**Supplement Figure 1: Simulation Flow Chart**

**For each of the twenty 2009 and twenty 2012 NHBS samples:**

**1a.** **Estimate:**

• Prevalence of trait

• Homophily of trait

• Average network size

• Differential Activity

**2.** **Calculate:**

• Sample size

• Number of seeds with and without trait

• Distribution of recruitments made by sample members

**1b.** **Using** **ERGM,** **create** **1,000 networks** **with:**

• 10,000 members

• Characteristics estimated in step 1a

**3.** **For** **each** **of** **the** **1,000** **networks:**

• Simulate 1 RDS sample without replacement that has the same sample size, number of seeds, and distribution of recruitments calculated in step 2

**4.** **For** **each** **simulated** **RDS** **sample:**

• Calculate the sample mean and SRS variance estimator

• Calculate the SH point estimator and Sal‐BS variance estimator

• Calculate the VH point estimator and Sal‐BS variance estimator

• Calculate the SS point estimator and SS‐BS variance estimator

**Supplement Table 1: Population Parameters by Sample**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Sample** | **Trait****Prevalence** | **Mean****Degree** | **Differential****Activity** | **Homophily** |
| A‐01 | 0.259 | 7.89 | 0.74 | 1.53 |
| A‐02 | 0.160 | 10.52 | 1.04 | 1.21 |
| A‐03 | 0.082 | 11.65 | 0.82 | 1.41 |
| A‐04 | 0.068 | 7.43 | 0.93 | 1.37 |
| A‐05 | 0.036 | 7.36 | 0.53 | 1.19 |
| A‐06 | 0.037 | 6.24 | 1.22 | 1.20 |
| A‐07 | 0.032 | 10.04 | 0.86 | 1.25 |
| A‐08 | 0.112 | 6.03 | 0.62 | 1.21 |
| A‐09 | 0.055 | 7.61 | 0.97 | 1.13 |
| A‐10 | 0.172 | 7.93 | 0.73 | 1.07 |
| A‐11 | 0.084 | 8.29 | 0.82 | 0.91 |
| A‐12 | 0.070 | 4.70 | 1.32 | 1.19 |
| A‐13 | 0.171 | 5.77 | 0.79 | 1.05 |
| A‐14 | 0.154 | 4.45 | 0.92 | 1.41 |
| A‐15 | 0.096 | 13.91 | 0.91 | 1.30 |
| A‐16 | 0.022 | 5.73 | 1.26 | 0.96 |
| A‐17 | 0.156 | 9.45 | 0.97 | 1.43 |
| A‐18 | 0.156 | 10.77 | 1.27 | 0.98 |
| A‐19 | 0.072 | 9.40 | 0.97 | 1.37 |
| A‐20 | 0.094 | 11.36 | 1.29 | 1.02 |
| B‐01 | 0.233 | 10.26 | 0.69 | 1.44 |
| B‐02 | 0.286 | 11.26 | 0.85 | 1.15 |
| B‐03 | 0.034 | 17.24 | 0.74 | 1.16 |
| B‐04 | 0.034 | 9.76 | 0.92 | 0.94 |
| B‐05 | 0.019 | 12.43 | 1.44 | 1.06 |
| B‐06 | 0.073 | 8.70 | 0.87 | 1.62 |
| B‐07 | 0.043 | 9.18 | 0.80 | 1.05 |
| B‐08 | 0.097 | 9.21 | 0.83 | 1.14 |
| B‐09 | 0.068 | 11.21 | 0.78 | 0.93 |
| B‐10 | 0.122 | 14.19 | 1.16 | 1.36 |
| B‐11 | 0.179 | 12.91 | 0.94 | 1.60 |
| B‐12 | 0.074 | 8.93 | 0.68 | 1.35 |
| B‐13 | 0.095 | 7.89 | 1.02 | 1.19 |
| B‐14 | 0.136 | 10.49 | 0.82 | 1.06 |
| B‐15 | 0.066 | 17.82 | 0.97 | 0.96 |
| B‐16 | 0.018 | 10.00 | 1.04 | 1.46 |
| B‐17 | 0.126 | 13.82 | 0.98 | 1.28 |
| B‐18 | 0.156 | 35.39 | 0.98 | 0.97 |
| B‐19 | 0.133 | 14.42 | 0.59 | 1.99 |
| B‐20 | 0.087 | 13.89 | 1.14 | 1.12 |

**Supplement Table 2: Sample Conditions by Sample**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Sample** | **Seeds with Trait** | **Seeds without Trait** | **Seeds Missing Trait** | **Number sample members who recruited****0 persons** | **Number sample members who recruited****1 persons** | **Number sample members who recruited****2 persons** | **Number sample members who recruited****3 persons** | **Number sample members who recruited****4 persons** | **Number sample members who recruited****5 persons** |
| A‐01 | 2 | 1 | 0 | 170 | 73 | 77 | 49 | 16 | 5 |
| A‐02 | 0 | 8 | 0 | 115 | 113 | 99 | 61 | 3 | 1 |
| A‐03 | 0 | 4 | 1 | 210 | 170 | 112 | 46 | 24 | 2 |
| A‐04 | 3 | 6 | 0 | 196 | 143 | 89 | 55 | 7 | 6 |
| A‐05 | 0 | 9 | 0 | 160 | 112 | 130 | 82 | 1 | 0 |
| A‐06 | 2 | 8 | 0 | 193 | 104 | 51 | 40 | 17 | 5 |
| A‐07 | 0 | 4 | 0 | 100 | 111 | 82 | 48 | 0 | 0 |
| A‐08 | 2 | 4 | 0 | 209 | 111 | 92 | 79 | 0 | 0 |
| A‐09 | 0 | 9 | 0 | 206 | 114 | 93 | 81 | 1 | 1 |
| A‐10 | 0 | 7 | 0 | 249 | 138 | 80 | 53 | 26 | 8 |
| A‐11 | 2 | 12 | 0 | 211 | 96 | 84 | 78 | 2 | 2 |
| A‐12 | 2 | 7 | 0 | 75 | 33 | 23 | 22 | 13 | 0 |
| A‐13 | 0 | 7 | 0 | 232 | 147 | 110 | 68 | 15 | 0 |
| A‐14 | 0 | 7 | 1 | 158 | 98 | 70 | 28 | 20 | 3 |
| A‐15 | 0 | 4 | 0 | 151 | 100 | 101 | 61 | 10 | 3 |
| A‐16 | 0 | 4 | 0 | 181 | 56 | 61 | 61 | 47 | 12 |
| A‐17 | 1 | 8 | 0 | 165 | 148 | 120 | 49 | 0 | 0 |
| A‐18 | 1 | 4 | 0 | 217 | 65 | 94 | 69 | 0 | 0 |
| A‐19 | 1 | 5 | 0 | 128 | 134 | 105 | 41 | 12 | 1 |
| A‐20 | 1 | 3 | 0 | 143 | 143 | 122 | 57 | 0 | 0 |
| B‐01 | 5 | 3 | 0 | 161 | 165 | 108 | 51 | 3 | 2 |
| B‐02 | 4 | 11 | 0 | 168 | 152 | 137 | 66 | 1 | 0 |
| B‐03 | 0 | 3 | 0 | 163 | 153 | 108 | 32 | 9 | 2 |
| B‐04 | 0 | 16 | 0 | 66 | 27 | 30 | 20 | 8 | 3 |
| B‐05 | 1 | 9 | 0 | 185 | 112 | 98 | 66 | 1 | 0 |
| B‐06 | 1 | 11 | 0 | 229 | 101 | 83 | 50 | 12 | 9 |
| B‐07 | 0 | 8 | 0 | 126 | 105 | 120 | 68 | 4 | 3 |
| B‐08 | 3 | 5 | 0 | 218 | 112 | 105 | 89 | 0 | 0 |
| B‐09 | 1 | 14 | 0 | 200 | 99 | 63 | 56 | 22 | 10 |
| B‐10 | 1 | 6 | 0 | 207 | 132 | 98 | 45 | 5 | 7 |
| B‐11 | 1 | 11 | 0 | 191 | 94 | 96 | 80 | 0 | 0 |
| B‐12 | 1 | 8 | 0 | 93 | 45 | 29 | 14 | 8 | 5 |
| B‐13 | 0 | 7 | 2 | 196 | 132 | 60 | 45 | 24 | 4 |
| B‐14 | 1 | 3 | 0 | 184 | 96 | 90 | 53 | 3 | 1 |
| B‐15 | 2 | 6 | 1 | 135 | 141 | 121 | 55 | 2 | 1 |
| B‐16 | 1 | 4 | 0 | 176 | 121 | 120 | 47 | 6 | 2 |
| B‐17 | 1 | 6 | 0 | 193 | 170 | 113 | 51 | 1 | 2 |
| B‐18 | 2 | 7 | 0 | 219 | 66 | 74 | 73 | 2 | 1 |
| B‐19 | 2 | 7 | 0 | 197 | 225 | 176 | 32 | 2 | 2 |
| B‐20 | 1 | 4 | 0 | 155 | 139 | 122 | 52 | 0 | 0 |

**Supplement Table 3: Coverage Results by Sample**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Sample** | **Coverage:****sample mean** | **Coverage: SH** | **Coverage: VH** | **Coverage: SS** |
| A‐01 | 31.4% | 86.3% | 85.2% | 94.0% |
| A‐02 | 91.6% | 95.1% | 94.5% | 93.8% |
| A‐03 | 63.3% | 94.1% | 93.8% | 93.5% |
| A‐04 | 86.6% | 92.6% | 93.3% | 95.9% |
| A‐05 | 21.9% | 91.0% | 91.1% | 90.5% |
| A‐06 | 80.9% | 94.8% | 96.2% | 95.3% |
| A‐07 | 76.2% | 91.1% | 90.8% | 90.5% |
| A‐08 | 16.3% | 85.7% | 87.2% | 95.0% |
| A‐09 | 87.0% | 93.9% | 93.8% | 93.4% |
| A‐10 | 16.4% | 95.0% | 95.1% | 93.9% |
| A‐11 | 82.1% | 94.4% | 94.4% | 95.1% |
| A‐12 | 76.0% | 94.0% | 95.9% | 95.6% |
| A‐13 | 31.4% | 95.0% | 94.4% | 93.7% |
| A‐14 | 73.5% | 93.3% | 93.1% | 92.6% |
| A‐15 | 76.6% | 94.7% | 94.3% | 94.2% |
| A‐16 | 91.4% | 93.1% | 92.8% | 92.4% |
| A‐17 | 82.9% | 94.8% | 94.8% | 94.2% |
| A‐18 | 53.2% | 96.7% | 96.7% | 94.6% |
| A‐19 | 81.4% | 93.8% | 93.8% | 94.9% |
| A‐20 | 57.9% | 96.5% | 96.7% | 95.0% |
| B‐01 | 23.2% | 86.2% | 81.6% | 95.5% |
| B‐02 | 53.7% | 93.8% | 93.9% | 94.3% |
| B‐03 | 63.9% | 91.2% | 91.7% | 91.2% |
| B‐04 | 85.8% | 90.0% | 90.1% | 86.8% |
| B‐05 | 77.4% | 94.1% | 95.7% | 94.9% |
| B‐06 | 67.5% | 92.7% | 91.9% | 93.5% |
| B‐07 | 72.9% | 93.2% | 93.1% | 92.4% |
| B‐08 | 79.6% | 92.2% | 91.2% | 95.0% |
| B‐09 | 66.0% | 93.6% | 94.5% | 94.0% |
| B‐10 | 72.4% | 94.3% | 93.9% | 92.9% |
| B‐11 | 73.7% | 95.8% | 94.4% | 95.1% |
| B‐12 | 61.5% | 87.0% | 89.4% | 91.8% |
| B‐13 | 90.4% | 94.8% | 94.4% | 94.0% |
| B‐14 | 69.8% | 93.8% | 94.2% | 95.5% |
| B‐15 | 96.0% | 94.2% | 94.9% | 94.8% |
| B‐16 | 83.9% | 89.6% | 90.9% | 91.8% |
| B‐17 | 86.0% | 94.6% | 95.2% | 94.9% |
| B‐18 | 95.6% | 95.6% | 95.9% | 95.7% |
| B‐19 | 14.0% | 89.5% | 86.8% | 94.8% |
| B‐20 | 84.9% | 96.1% | 96.2% | 95.0% |

**Supplement Table 4: Confidence Interval Width Results by Sample**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Sample** | **Avg CI Width: sample mean** | **Avg CI Width: SH** | **Avg CI Width: VH** | **Avg CI Width: SS** | **Std. Dev. CI Width: sample mean** | **Std. Dev. CI Width: SH** | **Std. Dev. CI Width: VH** | **Std. Dev. CI Width: SS** |
| A‐01 | 0.0719 | 0.1073 | 0.1074 | 0.1397 | 0.00372 | 0.02166 | 0.02187 | 0.01559 |
| A‐02 | 0.0616 | 0.0775 | 0.0774 | 0.0753 | 0.00278 | 0.00730 | 0.00721 | 0.00691 |
| A‐03 | 0.0375 | 0.0647 | 0.0647 | 0.0654 | 0.00346 | 0.01025 | 0.01022 | 0.01136 |
| A‐04 | 0.0406 | 0.0584 | 0.0585 | 0.0639 | 0.00374 | 0.01158 | 0.01143 | 0.01193 |
| A‐05 | 0.0208 | 0.0511 | 0.0516 | 0.0491 | 0.00332 | 0.02260 | 0.02918 | 0.01506 |
| A‐06 | 0.0394 | 0.0459 | 0.0460 | 0.0418 | 0.00450 | 0.01241 | 0.01252 | 0.00909 |
| A‐07 | 0.0299 | 0.0475 | 0.0496 | 0.0456 | 0.00534 | 0.03332 | 0.05440 | 0.01467 |
| A‐08 | 0.0433 | 0.0744 | 0.0744 | 0.0858 | 0.00355 | 0.02434 | 0.02433 | 0.01303 |
| A‐09 | 0.0355 | 0.0457 | 0.0457 | 0.0440 | 0.00338 | 0.00751 | 0.00758 | 0.00736 |
| A‐10 | 0.0520 | 0.0792 | 0.0789 | 0.0760 | 0.00240 | 0.00736 | 0.00732 | 0.00666 |
| A‐11 | 0.0428 | 0.0535 | 0.0535 | 0.0535 | 0.00278 | 0.00861 | 0.00869 | 0.00698 |
| A‐12 | 0.0797 | 0.0927 | 0.0926 | 0.0828 | 0.00853 | 0.02722 | 0.02746 | 0.01851 |
| A‐13 | 0.0518 | 0.0748 | 0.0747 | 0.0719 | 0.00217 | 0.00699 | 0.00683 | 0.00628 |
| A‐14 | 0.0642 | 0.1034 | 0.1032 | 0.1015 | 0.00447 | 0.01359 | 0.01347 | 0.01372 |
| A‐15 | 0.0458 | 0.0668 | 0.0668 | 0.0668 | 0.00368 | 0.00870 | 0.00862 | 0.00932 |
| A‐16 | 0.0249 | 0.0219 | 0.0219 | 0.0211 | 0.00286 | 0.00422 | 0.00422 | 0.00402 |
| A‐17 | 0.0583 | 0.0869 | 0.0868 | 0.0867 | 0.00331 | 0.00926 | 0.00926 | 0.00991 |
| A‐18 | 0.0693 | 0.0689 | 0.0687 | 0.0612 | 0.00240 | 0.01068 | 0.01062 | 0.00401 |
| A‐19 | 0.0426 | 0.0612 | 0.0612 | 0.0628 | 0.00412 | 0.01013 | 0.01013 | 0.01123 |
| A‐20 | 0.0517 | 0.0536 | 0.0536 | 0.0449 | 0.00258 | 0.01125 | 0.01134 | 0.00365 |
| B‐01 | 0.0621 | 0.0884 | 0.0884 | 0.1155 | 0.00289 | 0.02322 | 0.02311 | 0.01071 |
| B‐02 | 0.0651 | 0.0842 | 0.0841 | 0.0839 | 0.00161 | 0.00754 | 0.00756 | 0.00487 |
| B‐03 | 0.0264 | 0.0434 | 0.0431 | 0.0422 | 0.00413 | 0.01217 | 0.01050 | 0.01034 |
| B‐04 | 0.0442 | 0.0526 | 0.0524 | 0.0485 | 0.00878 | 0.01320 | 0.01308 | 0.01298 |
| B‐05 | 0.0273 | 0.0244 | 0.0244 | 0.0208 | 0.00351 | 0.00864 | 0.00872 | 0.00373 |
| B‐06 | 0.0408 | 0.0734 | 0.0733 | 0.0778 | 0.00499 | 0.01640 | 0.01642 | 0.01783 |
| B‐07 | 0.0284 | 0.0408 | 0.0407 | 0.0392 | 0.00316 | 0.00761 | 0.00761 | 0.00716 |
| B‐08 | 0.0436 | 0.0568 | 0.0568 | 0.0619 | 0.00273 | 0.01087 | 0.01087 | 0.00740 |
| B‐09 | 0.0369 | 0.0484 | 0.0485 | 0.0479 | 0.00301 | 0.00745 | 0.00750 | 0.00598 |
| B‐10 | 0.0572 | 0.0738 | 0.0737 | 0.0704 | 0.00362 | 0.01078 | 0.01065 | 0.00878 |
| B‐11 | 0.0612 | 0.1002 | 0.1000 | 0.1034 | 0.00356 | 0.01049 | 0.01031 | 0.01231 |
| B‐12 | 0.0593 | 0.1148 | 0.1144 | 0.1184 | 0.01074 | 0.04996 | 0.05274 | 0.04119 |
| B‐13 | 0.0492 | 0.0630 | 0.0630 | 0.0611 | 0.00347 | 0.00802 | 0.00801 | 0.00788 |
| B‐14 | 0.0574 | 0.0727 | 0.0727 | 0.0746 | 0.00336 | 0.01127 | 0.01124 | 0.00747 |
| B‐15 | 0.0395 | 0.0406 | 0.0406 | 0.0401 | 0.00267 | 0.00381 | 0.00374 | 0.00336 |
| B‐16 | 0.0227 | 0.0335 | 0.0337 | 0.0333 | 0.00447 | 0.04685 | 0.05212 | 0.01298 |
| B‐17 | 0.0524 | 0.0706 | 0.0706 | 0.0694 | 0.00312 | 0.00736 | 0.00748 | 0.00748 |
| B‐18 | 0.0647 | 0.0668 | 0.0668 | 0.0649 | 0.00269 | 0.00485 | 0.00473 | 0.00388 |
| B‐19 | 0.0403 | 0.1026 | 0.1027 | 0.1223 | 0.00419 | 0.02723 | 0.02711 | 0.02155 |
| B‐20 | 0.0485 | 0.0542 | 0.0543 | 0.0501 | 0.00302 | 0.00767 | 0.00753 | 0.00523 |

**Supplement Table 5: Actual Design Effect Results by Sample**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Sample** | **Actual DE: sample mean** | **Actual DE:****SH** | **Actual DE:****VH** | **Actual DE:****SS** |
| A-01 | 2.18 | 2.94 | 3.21 | 3.18 |
| A-02 | 1.32 | 1.46 | 1.40 | 1.40 |
| A-03 | 1.64 | 2.35 | 2.51 | 2.47 |
| A-04 | 1.67 | 2.12 | 2.25 | 2.22 |
| A-05 | 0.78 | 39.39a | 2.90 | 2.81 |
| A-06 | 1.71 | 1.34 | 1.33 | 1.33 |
| A-07 | 1.38 | 81.69b | 1.93 | 1.91 |
| A-08 | 1.02 | 2.90 | 2.72 | 2.65 |
| A-09 | 1.21 | 1.53 | 1.47 | 1.46 |
| A-10 | 0.92 | 1.74 | 1.68 | 1.65 |
| A-11 | 0.75 | 1.36 | 1.31 | 1.29 |
| A-12 | 1.73 | 1.35 | 1.28 | 1.28 |
| A-13 | 0.92 | 1.70 | 1.64 | 1.61 |
| A-14 | 1.81 | 2.39 | 2.23 | 2.21 |
| A-15 | 1.55 | 1.91 | 1.91 | 1.89 |
| A-16 | 1.24 | 0.95 | 0.94 | 0.94 |
| A-17 | 1.85 | 2.11 | 2.08 | 2.06 |
| A-18 | 1.08 | 0.91 | 0.89 | 0.89 |
| A-19 | 1.81 | 1.90 | 2.04 | 2.03 |
| A-20 | 1.28 | 0.94 | 0.92 | 0.93 |
| B-01 | 1.65 | 2.59 | 2.68 | 2.64 |
| B-02 | 1.23 | 1.65 | 1.60 | 1.58 |
| B-03 | 1.09 | 2.15 | 2.05 | 2.03 |
| B-04 | 0.82 | 1.37 | 1.08 | 1.07 |
| B-05 | 1.55 | 0.83 | 0.81 | 0.83 |
| B-06 | 2.31 | 3.03 | 3.13 | 3.10 |
| B-07 | 0.93 | 1.69 | 1.63 | 1.60 |
| B-08 | 1.04 | 1.68 | 1.70 | 1.67 |
| B-09 | 0.79 | 1.49 | 1.42 | 1.40 |
| B-10 | 2.19 | 1.74 | 1.81 | 1.82 |
| B-11 | 2.25 | 2.31 | 2.53 | 2.52 |
| B-12 | 1.31 | 16.91c | 2.99 | 2.97 |
| B-13 | 1.38 | 1.58 | 1.52 | 1.51 |
| B-14 | 1.00 | 1.46 | 1.42 | 1.41 |
| B-15 | 0.88 | 1.04 | 1.02 | 1.01 |
| B-16 | 2.10 | 95.51d | 2.19 | 2.19 |
| B-17 | 1.60 | 1.74 | 1.76 | 1.75 |
| B-18 | 0.88 | 0.99 | 0.94 | 0.94 |
| B-19 | 2.64 | 4.93 | 6.19 | 6.03 |
| B-20 | 1.36 | 1.15 | 1.16 | 1.16 |

**abcd** These large values are due to a small number (2 to 6 out of the 1000 samples) of failed prevalence estimates (estimated prevalences of 100%). The results when these DE's are recalculated without these outliers are **a**=3.42, **b**=1.99, **c**=3.54, **d**=2.07.

**Supplement Table 6: Estimated Design Effect Results by Sample**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Sample** | **Mean****SH** | **Std. Dev.****SH** | **Median****SH** | **Minimum****SH** | **Maximum****SH** | **Mean****VH** | **Std. Dev.****VH** | **Median****VH** | **Minimum****VH** | **Maximum****VH** | **Mean****SS** | **Std. Dev.****SS** | **Median****SS** | **Minimum****SS** | **Maximum****SS** |
| A‐01 | 1.99 | 0.763 | 1.64 | 0.80 | 4.39 | 1.97 | 0.766 | 1.65 | 0.85 | 4.69 | 3.26 | 0.625 | 3.18 | 1.84 | 6.51 |
| A‐02 | 1.60 | 0.216 | 1.58 | 1.02 | 2.68 | 1.63 | 0.222 | 1.62 | 1.03 | 2.67 | 1.54 | 0.201 | 1.53 | 1.06 | 2.45 |
| A‐03 | 2.50 | 0.482 | 2.45 | 1.00 | 4.52 | 2.54 | 0.555 | 2.44 | 1.10 | 5.55 | 2.59 | 0.604 | 2.50 | 1.06 | 5.41 |
| A‐04 | 2.10 | 0.589 | 2.05 | 0.52 | 4.36 | 1.94 | 0.579 | 1.88 | 0.54 | 4.94 | 2.30 | 0.587 | 2.20 | 1.01 | 5.11 |
| A‐05 | >1000 | >1000 | 2.94 | 0.00 | >1000 | 4.85 | 39.265 | 2.98 | 1.28 | >1000 | 3.26 | 1.713 | 2.88 | 0.80 | 32.16 |
| A‐06 | 1.86 | 0.942 | 1.54 | 0.78 | 7.97 | 1.70 | 0.910 | 1.38 | 0.67 | 8.25 | 1.34 | 0.394 | 1.28 | 0.57 | 4.12 |
| A‐07 | >1000 | >1000 | 1.87 | 0.00 | >1000 | 9.51 | 138.297 | 1.86 | 0.82 | >1000 | 2.10 | 1.335 | 1.82 | 0.57 | 16.46 |
| A‐08 | 2.24 | 1.086 | 2.54 | 0.21 | 4.62 | 2.18 | 1.071 | 2.44 | 0.22 | 5.23 | 2.69 | 0.539 | 2.65 | 1.50 | 4.45 |
| A‐09 | 1.59 | 0.323 | 1.55 | 0.84 | 3.25 | 1.61 | 0.351 | 1.56 | 0.92 | 3.53 | 1.50 | 0.326 | 1.44 | 0.86 | 3.57 |
| A‐10 | 1.86 | 0.271 | 1.82 | 1.24 | 3.17 | 1.86 | 0.274 | 1.82 | 1.26 | 3.14 | 1.74 | 0.236 | 1.69 | 1.21 | 2.85 |
| A‐11 | 1.37 | 0.353 | 1.34 | 0.42 | 3.24 | 1.34 | 0.343 | 1.32 | 0.41 | 3.35 | 1.33 | 0.266 | 1.27 | 0.92 | 2.93 |
| A‐12 | 1.91 | 1.089 | 1.53 | 0.63 | 10.22 | 1.77 | 1.045 | 1.40 | 0.52 | 9.48 | 1.34 | 0.409 | 1.26 | 0.50 | 3.23 |
| A‐13 | 1.76 | 0.250 | 1.74 | 1.22 | 2.78 | 1.78 | 0.248 | 1.75 | 1.16 | 2.71 | 1.65 | 0.211 | 1.63 | 1.13 | 2.45 |
| A‐14 | 2.42 | 0.414 | 2.40 | 1.42 | 3.82 | 2.48 | 0.463 | 2.43 | 1.33 | 4.26 | 2.39 | 0.452 | 2.35 | 1.34 | 4.12 |
| A‐15 | 1.95 | 0.324 | 1.92 | 1.18 | 4.06 | 1.98 | 0.365 | 1.92 | 1.20 | 4.43 | 1.98 | 0.394 | 1.92 | 1.14 | 5.05 |
| A‐16 | 0.97 | 0.232 | 0.93 | 0.51 | 3.03 | 0.97 | 0.236 | 0.92 | 0.63 | 3.14 | 0.90 | 0.211 | 0.85 | 0.44 | 3.13 |
| A‐17 | 2.17 | 0.318 | 2.15 | 1.31 | 3.51 | 2.18 | 0.343 | 2.15 | 1.33 | 4.15 | 2.18 | 0.352 | 2.16 | 1.09 | 4.13 |
| A‐18 | 1.18 | 0.383 | 1.02 | 0.67 | 2.52 | 1.18 | 0.380 | 1.02 | 0.66 | 2.49 | 0.91 | 0.082 | 0.90 | 0.71 | 1.22 |
| A‐19 | 2.05 | 0.430 | 2.01 | 0.86 | 4.27 | 2.02 | 0.449 | 1.98 | 0.81 | 4.09 | 2.12 | 0.494 | 2.05 | 1.05 | 4.27 |
| A‐20 | 1.38 | 0.582 | 1.06 | 0.73 | 3.25 | 1.36 | 0.582 | 1.05 | 0.68 | 3.17 | 0.91 | 0.091 | 0.90 | 0.68 | 1.34 |
| B‐01 | 1.81 | 0.906 | 1.29 | 0.60 | 4.32 | 1.75 | 0.876 | 1.25 | 0.54 | 4.19 | 2.83 | 0.428 | 2.81 | 1.88 | 4.65 |
| B‐02 | 1.57 | 0.258 | 1.60 | 0.93 | 2.46 | 1.56 | 0.257 | 1.59 | 0.89 | 2.34 | 1.55 | 0.158 | 1.53 | 1.15 | 2.33 |
| B‐03 | 2.07 | 1.532 | 1.92 | 0.70 | 35.64 | 2.03 | 0.650 | 1.91 | 0.96 | 6.95 | 1.96 | 0.583 | 1.85 | 0.70 | 5.14 |
| B‐04 | 1.18 | 0.283 | 1.16 | 0.37 | 2.59 | 1.32 | 0.270 | 1.27 | 0.71 | 2.76 | 1.12 | 0.258 | 1.10 | 0.41 | 2.55 |
| B‐05 | 1.33 | 1.071 | 0.92 | 0.59 | 6.78 | 1.25 | 1.021 | 0.88 | 0.53 | 6.91 | 0.81 | 0.158 | 0.79 | 0.52 | 2.12 |
| B‐06 | 2.90 | 0.829 | 2.84 | 0.78 | 10.71 | 2.97 | 1.336 | 2.74 | 0.77 | 25.99 | 3.29 | 1.065 | 3.14 | 1.09 | 11.04 |
| B‐07 | 1.66 | 0.371 | 1.60 | 0.99 | 4.54 | 1.68 | 0.387 | 1.61 | 1.01 | 4.74 | 1.57 | 0.342 | 1.51 | 0.97 | 3.95 |
| B‐08 | 1.56 | 0.511 | 1.65 | 0.50 | 3.42 | 1.49 | 0.489 | 1.56 | 0.46 | 3.13 | 1.73 | 0.297 | 1.67 | 1.13 | 3.87 |
| B‐09 | 1.41 | 0.330 | 1.39 | 0.35 | 5.54 | 1.40 | 0.321 | 1.40 | 0.32 | 4.64 | 1.36 | 0.233 | 1.32 | 1.04 | 4.49 |
| B‐10 | 1.88 | 0.463 | 1.76 | 1.12 | 4.63 | 1.88 | 0.483 | 1.75 | 1.11 | 4.65 | 1.70 | 0.293 | 1.65 | 1.01 | 2.88 |
| B‐11 | 2.54 | 0.382 | 2.52 | 1.58 | 4.42 | 2.59 | 0.430 | 2.54 | 1.54 | 4.41 | 2.77 | 0.498 | 2.71 | 1.57 | 5.00 |
| B‐12 | >1000 | >1000 | 2.63 | 0.00 | >1000 | 3.04 | 7.732 | 2.37 | 0.02 | 227.58 | 2.89 | 1.589 | 2.57 | 0.49 | 18.11 |
| B‐13 | 1.65 | 0.274 | 1.62 | 1.02 | 3.30 | 1.67 | 0.291 | 1.63 | 1.08 | 3.63 | 1.57 | 0.271 | 1.54 | 0.99 | 2.94 |
| B‐14 | 1.42 | 0.375 | 1.46 | 0.49 | 3.48 | 1.41 | 0.370 | 1.45 | 0.44 | 3.13 | 1.47 | 0.225 | 1.43 | 1.04 | 3.33 |
| B‐15 | 1.06 | 0.129 | 1.06 | 0.60 | 1.54 | 1.03 | 0.120 | 1.02 | 0.61 | 1.51 | 1.00 | 0.080 | 0.99 | 0.84 | 1.43 |
| B‐16 | >1000 | >1000 | 1.98 | 0.26 | >1000 | 12.22 | 227.234 | 1.68 | 0.19 | >1000 | 2.25 | 1.501 | 1.96 | 0.25 | 25.12 |
| B‐17 | 1.80 | 0.254 | 1.78 | 1.00 | 2.74 | 1.80 | 0.270 | 1.77 | 1.08 | 3.45 | 1.74 | 0.261 | 1.70 | 1.15 | 2.82 |
| B‐18 | 1.06 | 0.125 | 1.05 | 0.77 | 1.54 | 1.05 | 0.122 | 1.05 | 0.78 | 1.47 | 0.99 | 0.087 | 0.98 | 0.79 | 1.30 |
| B‐19 | 4.65 | 1.725 | 4.99 | 0.47 | 9.37 | 4.55 | 1.784 | 4.73 | 0.38 | 10.59 | 6.23 | 1.551 | 6.06 | 2.60 | 14.82 |
| B‐20 | 1.42 | 0.359 | 1.32 | 0.84 | 2.93 | 1.41 | 0.358 | 1.31 | 0.87 | 3.42 | 1.19 | 0.162 | 1.17 | 0.85 | 1.76 |

**>1000**: Mean and s.d. of estimates adversely affected by a small number of extreme outliers. Refer to the median for these cases.

**Supplement Table 7: Coverage Percentile Bootstrap by Sample**

|  |  |  |  |
| --- | --- | --- | --- |
| **Sample** | **Coverage:****SH** | **Coverage:****VH** | **Coverage:****SS** |
| A‐01 | 40.5% | 40.7% | 95.4% |
| A‐02 | 95.6% | 95.8% | 94.3% |
| A‐03 | 94.2% | 93.9% | 94.1% |
| A‐04 | 91.8% | 92.7% | 96.1% |
| A‐05 | 92.0% | 91.8% | 91.6% |
| A‐06 | 92.1% | 90.8% | 94.8% |
| A‐07 | 91.7% | 91.8% | 92.0% |
| A‐08 | 70.4% | 70.7% | 94.1% |
| A‐09 | 93.7% | 93.7% | 93.3% |
| A‐10 | 95.2% | 95.4% | 94.5% |
| A‐11 | 89.0% | 88.9% | 94.9% |
| A‐12 | 88.4% | 87.0% | 94.8% |
| A‐13 | 94.9% | 94.8% | 94.3% |
| A‐14 | 93.6% | 93.8% | 94.0% |
| A‐15 | 94.8% | 94.9% | 95.0% |
| A‐16 | 93.7% | 93.7% | 92.5% |
| A‐17 | 94.8% | 94.9% | 94.8% |
| A‐18 | 74.8% | 74.6% | 94.9% |
| A‐19 | 94.1% | 94.4% | 95.4% |
| A‐20 | 67.4% | 67.0% | 94.6% |
| B‐01 | 41.9% | 41.9% | 95.8% |
| B‐02 | 77.4% | 77.1% | 94.1% |
| B‐03 | 92.8% | 93.0% | 92.3% |
| B‐04 | 90.9% | 90.5% | 86.7% |
| B‐05 | 88.9% | 86.9% | 94.7% |
| B‐06 | 92.5% | 92.8% | 94.4% |
| B‐07 | 93.4% | 93.6% | 92.6% |
| B‐08 | 76.1% | 77.3% | 94.9% |
| B‐09 | 90.7% | 90.4% | 93.7% |
| B‐10 | 88.9% | 88.2% | 93.4% |
| B‐11 | 96.0% | 96.0% | 96.5% |
| B‐12 | 85.9% | 86.3% | 91.2% |
| B‐13 | 94.9% | 94.8% | 94.6% |
| B‐14 | 81.6% | 82.4% | 95.2% |
| B‐15 | 94.0% | 94.4% | 94.8% |
| B‐16 | 86.2% | 87.7% | 91.5% |
| B‐17 | 95.1% | 95.2% | 94.8% |
| B‐18 | 95.6% | 95.8% | 95.8% |
| B‐19 | 83.0% | 82.8% | 95.4% |
| B‐20 | 90.3% | 89.9% | 95.3% |

**Supplement Table 8: Volz‐Heckathorn With-Replacement Sampling Results by Sample**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Sample** | **Coverage: Studentized Bootstrap** | **Coverage: Percentile Bootstrap** | **Actual DE** | **Mean Estimated DE** | **Std. Dev. Estimated DE** | **Median Estimated DE** | **Minimum Estimated DE** | **Maximum Estimated DE** |
| A‐01 | 72.3% | 40.9% | 5.50 | 1.97 | 0.766 | 1.65 | 0.85 | 4.69 |
| A‐02 | 88.8% | 90.7% | 2.03 | 1.63 | 0.222 | 1.62 | 1.03 | 2.67 |
| A‐03 | 87.2% | 89.7% | 3.48 | 2.54 | 0.555 | 2.44 | 1.10 | 5.55 |
| A‐04 | 82.8% | 87.6% | 4.26 | 1.94 | 0.579 | 1.88 | 0.54 | 4.94 |
| A‐05 | 81.4% | 83.0% | 4.22 | 4.85 | 39.265 | 2.98 | 1.28 | 1220.79 |
| A‐06 | 89.2% | 83.1% | 2.34 | 1.70 | 0.910 | 1.38 | 0.67 | 8.25 |
| A‐07 | 85.1% | 87.0% | 2.42 | 9.51 | 138.297 | 1.86 | 0.82 | 3911.69 |
| A‐08 | 74.2% | 64.3% | 5.09 | 2.18 | 1.071 | 2.44 | 0.22 | 5.23 |
| A‐09 | 86.0% | 87.1% | 2.34 | 1.61 | 0.351 | 1.56 | 0.92 | 3.53 |
| A‐10 | 87.5% | 87.2% | 2.54 | 1.86 | 0.274 | 1.82 | 1.26 | 3.14 |
| A‐11 | 88.0% | 83.5% | 1.92 | 1.34 | 0.343 | 1.32 | 0.41 | 3.35 |
| A‐12 | 86.7% | 75.1% | 2.98 | 1.77 | 1.045 | 1.40 | 0.52 | 9.48 |
| A‐13 | 85.8% | 86.8% | 2.59 | 1.78 | 0.248 | 1.75 | 1.16 | 2.71 |
| A‐14 | 75.0% | 80.1% | 5.25 | 2.48 | 0.463 | 2.43 | 1.33 | 4.26 |
| A‐15 | 89.8% | 91.8% | 2.31 | 1.98 | 0.365 | 1.92 | 1.20 | 4.43 |
| A‐16 | 80.1% | 81.8% | 1.95 | 0.97 | 0.236 | 0.92 | 0.63 | 3.14 |
| A‐17 | 88.7% | 90.7% | 2.95 | 2.18 | 0.343 | 2.15 | 1.33 | 4.15 |
| A‐18 | 94.8% | 72.5% | 1.01 | 1.18 | 0.380 | 1.02 | 0.66 | 2.49 |
| A‐19 | 86.5% | 89.0% | 3.11 | 2.02 | 0.449 | 1.98 | 0.81 | 4.09 |
| A‐20 | 93.9% | 66.5% | 1.14 | 1.36 | 0.582 | 1.05 | 0.68 | 3.17 |
| B‐01 | 74.3% | 41.2% | 3.79 | 1.75 | 0.876 | 1.25 | 0.54 | 4.19 |
| B‐02 | 91.7% | 73.2% | 1.86 | 1.56 | 0.257 | 1.59 | 0.89 | 2.34 |
| B‐03 | 89.3% | 90.2% | 2.23 | 2.03 | 0.650 | 1.91 | 0.96 | 6.95 |
| B‐04 | 86.3% | 89.5% | 1.37 | 1.32 | 0.270 | 1.27 | 0.71 | 2.76 |
| B‐05 | 94.1% | 87.7% | 1.01 | 1.25 | 1.021 | 0.88 | 0.53 | 6.91 |
| B‐06 | 83.3% | 87.9% | 4.99 | 2.97 | 1.336 | 2.74 | 0.77 | 25.99 |
| B‐07 | 88.0% | 89.1% | 2.05 | 1.68 | 0.387 | 1.61 | 1.01 | 4.74 |
| B‐08 | 84.9% | 76.2% | 2.41 | 1.49 | 0.489 | 1.56 | 0.46 | 3.13 |
| B‐09 | 90.1% | 88.8% | 1.72 | 1.40 | 0.321 | 1.40 | 0.32 | 4.64 |
| B‐10 | 93.0% | 88.6% | 2.05 | 1.88 | 0.483 | 1.75 | 1.11 | 4.65 |
| B‐11 | 87.8% | 89.1% | 3.45 | 2.59 | 0.430 | 2.54 | 1.54 | 4.41 |
| B‐12 | 86.4% | 84.6% | 3.58 | 3.04 | 7.732 | 2.37 | 0.02 | 227.58 |
| B‐13 | 86.9% | 88.7% | 2.33 | 1.67 | 0.291 | 1.63 | 1.08 | 3.63 |
| B‐14 | 88.1% | 78.9% | 1.86 | 1.41 | 0.370 | 1.45 | 0.44 | 3.13 |
| B‐15 | 93.0% | 93.0% | 1.06 | 1.03 | 0.120 | 1.02 | 0.61 | 1.51 |
| B‐16 | 84.0% | 80.6% | 3.39 | 12.22 | 227.234 | 1.68 | 0.19 | 6706.69 |
| B‐17 | 91.6% | 92.6% | 2.05 | 1.80 | 0.270 | 1.77 | 1.08 | 3.45 |
| B‐18 | 94.1% | 93.4% | 1.02 | 1.05 | 0.122 | 1.05 | 0.78 | 1.47 |
| B‐19 | 79.4% | 76.5% | 7.97 | 4.55 | 1.784 | 4.73 | 0.38 | 10.59 |
| B‐20 | 93.8% | 85.4% | 1.29 | 1.41 | 0.358 | 1.31 | 0.87 | 3.42 |



**Sample**



 **Supplement Figure 4: Estimated and Actual DE Ratio Boxplots**



 **Supplement Figure 4: Estimated and Actual DE Ratio Boxplots (continued)**

