.00, 1.25) | (1.00, 1.01) | (0.00, 1.25) | (1.00, 1.01) | (1.00, 1.01) |
| Department: Community Development | -0.37 | 1.92 | 0.78 | 0.78 | | | | | 0.52** | 0.52** |
| | (-0.91, 0.18) | (0.65, 5.43) | (0.59, 1.04) | (0.59, 1.04) | | | | | (0.34, 0.80) | (0.34 ,0.80) |
| Department: Finance | -0.85*** | 0.17*** | 0.47*** | 0.47*** | | | | | 0.44** | 0.44** |
| | (-1.41, -0.30) | (0.06, 0.45) | (0.34, 0.65) | (0.34, 0.65) | | | | | (0.25, 0.77) | (0.25, 0.77) |
| Department: Parks and Recreation | -0.03 | 1.81 | 1.01 | 1.01 | | | | | 0.83 | 0.83 |
| | (-0.59, 0.54) | (0.59, 5.45) | (0.76, 1.32) | (0.76, 1.32) | | | | | (0.57, 1.21) | (0.57, 1.21) |
| Department: Police | -0.18 | 0.77 | 0.91 | 0.91 | | | | | 0.95 | 0.95 |
| | (-0.74, 0.37) | (0.26, 2.12) | (0.69, 1.20) | (0.69, 1.20) | | | | | (0.65, 1.37) | (0.65, 1.37) |
| City-level NGO density | 0.03 | 1 | 1.02* | 1.02* | 1.02 | 1.78 | 1.02 | 1.78 | 1.05** | 1.05** |
| | (-0.01, 0.08) | (0.93, 1.09) | (1.00, 1.05) | (1.00, 1.05) | (1.00, 1.05) | (0.92, 3.44) | (1.00, 1.05) | (0.92, 3.44) | (1.01, 1.08) | (1.01, 1.08) |
| Constant | 1.58 | 148.81* (1.20, $23.56\times10^{3}$) | 1.35 | 1.35 | 1.22 | 0.00 | 1.22 | 0.00 | 0.26 | 0.26 |
| | (-1.13, 4.28) | | (0.30, 6.00) | (0.30, 6.00) | (0.36, 4.13) | (0.00, ∞) | (0.36, 4.14) | (0.00, ∞) | (0.03, 2.49) | (0.03, 2.49) |

Note: 95% Confidence Interval in parentheses. *p < 0.05, **p < 0.01, ***p < 0.001. "NB" denotes Negative Binomial model. "ZI" denotes Zero-inflated. "H" denotes Hurdle. To ensure comparability of coefficients across models, I report odds ratio for logistic regression model and incidence rate ratio for Poisson, NB, ZI Poisson, ZINB, Hurdle Poisson, and Hurdle NB. The analysis is based on 173 observations. The results of zero-hurdle models for H Poisson and HNB are the same as the logistic regression model result. ZI Poisson and ZINB are reduced specifications that exclude work experience, parenting status, race and department type due to estimation issues. Specifically, the full models failed to produce standard errors and p-values. Thus, these models are less desirable compared to hurdle model. The results of zero-inflated models for H Poisson and HNB are the same as the logistic regression model result. The results indicate that, after accounting for zero-inflation and overdispersion, there is significant association between volunteering hours and job satisfaction in count and zero-inflated models of Hurdle NB, compared to OLS. The finding on variables of interests from the Hurdle NB model is robust and preferable compared to those from other regression models.

Table S7.5 Model Specifications on Interacting Effect of Public Participation and Job Satisfaction on Volunteering Hours

| | OLS | Logistic | Poisson | NB | ZI Poisson | | ZINB | | H Poisson | Model 5: HNB |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Count model | ZI model | Count model | ZI model | Count model | Count model |
| Public participation | 3.35 (-1.64, 8.35) | 42.57* (1.14, 1804.20) | 7.82*** (2.81, 21.79) | 8.87** (2.37, 33.54) | 6.74*** (2.41, 18.82) | 0.00** (0.00, 0.82) | 6.74*** (2.41, 18.82) | 0.00** (0.00, 0.82) | 7.2*** (2.37, 21.84) | 7.19** (1.99, 26.01) |
| Job Satisfaction | 1.58 (-0.85, 4.02) | 21.3** (3.53, 141.70) | 2.56*** (1.53, 4.32) | 2.94** (1.51, 5.76) | 1.62 (0.95, 2.74) | 0.00 (0.00, 1.33) | 1.62 (0.95, 2.74) | 0.00 (0.00, 1.33) | 1.64 (0.93, 2.89) | 1.64 (0.83, 3.21) |
| Public Participation × Job Satisfaction | -0.58 (-1.64, 0.48) | 0.44* (0.20, 0.96) | 0.68*** (0.55, 0.84) | 0.66** (0.50, 0.87) | 0.71** (0.57, 0.88) | 5.76* (1.14, 29.14) | 0.71** (0.57, 0.88) | 5.76* (1.14, 29.14) | 0.70** (0.56, 0.88) | 0.70** (0.54, 0.92) |
| Work experience in public sector | -0.02 (-0.08, 0.04) | 1.02 (0.98, 1.07) | 0.99 (0.98, 1.01) | 0.99 (0.98, 1.01) | 0.99* (0.98, 1.00) | 0.94 (0.86, 1.02) | 0.99* (0.98, 1.00) | 0.94 (0.86, 1.02) | 0.98* (0.97, 1.00) | 0.98* (0.97, 1.00) |
| Education | 0.06 (-0.58, 0.70) | 1.11 (0.69, 1.76) | 1.01 (0.89, 1.14) | 1.03 (0.87, 1.22) | 1.00 (0.88, 1.14) | 0.82 (0.66, 1.02) | 1.00 (0.88, 1.14) | 0.82 (0.66, 1.02) | 1.06 (0.92, 1.21) | 1.06 (0.92, 1.21) |
| Salary | 0.42 (-0.06, 0.90) | 1.64** (1.15, 2.37) | 1.23*** (1.11, 1.36) | 1.23** (1.08, 1.40) | 1.01 (0.91, 1.12) | 0.13** (0.04, 0.47) | 1.01 (0.91, 1.12) | 0.13** (0.04, 0.47) | 1.11 (0.99, 1.24) | 1.11 (0.99, 1.25) |
| Gender: Female | -0.76 (-1.61, 0.08) | 1.07 (0.59, 1.99) | 0.65*** (0.54, 0.79) | 0.63*** (0.49, 0.80) | 0.61*** (0.50, 0.75) | 1.04 (0.98, 1.11) | 0.61*** (0.50, 0.75) | 1.04 (0.98, 1.11) | 0.51*** (0.40, 0.64) | 0.51*** (0.40, 0.64) |
| Age | -0.02 (-0.10, 0.07) | 0.91** (0.86, 0.97) | 0.99 (0.98, 1.01) | 0.99 (0.97, 1.01) | 1.02* (1.00, 1.04) | 1.31** (1.09, 1.58) | 1.02* (1.00, 1.04) | 1.31** (1.09, 1.58) | 1.02 (1.00, 1.04) | 1.02 (1.00, 1.04) |
| Parenting status | -1.06 (-2.54, 0.41) | 0.28* (0.09, 0.83) | 0.64** (0.48, 0.86) | 0.61* (0.41, 0.91) | 0.99 (0.71, 1.38) | 58.26** (3.38, 10667.30) | 0.99 (0.71, 1.38) | 58.26** (3.38, 10667.30) | 0.84 (0.59, 1.20) | 0.84 (0.59, 1.20) |
| Race: White | -0.03 (-1.33, 1.26) | 0.37 (0.10, 1.13) | 1.04 (0.82, 1.33) | 1.06 (0.76, 1.48) | 1.11 (0.87, 1.41) | 1.63 (0.23, 11.55) | 1.11 (0.87, 1.41) | 1.63 (0.23, 11.55) | 1.22 (0.93, 1.58) | 1.22 (0.93, 1.58) |
| Department size | 0.00 (-0.02, 0.02) | 1.00 (0.99, 1.02) | 1.00 (1.00, 1.00) | 1.00 (1.00, 1.01) | 1.00 (1.00, 1.00) | 1.01 (0.99, 1.02) | 1.00 (1.00, 1.00) | 1.01 (0.99, 1.02) | 1.00 (1.00, 1.00) | 1.00 (1.00, 1.00) |
| Department: Community Development | 0.21 (-0.98, 1.40) | 1.65 (0.65, 4.17) | 1.06 (0.85, 1.33) | 1.15 (0.84, 1.58) | 0.75* (0.59, 0.96) | 0.01 (0.00, 0.17) | 0.75* (0.59, 0.96) | 0.01 (0.00, 0.17) | 1.00 (0.76, 1.31) | 1.00 (0.76, 1.31) |
| Department: Finance | -0.49 (-1.76, 0.77) | 0.40* (0.16, 0.95) | 0.67** (0.51, 0.89) | 0.71 (0.49, 1.01) | 0.76 (0.55, 1.05) | 0.29 (0.04, 2.11) | 0.76 (0.55, 1.05) | 0.29 (0.04, 2.11) | 0.91 (0.66, 1.27) | 0.91 (0.66, 1.27) |
| Department: Parks and Recreation | 0.58 (-0.65, 1.81) | 1.97 (0.74, 5.34) | 1.26* (1.01, 1.58) | 1.31 (0.96, 1.79) | 0.99 (0.78, 1.26) | 0.05** (0.00, 0.49) | 0.99 (0.78, 1.26) | 0.05** (0.00, 0.49) | 1.16 (0.90, 1.50) | 1.16 (0.90, 1.51) |
| Department: Police | 1.28 (0.03, 2.54) | 0.92 (0.35, 2.37) | 1.52*** (1.23, 1.89) | 1.57** (1.15, 2.14) | 1.52*** (1.21, 1.91) | 0.51 (0.10, 2.71) | 1.52*** (1.21, 1.91) | 0.51 (0.10, 2.71) | 1.77*** (1.39, 2.25) | 1.77*** (1.38, 2.26) |
| City-level NGO density | -0.05 (-0.15, 0.05) | 1.01 (0.94, 1.08) | 0.97** (0.95, 0.99) | 0.97 (0.95, 1.00) | 0.96** (0.95, 0.99) | 1.02 (0.88, 1.18) | 0.96** (0.95, 0.99) | 1.02 (0.88, 1.18) | 0.96** (0.94, 0.98) | 0.96** (0.94, 0.98) |
| Constant | -6.85 (-19.76, 6.06) | 0.00 (0.00, 0.39) | 0.01** (0.00, 0.20) | 0.01** (0.00, 0.24) | 0.07 (0.00, 1.16) | $2.32\times10^{11}$** (183.08, $295.28\times10^{19}$) | 0.07 (0.00, 1.16) | $2.32\times10^{11}$** (183.08, $295.28\times10^{19}$) | 0.04* (0.00, 0.79) | 0.04 (0.00, 1.37) |

Note: 95% Confidence Interval in parentheses. *p < 0.05, **p < 0.01, ***p < 0.001. "NB" denotes Negative Binomial model. "ZI" denotes Zero-inflated. "H" denotes Hurdle. To ensure comparability of coefficients across models, I report odds ratio for logistic regression model and incidence rate ratio for Poisson, NB, ZI Poisson, ZINB, Hurdle Poisson, and Hurdle NB. The analysis is based on 154 observations. The results of zero-hurdle models for H Poisson and HNB are the same as the logistic regression model result. The results indicate that, after accounting for zero-inflation and overdispersion, there is significant association between volunteering hours and job satisfaction in count and zero-inflated models of Hurdle NB, compared to OLS. The finding on variables of interests from the Hurdle NB model is robust compared to those from other regression models.

Table S7.6 Model Specifications on Interacting Effect of Public Participation and Job Satisfaction on Volunteering Diversity

| | OLS | Logistic | Poisson | NB | ZI Poisson | | ZINB | | H Poisson | Model 6: HNB |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Count model | ZI model | Count model | ZI model | Count model | Count model |
| Public participation | 2.65* | 103.82* (1.40, | 10.74*** | 10.73*** | 5.69** | 0.00 | 5.66** | 0.00 | 23.12** | 23.11** |
| | (0.34, 4.95) | 10461.20) | (2.82, 41.22) | (2.82, 41.21) | (1.67, 19.42) | (0.00, ∞) | (1.66, 19.33) | (0.00, ∞) | (2.97, 180.05) | (2.97, 180.01) |
| Job Satisfaction | 1.45* | 20.16** | 3.90*** | 3.90*** | 2.71** | 0.00 | 2.71** | 0.00 | 5.98** | 5.98** |
| | (0.33, 2.57) | (2.64, 171.13) | (1.95, 7.97) | (1.95, 7.97) | (1.40, 5.26) | (0.00, ∞) | (1.40, 5.25) | (0.00, ∞) | (1.92, 18.68) | (1.92, 18.68) |
| Public Participation | -0.54* | 0.37* | 0.62*** | 0.62*** | 0.72** | $14.93\times10^{5}$ | 0.72** | $48.38\times10^{6}$ | 0.53** | 0.53** |
| × Job Satisfaction | (-1.03, -0.05) | (0.14, 0.93) | (0.46, 0.81) | (0.46, 0.81) | (0.55, 0.93) | (0.00, ∞) | (0.55, 0.93) | (0.00, ∞) | (0.35, 0.82) | (0.35, 0.82) |
| Work experience in | -0.01 | 0.91** | 0.99 | 0.99 | | | | | 1.03* | 1.03* |
| public sector | (-0.03, 0.02) | (0.85, 0.96) | (0.98, 1.01) | (0.98, 1.01) | | | | | (1.00, 1.06) | (1.00, 1.06) |
| Education | -0.13 | 0.44** | 0.91 | 0.91 | | | | | 1.14 | 1.14 |
| | (-0.42, 0.17) | (0.24, 0.78) | (0.78, 1.07) | (0.78, 1.07) | | | | | (0.91, 1.43) | (0.91, 1.43) |
| Salary | 0.15 | 1.13 | 1.12 | 1.12 | | | | | 1.15 | 1.15 |
| | (-0.07, 0.38) | (0.71, 1.78) | (0.99, 1.27) | (0.99, 1.27) | | | | | (0.95, 1.39) | (0.95, 1.39) |
| Gender: Female | -0.15 | 0.79 | 0.84 | 0.84 | 0.8* | $3.61\times10^{11}$ | 0.8* | $4.45\times10^{14}$ | 0.65* | 0.65* |
| | (-0.55, 0.24) | (0.40, 1.57) | (0.67, 1.06) | (0.67, 1.06) | (0.65, 1.00) | (0.00, ∞) | (0.65, 1.00) | (0.00, ∞) | (0.45, 0.94) | (0.45, 0.94) |
| | -0.02 | 0.96 | 0.98 | 0.98 | 0.99** | 70.95 | 0.99** | 192.27 | 0.97 | 0.97 |
| Age | (-0.06, 0.02) | (0.90, 1.03) | (0.96, 1.00) | (0.96, 1.00) | (0.97, 1.00) | $(0.00, 5.13\times10^{4})$ | (0.97, 1.00) | (0.00, ∞) | (0.94, 1.00) | (0.94, 1.00) |
| | -0.01 | 0.26* | 0.97 | 0.97 | | | | | 1.55 | 1.55 |
| Parenting status | (-0.70, 0.67) | (0.07, 0.91) | (0.67, 1.40) | (0.67, 1.40) | | | | | (0.89, 2.71) | (0.89, 2.71) |
| Race: White | -0.31 | 1.00 | 0.82 | 0.82 | | | | | 0.7 | 0.7 |
| | (-0.92, 0.29) | (0.25, 3.33) | (0.62, 1.11) | (0.62, 1.11) | | | | | (0.45, 1.07) | (0.45, 1.07) |
| Department size | 0.01* | 1.14*** | 1.00*** | 1.00*** | 1.00*** | 0.76 | 1.00*** | 0.69 | 1.00* | 1.00* |
| | (0.00, 0.01) | (1.07, 1.23) | (1.00, 1.01) | (1.00, 1.01) | (1.00, 1.01) | $(0.00, 5.07\times10^{4})$ | (1.00, 1.01) | $(0.00, 1.47\times10^{4})$ | (1.00, 1.01) | (1.00, 1.01) |
| Department: | | | | | | | | | | |
| Community | -0.47 | 1.77 | 0.71* | 0.71* | | | | | 0.39*** | 0.39*** |
| Development | (-1.03, 0.08) | (0.59, 5.18) | (0.53, 0.95) | (0.53, 0.95) | | | | | (0.25, 0.63) | (0.25, 0.63) |
| Department: Finance | -0.83** | 0.16*** | 0.48*** | 0.48*** | | | | | 0.40** | 0.40** |
| | (-1.39, -0.27) | (0.06, 0.44) | (0.34, 0.66) | (0.34, 0.66) | | | | | (0.22, 0.70) | (0.22, 0.70) |
| Department: Parks | 0.00 | 2.00 | 1.02 | 1.02 | | | | | 0.79 | 0.79 |
| and Recreation | (-0.57, 0.58) | (0.63, 6.29) | (0.77, 1.35) | (0.77, 1.35) | | | | | (0.53, 1.17) | (0.53, 1.17) |
| Department: Police | -0.24 | 0.67 | 0.87 | 0.87 | | | | | 0.94 | 0.94 |
| | (-0.81, 0.33) | (0.23, 1.88) | (0.65, 1.15) | (0.65, 1.15) | | | | | (0.64, 1.38) | (0.64, 1.38) |
| City-level NGO | 0.02 | 1.01 | 1.01 | 1.01 | 1.01 | 0.02 | 1.01 | 0.00 | 1.03 | 1.03 |
| density | (-0.03, 0.06) | (0.93, 1.10) | (0.99, 1.04) | (0.99, 1.04) | (0.98, 1.03) | $(0.00, 7.87\times10^{4})$ | (0.98, 1.03) | (0.00, ∞) | (1.00, 1.07) | (1.00, 1.07) |
| | -4.07 | 0.00 | 0.01** | 0.01** | 0.02** | 0.00 | 0.02** | 0.00 | 0.00*** | 0.00*** |
| Constant | (-10.01, 1.87) | (0.00, 322.48) | (0.00, 0.23) | (0.00, 0.23) | (0.00, 0.40) | (0.00, ∞) | (0.00, 0.40) | (0.00, ∞) | (0.00, 0.07) | (0.00, 0.07) |

Note: 95% Confidence Interval in parentheses. *p < 0.05, **p < 0.01, ***p < 0.001. "NB" denotes Negative Binomial model. "ZI" denotes Zero-inflated. "H" denotes Hurdle. To ensure comparability of coefficients across models, I report odds ratio for logistic regression model and incidence rate ratio for Poisson, NB, ZI Poisson, ZINB, Hurdle Poisson, and Hurdle NB. The analysis is based on 161 observations. The results of zero-hurdle models for H Poisson and HNB are the same as the logistic regression model result. ZI Poisson and ZINB are reduced specifications that exclude work experience, education, salary, age, parenting status, race and department types due to estimation issues. Specifically, the full models failed to produce standard errors and p-values. Thus, these models are less desirable compared to hurdle model. The results of zero-inflated models for H Poisson and HNB are the same as the logistic regression model result. The finding on variables of interests from the Hurdle NB model is robust and preferable compared to those from other regression models.

S8. Robustness Check for Selection Bias

A high volume of survey respondents declines to indicate their attitude on survey items relevant to job satisfaction in the survey. It may be the case that the job satisfaction of nonrespondent has a different distribution than the respondents. For example, public managers who are less satisfied with their job may be more likely to decline disclosing their job satisfaction. This potentially leading to non-response and selection bias. I conduct two analyses to examine how much likely this concern brings bias to this study's findings. First, I use a t-test to compare the respondents of the job satisfaction variable with all survey respondents, including nonrespondents. Table S8.1 shows that the respondents significantly volunteer 42 minutes less ($p<0.01$) than all survey respondents. There are no significant differences regarding other variables. This selection bias could cause overestimation on the effect of job satisfaction on volunteering hours.

Table S8.1 T-test result comparing respondents of job satisfaction and all survey respondents

| Variable | Mean of respondents of job satisfaction (n=187) | Mean of survey respondent (n=621) | Mean Difference | P Value |
|---|---|---|---|---|
| Volunteer hours | 2.6 | 3.3 | -0.7** | 0.005 |
| Volunteer diversity | 1.4 | 1.5 | -0.1 | 0.408 |
| Public participation | 2.4 | 2.4 | 0 | 0.876 |
| Job satisfaction | 4.6 | 4.6 | 0 | 1 |
| Working experience in public sector | 24.9 | 24.3 | 0.6 | 0.458 |
| Education | 4.6 | 4.6 | 0 | 0.903 |
| Salary | 4.3 | 4.3 | 0 | 0.379 |
| Age | 52.4 | 52 | 0.4 | 0.484 |
| Parenting status | 14.1 | 18 | -3.9 | 0.207 |
| Gender (1=female, 0 = male) | 29.1 | 28.7 | 0.4 | 0.922 |
| Race: white (1=white, 0=other) | 89.4 | 86.7 | 2.7 | 0.31 |
| Department size | 13.4 | 15 | -1.6 | 0.557 |
| Department types: Mayor's office (1=yes, 0=no) | 16 | 16.1 | -0.1 | 0.984 |
| Department types: Community Development (1=yes, 0=no) | 22.5 | 24.3 | -1.8 | 0.598 |
| Department types: Parks and Recreation (1=yes, 0=no) | 18.7 | 19.5 | -0.8 | 0.815 |
| Department types: Police (1=yes, 0=no) | 20.9 | 19.8 | 1.1 | 0.757 |
| Department types: Finance (1=yes, 0=no) | 21.9 | 20.3 | 1.6 | 0.635 |
| City-level NGO density | 4.4 | 4.5 | -0.1 | 0.207 |

*Note: *p<0.05, **p<0.01, ***p<0.005.*

To assess potential overestimation estimated by the unadjusted regression specification, I conducted a two-stage Heckman selection model to correct for nonresponse and selection biases (Heckman 1979), following Wooldridge's recommended procedure (Procedure 19.2, 809–812, 2010). Specifically, the two-stage model is structured as follows:

$$Volunteering\ Hours = \beta_1\delta_1 + \alpha_1 JobSatisfaction + \mu_1 (1)$$

$$JobSatisfaction = \beta_2\delta_2 + \upsilon_2 \quad (2)$$

$$ObservedIndex = 1\ [\beta_3\delta_3 + \upsilon_3 > 0] \quad (3)$$

Equation (1) is a Hurdle Negative Binomial model predicting volunteering hours based on explanatory and control variables. Equation (2) is a linear regression model predicting job satisfaction using demographic control variables. Equation (3) is the first-stage selection equation, using an observed index coded as "1" if respondents provided answers for both job satisfaction and volunteering hours and "0" if either measures have missing value. This selection model estimates the likelihood of respondents providing both measurements based on demographic variables for the full sample. From this model, I computed the Inverse Mills Ratio and subsequently include it into the outcome model (Equation 4), which is estimated only for respondents with complete observations for both volunteering hours and job satisfaction.

$$Volunteering\ Hours_i = \beta_1\delta_1 + \alpha_1 JobSatisfaction + \gamma_1 InverseMillsRatio + \mu_1 \ (4)$$

Table S8.2 displays the results of the Heckman selection model. The comparison focuses on the job satisfaction coefficients to evaluate nonresponse and selection bias implications. In count models (Models 3 to 6), the incidence rate ratios for job satisfaction in the Heckman-adjusted models are slightly lower than in unadjusted models, with unchanged significance levels. In model

6, the incidence rate ratio and significance of the interaction term decrease after correcting for selection bias. Overall, these robustness checks suggest minimal concern regarding selection bias for the main effects of job satisfaction in unadjusted models; however, caution is advised when interpreting the interaction effects on the intensity of volunteering diversity.

In the zero-hurdle component of models 3 to 6, incidence rate ratios for both main and interaction effects of job satisfaction exhibit slight changes after adjusting for selection bias, yet the significance levels remain consistent. This finding indicates robustness in the results and confirms that using an unadjusted model to assess the impact of job satisfaction on public managers' probability to volunteer does not introduce substantial selection bias.

Table S8.2 Heckman Selection Model Results

| Outcome variable | Volunteering Hours | | Volunteering Diversity | | Volunteering Hours | | Volunteering Diversity | |
|---|---|---|---|---|---|---|---|---|
| Count model | Model 3: Unadjusted model | Heckman selection model | Model 4: Unadjusted model | Heckman selection model | Model 5: Unadjusted model | Heckman selection model | Model 6: Unadjusted model | Heckman selection model |
| Public participation | | | | | 7.19** (1.99, 26.01) | 6.51** (2.04, 20.71) | 23.11** (2.97, 180.01) | 7.13 (0.93, 54.45) |
| Job satisfaction | 0.76** (0.62, 0.92) | 0.75** (0.62, 0.92) | 1.50* (1.07, 2.10) | 1.48* (1.05, 2.08) | 1.64 (0.83, 3.21) | 1.50 (0.83, 2.73) | 5.98** (1.92, 18.68) | 3.48* (1.13, 10.66) |
| Public Participation × Job Satisfaction | | | | | 0.70** (0.54, 0.92) | 0.72*** (0.56, 0.91) | 0.53** (0.35, 0.82) | 0.69† (0.45, 1.06) |
| Constant | 1.77 (0.49, 6.36) | 0.00 (0.00, $42.70\times10^{20}$) | 0.26 (0.03, 2.49) | $1.75\times10^{44}$ (0, $1.3\times10^{106}$) | 0.04 (0.00, 1.37) | 25.94 (0.54, 1242.79) | 0.00*** (0.00, 0.07) | 2.69 (0.00, 3761.31) |
| Zero-hurdle model | | | | | | | | |
| Public participation | | | | | 42.57* (1.14, 1804.20) | 65.73* (1.80, 2401.42) | 103.82* (1.40, 10461.20) | 117.7* (1.67, 8273.27) |
| Job satisfaction | 4.06*** (2.35, 7.22) | 4.07*** (2.31, 7.18) | 2.63** (1.39, 5.12) | 4.07*** (2.01, 8.24) | 21.3** (3.53, 141.70) | 25.92*** (4.24, 158.65) | 20.16** (2.64, 171.13) | 29.06** (3.94, 214.16) |
| Public Participation × Job Satisfaction | | | | | 0.44* (0.20, 0.96) | 0.41* (0.19, 0.89) | 0.37* (0.14, 0.93) | 0.38* (0.15, 0.93) |
| Constant | 0.06 (0.00, 3.37) | 0.00 (0.00, $42.70\times10^{19}$) | 148.81* (1.20, $23.56\times10^{3}$) | $1.35\times10^{125}$ ($3.5\times10^{9}$, $5.00\times10^{240}$) | 0.00* (0.00, 0.39) | 4.32 (0.00, $24.56\times10^{5}$) | 0.00 (0.00, 390.77) | 2708.49 (0.00, $15.88\times10^{9}$) |
| Inverse Mills Ratio (IMR) | No | Yes | No | Yes | No | Yes | No | Yes |
| Control variables | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Observation | 166 | 166 | 173 | 166 | 154 | 154 | 161 | 154 |
| R2 (R2 adjusted) | 0.330 (0.263) | 0.329 (0.257) | 0.142 (0.060) | 0.147 (0.055) | 0.386 (0.310) | 0.356 (0.292) | 0.154 (0.053) | 0.133 (0.045) |

Note: 95% Confidence Interval in parentheses. †p < 0.1, *p < 0.05, **p < 0.01, ***p < 0.001. To ensure comparability of coefficients across models, I report the incidence rate ratio as coefficient for each model.

S9. Endogeneity Check Results

Table S9 OLS Regression Results on Endogeneity

| Outcome variables | Public Participation Exposure | | Job Satisfaction | |
|---|---|---|---|---|
| | (1) | (2) | (3) | (4) |
| Volunteer Hours | 0.018 | | 0.014 | |
| | (0.011) | | (0.018) | |
| Volunteer Diversity | | 0.058 | | 0.052 |
| | | (0.035) | | (0.036) |
| Public participation | | | -0.007 | 0.020 |
| | | | (0.045) | (0.042) |
| Work experience in public sector | 0.004 | 0.006 | 0.009 | 0.009 |
| | (0.007) | (0.007) | (0.006) | (0.006) |
| Education | 0.180** | 0.194*** | 0.046 | 0.046 |
| | (0.076) | (0.074) | (0.068) | (0.066) |
| Salary | 0.004 | 0.006 | 0.106** | 0.111** |
| | (0.047) | (0.046) | (0.047) | (0.047) |
| Gender: Female | 0.193* | 0.183* | -0.041 | -0.061 |
| | (0.100) | (0.097) | (0.090) | (0.088) |
| Age | -0.006 | -0.006 | -0.001 | -0.001 |
| | (0.009) | (0.009) | (0.009) | (0.008) |
| Parenting status | 0.024 | 0.029 | 0.128 | 0.069 |
| | (0.160) | (0.157) | (0.157) | (0.153) |
| Race: White | -0.051 | -0.075 | 0.082 | 0.089 |
| | (0.138) | (0.134) | (0.137) | (0.135) |
| Department size | 0.003** | 0.003** | 0.001 | -0.0003 |
| | (0.001) | (0.001) | (0.002) | (0.001) |
| Department: Community Development | -0.250* | -0.227* | -0.191 | -0.134 |
| | (0.138) | (0.135) | (0.124) | (0.124) |
| Department: Finance | -0.595*** | -0.530*** | -0.242* | -0.088 |
| | (0.149) | (0.145) | (0.132) | (0.129) |
| Department: Parks and Recreation | -0.389*** | -0.376*** | -0.088 | -0.039 |
| | (0.143) | (0.140) | (0.130) | (0.128) |
| Department: Police | -0.465*** | -0.420*** | -0.162 | -0.071 |
| | (0.152) | (0.146) | (0.134) | (0.128) |
| City-level NGO density | -0.009 | -0.008 | -0.016 | -0.016 |
| | (0.010) | (0.009) | (0.010) | (0.010) |
| Work experience in public sector | 0.004 | 0.006 | 0.009 | 0.009 |
| | (0.007) | (0.007) | (0.006) | (0.006) |
| Constant | 2.033*** | 1.907*** | 3.827*** | 3.701*** |
| | (0.611) | (0.600) | (0.559) | (0.552) |
| Observations | 499 | 519 | 154 | 161 |
| R2 | 0.087 | 0.083 | 0.185 | 0.176 |
| Adjusted R2 | 0.060 | 0.057 | 0.097 | 0.090 |

Note: Standard errors in parentheses. *p < 0.1, **p < 0.05, ***p < 0.01.