**Appendix to Debiasing Human Response Estimations in Dynamic Models: Exploring the Significance of Delay Structure and Asymmetries**

**Vensim Model, Code, and Data for Synthetic and Empirical Analyses**

https://osf.io/rmgfz/?view_only=5dc610a2944a4779b3625097fbc3f7ac

**Appendix Table 1: No Delay**

| State | K (95% CI) | MSE | MAE | $R^2$ | BIC |
|---|---|---|---|---|---|
| **AK** | -0.001 (-0.002, 0.0) | 0.04 | 0.16 | 0.02 | -53.22 |
| **AL** | -0.002 (-0.002, -0.001) | 0.01 | 0.07 | 0.32 | -214.14 |
| **AR** | -0.001 (-0.002, -0.001) | 0.01 | 0.07 | 0.22 | -224.45 |
| **AZ** | -0.004 (-0.005, -0.003) | 0.03 | 0.15 | 0.48 | -70.22 |
| **CA** | -0.011 (-0.013, -0.009) | 0.07 | 0.23 | 0.54 | 32.35 |
| **CO** | -0.009 (-0.011, -0.008) | 0.04 | 0.16 | 0.58 | -64.24 |
| **CT** | -0.005 (-0.006, -0.005) | 0.02 | 0.12 | 0.68 | -130.26 |
| **DC** | -0.019 (-0.021, -0.017) | 0.23 | 0.44 | 0.52 | 386.69 |
| **DE** | -0.007 (-0.007, -0.006) | 0.02 | 0.11 | 0.73 | -160.25 |
| **FL** | -0.006 (-0.007, -0.005) | 0.05 | 0.17 | 0.49 | -29.8 |
| **GA** | -0.005 (-0.006, -0.004) | 0.03 | 0.12 | 0.54 | -109.49 |
| **HI** | -0.018 (-0.023, -0.014) | 0.13 | 0.31 | 0.32 | 117.1 |
| **IA** | -0.002 (-0.003, -0.002) | 0.01 | 0.07 | 0.36 | -220.71 |
| **ID** | -0.001 (-0.002, -0.0) | 0.01 | 0.08 | 0.08 | -200.63 |
| **IL** | -0.008 (-0.009, -0.007) | 0.03 | 0.13 | 0.7 | -104.9 |
| **IN** | -0.003 (-0.003, -0.002) | 0.01 | 0.06 | 0.55 | -249.13 |
| **KS** | -0.002 (-0.003, -0.002) | 0.01 | 0.07 | 0.33 | -225.81 |
| **KY** | -0.002 (-0.003, -0.002) | 0.02 | 0.1 | 0.3 | -154.83 |
| **LA** | -0.005 (-0.005, -0.004) | 0.01 | 0.09 | 0.73 | -216.45 |
| **MA** | -0.008 (-0.009, -0.007) | 0.06 | 0.21 | 0.62 | 7.79 |
| **MD** | -0.011 (-0.012, -0.009) | 0.04 | 0.17 | 0.65 | -44.2 |
| **ME** | -0.003 (-0.005, -0.002) | 0.03 | 0.14 | 0.12 | -66.17 |
| **MI** | -0.006 (-0.006, -0.005) | 0.02 | 0.11 | 0.69 | -141.23 |
| **MN** | -0.008 (-0.009, -0.007) | 0.04 | 0.16 | 0.51 | -52.87 |
| **MO** | -0.003 (-0.003, -0.002) | 0.01 | 0.08 | 0.42 | -201.92 |
| **MS** | -0.001 (-0.001, -0.001) | 0.01 | 0.08 | 0.14 | -232.51 |
| **MT** | -0.0 (-0.001, 0.001) | 0.02 | 0.12 | 0.0 | -122.23 |
| **NC** | -0.007 (-0.008, -0.006) | 0.02 | 0.12 | 0.56 | -125.03 |
| **ND** | -0.002 (-0.003, -0.002) | 0.02 | 0.08 | 0.31 | -178.04 |
| **NE** | -0.003 (-0.004, -0.002) | 0.01 | 0.07 | 0.34 | -225.69 |
| **NH** | -0.009 (-0.01, -0.007) | 0.02 | 0.09 | 0.6 | -147.69 |
| **NJ** | -0.006 (-0.007, -0.005) | 0.04 | 0.19 | 0.66 | -32.38 |
| **NM** | -0.004 (-0.005, -0.004) | 0.02 | 0.09 | 0.61 | -173.61 |
| **NV** | -0.006 (-0.007, -0.005) | 0.04 | 0.15 | 0.52 | -45.98 |
| **NY** | -0.008 (-0.01, -0.006) | 0.12 | 0.29 | 0.3 | 101.85 |
| **OH** | -0.004 (-0.004, -0.003) | 0.02 | 0.09 | 0.52 | -177.3 |
| **OK** | -0.001 (-0.001, -0.0) | 0.01 | 0.07 | 0.09 | -202.62 |
| **OR** | -0.009 (-0.011, -0.008) | 0.04 | 0.16 | 0.46 | -53.99 |

| | | | | | |
|---|---|---|---|---|---|
| **PA** | -0.006 (-0.007, -0.005) | 0.03 | 0.15 | 0.63 | -82.84 |
| **RI** | -0.007 (-0.008, -0.006) | 0.04 | 0.17 | 0.65 | -58.35 |
| **SC** | -0.002 (-0.002, -0.001) | 0.01 | 0.08 | 0.26 | -212.58 |
| **SD** | -0.001 (-0.001, -0.0) | 0.02 | 0.11 | 0.04 | -141.28 |
| **TN** | -0.002 (-0.002, -0.001) | 0.02 | 0.09 | 0.28 | -156.77 |
| **TX** | -0.006 (-0.007, -0.005) | 0.03 | 0.13 | 0.51 | -96.47 |
| **UT** | -0.011 (-0.012, -0.009) | 0.02 | 0.12 | 0.49 | -117.19 |
| **VA** | -0.007 (-0.008, -0.005) | 0.04 | 0.16 | 0.44 | -42.59 |
| **VT** | -0.017 (-0.02, -0.014) | 0.04 | 0.17 | 0.5 | -31.65 |
| **WA** | -0.016 (-0.018, -0.014) | 0.04 | 0.17 | 0.62 | -45.04 |
| **WI** | -0.005 (-0.006, -0.004) | 0.02 | 0.09 | 0.51 | -164.45 |
| **WV** | -0.001 (-0.002, -0.001) | 0.01 | 0.08 | 0.22 | -189.4 |
| **WY** | -0.001 (-0.001, -0.0) | 0.02 | 0.1 | 0.04 | -170.02 |
| **Average** | -0.006 (-0.007, -0.005) | 0.03 | 0.13 | 0.43 | -108.13 |

**Appendix Table 2: Fixed Delay**

| State | K (95% CI) | Delay | MSE | MAE | $R^2$ | BIC |
|---|---|---|---|---|---|---|
| **AK** | 0.003 (0.001, 0.004) | 33.0 | 0.03 | 0.15 | 0.11 | -66.69 |
| **AL** | -0.002 (-0.002, -0.001) | 1.0 | 0.01 | 0.07 | 0.31 | -212.1 |
| **AR** | -0.002 (-0.002, -0.001) | 3.0 | 0.01 | 0.07 | 0.25 | -230.12 |
| **AZ** | -0.004 (-0.005, -0.003) | 1.0 | 0.03 | 0.15 | 0.47 | -67.41 |
| **CA** | -0.011 (-0.013, -0.009) | 1.0 | 0.07 | 0.24 | 0.52 | 36.74 |
| **CO** | -0.009 (-0.011, -0.008) | 1.0 | 0.04 | 0.16 | 0.57 | -59.7 |
| **CT** | -0.005 (-0.006, -0.004) | 1.0 | 0.03 | 0.13 | 0.62 | -106.86 |
| **DC** | -0.019 (-0.021, -0.017) | 1.0 | 0.24 | 0.44 | 0.51 | 391.49 |
| **DE** | -0.007 (-0.007, -0.006) | 1.0 | 0.02 | 0.11 | 0.69 | -144.55 |
| **FL** | -0.006 (-0.007, -0.005) | 1.0 | 0.05 | 0.17 | 0.47 | -24.13 |
| **GA** | -0.005 (-0.006, -0.004) | 1.0 | 0.03 | 0.13 | 0.51 | -102.3 |
| **HI** | -0.018 (-0.023, -0.014) | 1.0 | 0.13 | 0.31 | 0.32 | 115.75 |
| **IA** | -0.003 (-0.003, -0.002) | 2.0 | 0.01 | 0.06 | 0.44 | -238.42 |
| **ID** | -0.001 (-0.002, -0.001) | 6.0 | 0.01 | 0.08 | 0.09 | -202.58 |
| **IL** | -0.008 (-0.009, -0.007) | 1.0 | 0.03 | 0.13 | 0.67 | -95.35 |
| **IN** | -0.003 (-0.003, -0.002) | 1.0 | 0.01 | 0.06 | 0.55 | -250.8 |
| **KS** | -0.002 (-0.003, -0.002) | 1.0 | 0.01 | 0.07 | 0.33 | -225.8 |
| **KY** | -0.002 (-0.003, -0.002) | 1.0 | 0.02 | 0.1 | 0.31 | -156.28 |
| **LA** | -0.005 (-0.005, -0.004) | 1.0 | 0.01 | 0.09 | 0.69 | -200.12 |
| **MA** | -0.008 (-0.009, -0.007) | 1.0 | 0.07 | 0.22 | 0.58 | 21.59 |
| **MD** | -0.01 (-0.012, -0.009) | 1.0 | 0.05 | 0.18 | 0.61 | -28.8 |
| **ME** | -0.004 (-0.005, -0.002) | 1.0 | 0.03 | 0.14 | 0.13 | -67.64 |
| **MI** | -0.006 (-0.006, -0.005) | 1.0 | 0.02 | 0.1 | 0.66 | -128.3 |
| **MN** | -0.008 (-0.009, -0.007) | 1.0 | 0.04 | 0.16 | 0.51 | -53.22 |
| **MO** | -0.003 (-0.003, -0.002) | 1.0 | 0.01 | 0.08 | 0.41 | -200.72 |
| **MS** | -0.001 (-0.001, -0.001) | 1.0 | 0.01 | 0.08 | 0.13 | -230.98 |
| **MT** | 0.003 (0.002, 0.003) | 35.0 | 0.02 | 0.08 | 0.31 | -173.12 |
| **NC** | -0.007 (-0.008, -0.006) | 1.0 | 0.02 | 0.12 | 0.54 | -117.96 |
| **ND** | -0.002 (-0.003, -0.002) | 7.0 | 0.01 | 0.08 | 0.4 | -197.0 |

| | | | | | | |
|---|---|---|---|---|---|---|
| **NE** | -0.003 (-0.004, -0.003) | 6.0 | 0.01 | 0.06 | 0.43 | -246.98 |
| **NH** | -0.008 (-0.01, -0.007) | 1.0 | 0.02 | 0.09 | 0.58 | -139.23 |
| **NJ** | -0.006 (-0.006, -0.005) | 1.0 | 0.05 | 0.19 | 0.61 | -13.73 |
| **NM** | -0.004 (-0.005, -0.004) | 1.0 | 0.02 | 0.09 | 0.6 | -171.97 |
| **NV** | -0.006 (-0.007, -0.005) | 1.0 | 0.04 | 0.15 | 0.51 | -42.91 |
| **NY** | -0.008 (-0.01, -0.006) | 1.0 | 0.12 | 0.29 | 0.29 | 104.09 |
| **OH** | -0.004 (-0.004, -0.003) | 1.0 | 0.02 | 0.09 | 0.52 | -179.38 |
| **OK** | -0.001 (-0.001, -0.0) | 1.0 | 0.01 | 0.07 | 0.07 | -200.41 |
| **OR** | -0.009 (-0.011, -0.008) | 3.0 | 0.04 | 0.15 | 0.47 | -56.4 |
| **PA** | -0.006 (-0.007, -0.005) | 1.0 | 0.03 | 0.14 | 0.61 | -78.31 |
| **RI** | -0.007 (-0.008, -0.006) | 1.0 | 0.04 | 0.18 | 0.6 | -40.62 |
| **SC** | -0.002 (-0.002, -0.001) | 1.0 | 0.01 | 0.08 | 0.24 | -208.53 |
| **SD** | 0.002 (0.001, 0.002) | 34.0 | 0.01 | 0.09 | 0.3 | -184.74 |
| **TN** | -0.002 (-0.002, -0.002) | 1.0 | 0.02 | 0.08 | 0.37 | -174.83 |
| **TX** | -0.006 (-0.007, -0.005) | 1.0 | 0.03 | 0.13 | 0.51 | -95.6 |
| **UT** | -0.011 (-0.013, -0.009) | 1.0 | 0.02 | 0.12 | 0.49 | -117.77 |
| **VA** | -0.006 (-0.008, -0.005) | 1.0 | 0.04 | 0.17 | 0.42 | -36.07 |
| **VT** | -0.017 (-0.02, -0.014) | 1.0 | 0.05 | 0.18 | 0.49 | -28.56 |
| **WA** | -0.016 (-0.018, -0.014) | 1.0 | 0.04 | 0.17 | 0.62 | -41.68 |
| **WI** | -0.005 (-0.006, -0.004) | 1.0 | 0.02 | 0.08 | 0.53 | -170.94 |
| **WV** | -0.001 (-0.002, -0.001) | 1.0 | 0.01 | 0.08 | 0.22 | -190.31 |
| **WY** | 0.001 (0.001, 0.002) | 35.0 | 0.01 | 0.09 | 0.15 | -185.99 |
| **Average** | -0.005 (-0.006, -0.004) | 4.02 | 0.03 | 0.13 | 0.44 | -108.16 |

**Appendix Table 3: Single Delay**

| State | K (95% CI) | Order | Delay | MSE | MAE | $R^2$ | BIC |
|---|---|---|---|---|---|---|---|
| **AK** | 0.005 (0.003, 0.007) | 10 | 37.31 | 0.03 | 0.14 | 0.15 | -73.36 |
| **AL** | -0.002 (-0.002, -0.001) | 2 | 2.21 | 0.01 | 0.08 | 0.29 | -208.11 |
| **AR** | -0.001 (-0.002, -0.001) | 4 | 3.22 | 0.01 | 0.08 | 0.18 | -217.79 |
| **AZ** | -0.006 (-0.007, -0.005) | 1 | 18.48 | 0.03 | 0.13 | 0.55 | -91.6 |
| **CA** | -0.017 (-0.019, -0.015) | 1 | 23.05 | 0.06 | 0.17 | 0.63 | 1.92 |
| **CO** | -0.011 (-0.013, -0.01) | 2 | 10.02 | 0.04 | 0.13 | 0.59 | -65.52 |
| **CT** | -0.009 (-0.01, -0.008) | 1 | 17.52 | 0.02 | 0.09 | 0.67 | -125.98 |
| **DC** | -0.038 (-0.041, -0.036) | 2 | 51.41 | 0.1 | 0.22 | 0.78 | 165.75 |
| **DE** | -0.007 (-0.007, -0.006) | 1 | 1.5 | 0.02 | 0.1 | 0.69 | -144.49 |
| **FL** | -0.007 (-0.009, -0.006) | 1 | 10.11 | 0.04 | 0.15 | 0.52 | -38.29 |
| **GA** | -0.005 (-0.006, -0.004) | 2 | 7.35 | 0.03 | 0.13 | 0.49 | -96.65 |
| **HI** | -0.033 (-0.039, -0.027) | 1 | 14.36 | 0.1 | 0.24 | 0.49 | 77.38 |
| **IA** | -0.003 (-0.003, -0.002) | 2 | 3.04 | 0.01 | 0.06 | 0.44 | -238.79 |
| **ID** | -0.001 (-0.002, -0.001) | 3 | 5.3 | 0.01 | 0.08 | 0.1 | -203.27 |
| **IL** | -0.009 (-0.01, -0.008) | 2 | 9.84 | 0.03 | 0.12 | 0.63 | -76.65 |
| **IN** | -0.003 (-0.003, -0.002) | 1 | 1.72 | 0.01 | 0.06 | 0.55 | -249.23 |
| **KS** | -0.002 (-0.002, -0.001) | 2 | 1.81 | 0.01 | 0.07 | 0.27 | -213.75 |
| **KY** | -0.003 (-0.004, -0.002) | 1 | 3.44 | 0.02 | 0.09 | 0.35 | -164.24 |
| **LA** | -0.004 (-0.005, -0.004) | 2 | 1.93 | 0.02 | 0.09 | 0.65 | -180.23 |
| **MA** | -0.014 (-0.015, -0.012) | 2 | 29.18 | 0.06 | 0.16 | 0.64 | 1.45 |

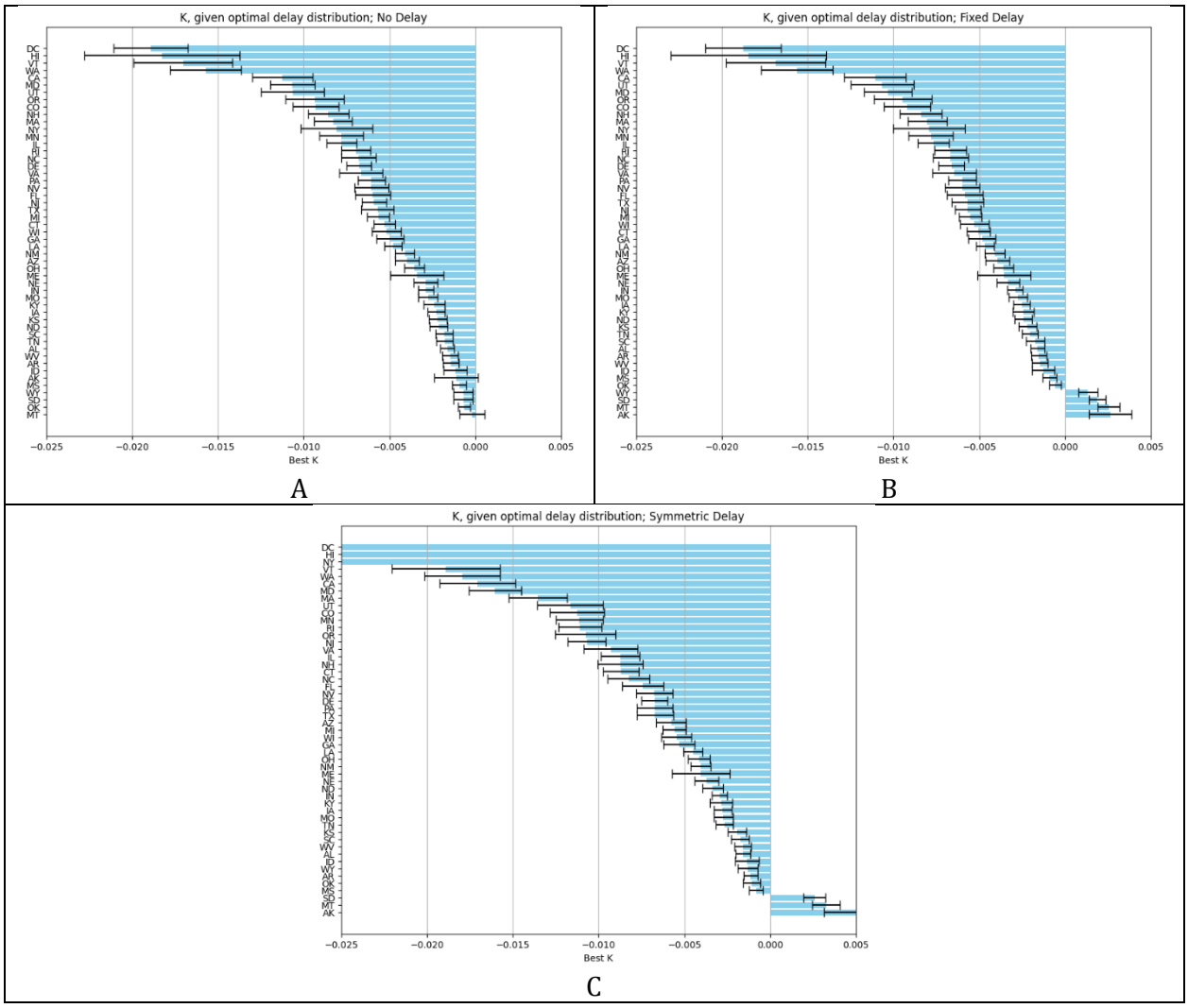
| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **MD** | -0.016 (-0.018, -0.015) | 1 | 14.45 | 0.03 | 0.11 | 0.76 | -95.73 |
| **ME** | -0.004 (-0.006, -0.002) | 1 | 2.58 | 0.03 | 0.14 | 0.14 | -69.15 |
| **MI** | -0.006 (-0.006, -0.005) | 1 | 1.39 | 0.02 | 0.1 | 0.66 | -126.28 |
| **MN** | -0.011 (-0.013, -0.01) | 1 | 9.36 | 0.03 | 0.1 | 0.65 | -98.0 |
| **MO** | -0.003 (-0.003, -0.002) | 2 | 2.3 | 0.01 | 0.08 | 0.41 | -199.01 |
| **MS** | -0.001 (-0.001, -0.0) | 2 | 1.92 | 0.01 | 0.08 | 0.11 | -227.42 |
| **MT** | 0.003 (0.002, 0.004) | 11 | 35.34 | 0.02 | 0.08 | 0.31 | -173.79 |
| **NC** | -0.008 (-0.009, -0.007) | 1 | 8.73 | 0.02 | 0.11 | 0.57 | -127.91 |
| **ND** | -0.003 (-0.004, -0.003) | 1 | 8.81 | 0.01 | 0.07 | 0.47 | -213.68 |
| **NE** | -0.004 (-0.004, -0.003) | 3 | 6.91 | 0.01 | 0.06 | 0.46 | -253.49 |
| **NH** | -0.009 (-0.01, -0.007) | 2 | 3.92 | 0.02 | 0.09 | 0.55 | -132.3 |
| **NJ** | -0.011 (-0.012, -0.01) | 1 | 19.74 | 0.04 | 0.11 | 0.73 | -60.56 |
| **NM** | -0.004 (-0.005, -0.003) | 2 | 2.47 | 0.02 | 0.1 | 0.57 | -162.24 |
| **NV** | -0.007 (-0.008, -0.006) | 1 | 4.58 | 0.04 | 0.14 | 0.53 | -50.23 |
| **NY** | -0.033 (-0.035, -0.03) | 1 | 17.76 | 0.03 | 0.11 | 0.8 | -73.83 |
| **OH** | -0.004 (-0.005, -0.004) | 1 | 5.98 | 0.01 | 0.08 | 0.55 | -185.67 |
| **OK** | -0.001 (-0.002, -0.001) | 1 | 3.02 | 0.01 | 0.08 | 0.11 | -206.88 |
| **OR** | -0.011 (-0.013, -0.009) | 2 | 5.74 | 0.03 | 0.14 | 0.52 | -68.47 |
| **PA** | -0.007 (-0.008, -0.006) | 2 | 9.7 | 0.04 | 0.14 | 0.55 | -55.96 |
| **RI** | -0.011 (-0.012, -0.01) | 1 | 26.7 | 0.03 | 0.11 | 0.68 | -73.09 |
| **SC** | -0.002 (-0.002, -0.001) | 1 | 1.14 | 0.01 | 0.08 | 0.24 | -208.43 |
| **SD** | 0.003 (0.002, 0.003) | 10 | 33.74 | 0.01 | 0.09 | 0.31 | -187.14 |
| **TN** | -0.003 (-0.003, -0.002) | 2 | 3.69 | 0.01 | 0.08 | 0.44 | -191.59 |
| **TX** | -0.007 (-0.008, -0.006) | 1 | 9.1 | 0.03 | 0.12 | 0.53 | -100.99 |
| **UT** | -0.012 (-0.014, -0.01) | 1 | 3.76 | 0.02 | 0.11 | 0.51 | -124.81 |
| **VA** | -0.009 (-0.011, -0.008) | 2 | 9.75 | 0.04 | 0.15 | 0.5 | -57.21 |
| **VT** | -0.019 (-0.022, -0.016) | 2 | 4.87 | 0.04 | 0.16 | 0.51 | -33.77 |
| **WA** | -0.018 (-0.02, -0.016) | 1 | 5.88 | 0.04 | 0.15 | 0.66 | -57.48 |
| **WI** | -0.005 (-0.006, -0.005) | 2 | 3.4 | 0.02 | 0.08 | 0.53 | -171.12 |
| **WV** | -0.002 (-0.002, -0.001) | 1 | 2.61 | 0.01 | 0.08 | 0.23 | -191.67 |
| **WY** | -0.001 (-0.002, -0.001) | 8 | 8.74 | 0.02 | 0.1 | 0.13 | -182.97 |
| **Average** | -0.008 (-0.009, -0.007) | 2 | 10.41 | 0.03 | 0.11 | 0.48 | -123.58 |

**Appendix Table 4: Asymmetric Delay**

| State | K (95% CI) | Delay (inc) | Delay (dec) | Order | MSE | MAE | $R^2$ | BIC |
|---|---|---|---|---|---|---|---|---|
| **AK** | 0.008 (0.005, 0.01) | 50.37 | 23.81 | 11 | 0.03 | 0.14 | 0.18 | -77.03 |
| **AL** | -0.004 (-0.005, -0.002) | 22.99 | 1.45 | 2 | 0.01 | 0.09 | 0.17 | -186.74 |
| **AR** | -0.002 (-0.002, -0.001) | 6.6 | 2.81 | 3 | 0.01 | 0.07 | 0.26 | -231.45 |
| **AZ** | -0.001 (-0.002, -0.001) | 2.39 | 46.89 | 4 | 0.04 | 0.15 | 0.43 | -59.2 |
| **CA** | -0.0 (-0.0, -0.0) | 1.16 | 49.34 | 4 | 0.13 | 0.33 | 0.13 | 120.13 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **CO** | -0.007 (-0.007, -0.006) | 1.58 | 22.96 | 1 | 0.02 | 0.09 | 0.75 | -133.75 |
| **CT** | -0.003 (-0.003, -0.002) | 1.79 | 51.49 | 1 | 0.02 | 0.08 | 0.7 | -142.64 |
| **DC** | -0.039 (-0.041, -0.036) | 51.88 | 51.2 | 2 | 0.1 | 0.22 | 0.78 | 166.34 |
| **DE** | -0.003 (-0.004, -0.003) | 1.08 | 11.16 | 2 | 0.02 | 0.11 | 0.62 | -116.17 |
| **FL** | -0.002 (-0.002, -0.001) | 1.1 | 35.24 | 2 | 0.06 | 0.19 | 0.34 | 6.24 |
| **GA** | -0.003 (-0.003, -0.002) | 1.52 | 20.99 | 2 | 0.03 | 0.12 | 0.49 | -96.13 |
| **HI** | -0.01 (-0.012, -0.008) | 1.88 | 51.48 | 3 | 0.09 | 0.23 | 0.52 | 68.63 |
| **IA** | -0.002 (-0.002, -0.001) | 2.38 | 3.19 | 3 | 0.01 | 0.07 | 0.27 | -202.37 |
| **ID** | -0.003 (-0.004, -0.002) | 20.67 | 1.32 | 1 | 0.01 | 0.08 | 0.11 | -205.96 |
| **IL** | -0.005 (-0.006, -0.005) | 1.57 | 19.85 | 1 | 0.02 | 0.09 | 0.75 | -134.56 |
| **IN** | -0.003 (-0.003, -0.002) | 1.23 | 2.41 | 1 | 0.01 | 0.06 | 0.55 | -251.75 |
| **KS** | -0.003 (-0.004, -0.002) | 4.43 | 1.68 | 1 | 0.01 | 0.07 | 0.33 | -225.79 |
| **KY** | -0.003 (-0.004, -0.003) | 4.95 | 1.79 | 1 | 0.02 | 0.09 | 0.35 | -165.92 |
| **LA** | -0.002 (-0.003, -0.002) | 1.53 | 30.81 | 2 | 0.01 | 0.08 | 0.69 | -198.91 |
| **MA** | -0.003 (-0.004, -0.003) | 1.4 | 51.12 | 2 | 0.04 | 0.15 | 0.73 | -36.73 |
| **MD** | -0.007 (-0.007, -0.006) | 2.77 | 31.72 | 2 | 0.03 | 0.1 | 0.77 | -101.53 |
| **ME** | -0.0 (-0.001, -0.0) | 1.55 | 40.4 | 4 | 0.04 | 0.15 | 0.06 | -57.46 |
| **MI** | -0.004 (-0.005, -0.004) | 1.96 | 8.29 | 2 | 0.02 | 0.09 | 0.64 | -119.47 |
| **MN** | -0.005 (-0.005, -0.004) | 1.27 | 17.58 | 2 | 0.03 | 0.1 | 0.66 | -102.56 |
| **MO** | -0.003 (-0.003, -0.002) | 1.59 | 3.3 | 1 | 0.01 | 0.08 | 0.42 | -202.03 |
| **MS** | -0.0 (-0.001, -0.0) | 12.24 | 1.69 | 3 | 0.01 | 0.08 | 0.03 | -216.29 |
| **MT** | 0.004 (0.003, 0.005) | 42.53 | 25.44 | 10 | 0.02 | 0.09 | 0.32 | -174.6 |
| **NC** | -0.005 (-0.006, -0.005) | 1.69 | 11.67 | 1 | 0.02 | 0.1 | 0.58 | -130.2 |
| **ND** | -0.002 (-0.002, -0.002) | 3.3 | 11.43 | 2 | 0.01 | 0.07 | 0.47 | -214.9 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **NE** | -0.003 (-0.004, -0.002) | 3.93 | 9.47 | 2 | 0.01 | 0.06 | 0.47 | -257.29 |
| **NH** | -0.007 (-0.008, -0.006) | 1.84 | 7.01 | 2 | 0.02 | 0.08 | 0.6 | -147.25 |
| **NJ** | -0.002 (-0.002, -0.002) | 1.03 | 51.15 | 2 | 0.03 | 0.11 | 0.76 | -78.44 |
| **NM** | -0.004 (-0.004, -0.003) | 1.71 | 5.2 | 1 | 0.02 | 0.09 | 0.62 | -176.91 |
| **NV** | -0.005 (-0.006, -0.004) | 2.58 | 12.38 | 1 | 0.04 | 0.13 | 0.55 | -56.59 |
| **NY** | -0.014 (-0.015, -0.013) | 5.54 | 34.01 | 1 | 0.03 | 0.09 | 0.85 | -107.45 |
| **OH** | -0.003 (-0.003, -0.002) | 1.3 | 9.65 | 2 | 0.01 | 0.08 | 0.56 | -190.66 |
| **OK** | -0.002 (-0.003, -0.001) | 9.55 | 1.67 | 2 | 0.01 | 0.08 | 0.1 | -205.47 |
| **OR** | -0.004 (-0.004, -0.003) | 1.44 | 19.95 | 3 | 0.04 | 0.16 | 0.42 | -43.85 |
| **PA** | -0.004 (-0.005, -0.004) | 1.38 | 23.09 | 1 | 0.02 | 0.09 | 0.72 | -124.93 |
| **RI** | -0.003 (-0.004, -0.003) | 1.59 | 51.41 | 2 | 0.03 | 0.1 | 0.74 | -101.35 |
| **SC** | -0.002 (-0.002, -0.001) | 1.91 | 1.67 | 1 | 0.01 | 0.08 | 0.23 | -206.86 |
| **SD** | 0.004 (0.003, 0.005) | 51.9 | 24.84 | 10 | 0.01 | 0.08 | 0.36 | -196.95 |
| **TN** | -0.003 (-0.004, -0.003) | 5.01 | 2.04 | 1 | 0.01 | 0.08 | 0.48 | -200.84 |
| **TX** | -0.004 (-0.004, -0.003) | 1.42 | 33.67 | 1 | 0.02 | 0.1 | 0.58 | -115.85 |
| **UT** | -0.007 (-0.008, -0.006) | 1.18 | 9.63 | 2 | 0.02 | 0.11 | 0.49 | -119.31 |
| **VA** | -0.019 (-0.022, -0.016) | 24.25 | 2.19 | 1 | 0.03 | 0.13 | 0.57 | -76.69 |
| **VT** | -0.004 (-0.005, -0.004) | 1.46 | 49.05 | 3 | 0.04 | 0.13 | 0.56 | -48.37 |
| **WA** | -0.011 (-0.013, -0.01) | 1.85 | 22.28 | 1 | 0.03 | 0.14 | 0.69 | -70.73 |
| **WI** | -0.004 (-0.005, -0.004) | 1.77 | 7.93 | 2 | 0.02 | 0.07 | 0.55 | -177.0 |
| **WV** | -0.002 (-0.002, -0.001) | 4.62 | 1.34 | 2 | 0.01 | 0.08 | 0.19 | -184.83 |
| **WY** | -0.001 (-0.002, -0.001) | 9.24 | 7.85 | 7 | 0.01 | 0.1 | 0.13 | -183.49 |
| **Average** | -0.004 (-0.005, -0.003) | 7.61 | 20.0 | 2 | 0.03 | 0.11 | 0.48 | -127.33 |




Appendix Figure 1: K values in an no delay (A), fixed delay (B), and symmetric delay (C) estimation frameworks for each state, with 95% confidence intervals.