

Environment	Confounder	Method	ATE	SPILL
$(LC) \text{ } PM_{2.5} \rightarrow m \text{ } (r = 1)$	ρ_{pop}	CVAE-SPATIAL+ (R=1) (L=1)	0.08 ± 0.01	0.39 ± 0.08
		CVAE-SPATIAL+ (R=1) (L=2)	0.07 ± 0.02	0.35 ± 0.08
		CVAE-SPATIAL+ (R=1) (L=4)	0.06 ± 0.02	0.30 ± 0.08
		CVAE-SPATIAL+ (R=1) (L=8)	0.09 ± 0.04	0.28 ± 0.09
		CVAE-SPATIAL+ (R=1) (L=32)	0.15 ± 0.03	0.10 ± 0.04
		CVAE-SPATIAL+ (R=2) (L=1)	0.11 ± 0.14	1.59 ± 2.05
		CVAE-SPATIAL+ (R=2) (L=2)	0.04 ± 0.02	1.43 ± 1.90
		CVAE-SPATIAL+ (R=2) (L=4)	0.18 ± 0.26	1.42 ± 2.14
		CVAE-SPATIAL+ (R=2) (L=8)	0.30 ± 0.37	1.43 ± 2.40
		CVAE-SPATIAL+ (R=2) (L=32)	0.85 ± 1.28	1.68 ± 2.90
		DAPSM	0.25 ± 0.01	n/a
		GCNN	0.36 ± 0.03	n/a
		S2SLS-LAG1	0.03 ± 0.00	n/a
		SPATIAL+	0.13 ± 0.04	n/a
		SPATIAL	0.10 ± 0.07	n/a
	q_{summer}	CVAE-SPATIAL+ (R=1) (L=1)	0.05 ± 0.01	0.40 ± 0.09
		CVAE-SPATIAL+ (R=1) (L=2)	0.05 ± 0.02	0.31 ± 0.08
		CVAE-SPATIAL+ (R=1) (L=4)	0.08 ± 0.03	0.29 ± 0.06
		CVAE-SPATIAL+ (R=1) (L=8)	0.09 ± 0.04	0.28 ± 0.06
		CVAE-SPATIAL+ (R=1) (L=32)	0.24 ± 0.04	0.11 ± 0.05
		CVAE-SPATIAL+ (R=2) (L=1)	0.23 ± 0.35	1.50 ± 1.79
		CVAE-SPATIAL+ (R=2) (L=2)	0.13 ± 0.18	1.47 ± 1.91
		CVAE-SPATIAL+ (R=2) (L=4)	0.22 ± 0.28	1.35 ± 1.84
		CVAE-SPATIAL+ (R=2) (L=8)	0.61 ± 0.85	1.54 ± 2.59
		CVAE-SPATIAL+ (R=2) (L=32)	0.88 ± 1.34	1.56 ± 2.71
		DAPSM	0.30 ± 0.03	n/a
		GCNN	0.41 ± 0.03	n/a
		S2SLS-LAG1	0.20 ± 0.00	n/a
		SPATIAL+	0.13 ± 0.04	n/a
		SPATIAL	0.10 ± 0.07	n/a
$(LC) \text{ } PM_{2.5} \rightarrow m \text{ } (r = 2)$	ρ_{pop}	CVAE-SPATIAL+ (R=1) (L=1)	0.26 ± 0.03	0.14 ± 0.03
		CVAE-SPATIAL+ (R=1) (L=2)	0.22 ± 0.03	0.09 ± 0.03
		CVAE-SPATIAL+ (R=1) (L=4)	0.19 ± 0.05	0.09 ± 0.03
		CVAE-SPATIAL+ (R=1) (L=8)	0.09 ± 0.05	0.08 ± 0.04
		CVAE-SPATIAL+ (R=1) (L=32)	0.03 ± 0.01	0.23 ± 0.07
		CVAE-SPATIAL+ (R=2) (L=1)	0.27 ± 0.02	0.40 ± 0.05
		CVAE-SPATIAL+ (R=2) (L=2)	0.24 ± 0.03	0.34 ± 0.05
		CVAE-SPATIAL+ (R=2) (L=4)	0.17 ± 0.03	0.16 ± 0.08
		CVAE-SPATIAL+ (R=2) (L=8)	0.10 ± 0.02	0.09 ± 0.03
		CVAE-SPATIAL+ (R=2) (L=32)	0.08 ± 0.03	0.08 ± 0.02
		DAPSM	0.16 ± 0.01	n/a
		GCNN	0.18 ± 0.03	n/a
		S2SLS-LAG1	0.07 ± 0.00	n/a
		SPATIAL+	0.10 ± 0.02	n/a
		SPATIAL	0.17 ± 0.03	n/a
	q_{summer}	CVAE-SPATIAL+ (R=1) (L=1)	0.25 ± 0.02	0.16 ± 0.05
		CVAE-SPATIAL+ (R=1) (L=2)	0.19 ± 0.03	0.11 ± 0.05
		CVAE-SPATIAL+ (R=1) (L=4)	0.15 ± 0.04	0.09 ± 0.04
		CVAE-SPATIAL+ (R=1) (L=8)	0.08 ± 0.05	0.13 ± 0.05
		CVAE-SPATIAL+ (R=1) (L=32)	0.06 ± 0.02	0.27 ± 0.06
		CVAE-SPATIAL+ (R=2) (L=1)	0.26 ± 0.02	0.41 ± 0.05
		CVAE-SPATIAL+ (R=2) (L=2)	0.23 ± 0.03	0.33 ± 0.06
		CVAE-SPATIAL+ (R=2) (L=4)	0.13 ± 0.02	0.17 ± 0.06
		CVAE-SPATIAL+ (R=2) (L=8)	0.09 ± 0.02	0.09 ± 0.04
		CVAE-SPATIAL+ (R=2) (L=32)	0.06 ± 0.04	0.08 ± 0.02
		DAPSM	0.20 ± 0.01	n/a
		GCNN	0.16 ± 0.05	n/a
		S2SLS-LAG1	0.09 ± 0.00	n/a
		SPATIAL+	0.10 ± 0.02	n/a
		SPATIAL	0.17 ± 0.03	n/a