

Appendix B

Table B1

Placebo Exercise— Balancing of Covariates After Matching with All Covariates for Treatment Group 1
(Unemployed and Retired)

	Nearest Neighbor with replacement				Nearest 5 Neighbors with replacement			
	Mean Treated	Mean Control	%bias	P value	Mean Treated	Mean Control	%bias	P value
Age	5.14	5.20	-6.7	0.56	5.14	5.15	-1.1	0.93
Age square	27.08	27.58	-6.7	0.57	27.08	27.15	-1	0.94
Gender	1.35	1.33	4.3	0.72	1.35	1.36	-1.9	0.87
Education	3.27	3.33	-5.6	0.64	3.27	3.40	-11.6	0.33
Age*Education	16.55	17.28	-12.7	0.31	16.55	17.26	-12.6	0.32
Education*Gender	4.31	4.35	-1.9	0.88	4.31	4.58	-12.7	0.32
No of Children in Household	0.31	0.27	4.6	0.57	0.31	0.31	0.3	0.97
Rural	0.10	0.08	5.9	0.56	0.10	0.10	2	0.85
Small Town	0.22	0.20	4.8	0.67	0.22	0.20	4	0.72
Micropolitan	0.15	0.16	-3.8	0.75	0.15	0.13	6.5	0.57
Boat Activity	0.43	0.48	-9.2	0.42	0.43	0.42	1.6	0.89
Hunting	0.04	0.04	0	1.00	0.04	0.06	-11.2	0.33
Fishing	0.51	0.43	15.7	0.17	0.51	0.46	9.7	0.40
Total Number of Trips	7.15	7.19	-0.4	0.98	7.15	6.14	9.2	0.42
Take overnight Trips	0.38	0.34	8	0.48	0.38	0.34	8.4	0.45
	Radius Matching (caliper =0.5*SD)				Kernel Matching (bandwidth =0.06)			
	Mean Treated	Mean Control	%bias	P value	Mean Treated	Mean Control	%bias	P value
Age	5.14	5.09	7.4	0.54	5.13	5.10	4	0.73
Age square	27.08	26.57	6.9	0.58	26.96	26.67	3.9	0.75
Gender	1.35	1.36	-0.7	0.95	1.34	1.38	-7.8	0.52
Education	3.27	3.37	-9.4	0.43	3.29	3.42	-12	0.31
Age*Education	16.55	16.90	-6.1	0.62	16.61	17.20	-10.3	0.41
Education*Gender	4.31	4.51	-9.2	0.46	4.32	4.66	-16.4	0.21
No of Children in Household	0.31	0.39	-7.7	0.39	0.32	0.35	-3.4	0.69
Rural	0.10	0.11	-2.4	0.82	0.11	0.11	-0.4	0.97
Small Town	0.22	0.20	3.5	0.76	0.22	0.19	6.4	0.58
Micropolitan	0.15	0.16	-2.9	0.81	0.15	0.16	-3.7	0.76
Boat Activity	0.43	0.45	-3.9	0.73	0.44	0.43	0.7	0.95
Hunting	0.04	0.05	-4.8	0.66	0.04	0.05	-6.1	0.59
Fishing	0.51	0.48	5.2	0.65	0.50	0.47	6.7	0.56
Total Number of Trips	7.15	7.09	0.5	0.96	7.17	6.86	2.8	0.81
Take overnight Trips	0.38	0.38	0.2	0.99	0.38	0.37	2.3	0.84

Note: For each matching algorithm, the balancing of covariates is assessed based on two criteria: (a) the difference between mean of treated and matched control group, and (b) standardized mean difference of the covariates between the treatment and control group. The standardized difference of means is calculated as

$$\frac{Mean_{treated} - Mean_{control}}{\sqrt{\frac{1}{2} * (Variance_{treated} + Variance_{control})}}$$

. A standardized difference of means of 25 is considered large (Rosenbaum and Rubin 1983; Imbens and Woolridge 2009).

Table B2

Placebo Exercise— Balancing of Covariates After Matching with All Covariates for Treatment Group 2
(Unemployed)

	Nearest Neighbor with Replacement				Nearest 5 Neighbors with Replacement			
	Mean Treated	Mean Control	%bias	P value	Mean Treated	Mean Control	%bias	P value
Age	4.68	4.68	0.00	1.00	4.68	4.67	2.10	0.91
Age square	22.58	22.58	0.00	1.00	22.58	22.41	2.30	0.90
Gender	1.40	1.52	-25.00	0.20	1.40	1.43	-6.40	0.74
Education	3.23	3.28	-4.90	0.77	3.23	3.18	5.30	0.78
Age*Education	14.83	15.30	-8.70	0.65	14.83	14.50	6.10	0.75
Education*Gender	4.45	4.88	-20.10	0.29	4.45	4.45	0.00	1.00
No of Children in Household	0.52	0.48	3.20	0.84	0.52	0.49	2.70	0.86
Rural	0.10	0.10	0.00	1.00	0.10	0.13	-8.10	0.65
Small Town	0.28	0.22	15.30	0.40	0.28	0.22	15.00	0.41
Micropolitan	0.17	0.23	-18.40	0.37	0.17	0.18	-2.80	0.89
Boat Activity	0.42	0.45	-6.70	0.72	0.42	0.44	-4.30	0.81
Hunting	0.02	0.03	-8.50	0.56	0.02	0.02	-3.40	0.80
Fishing	0.48	0.48	0.00	1.00	0.48	0.54	-12.20	0.51
Total Number of Trips	4.78	5.18	-4.50	0.77	4.78	4.92	-1.50	0.92
Take overnight Trips	0.28	0.32	-7.00	0.69	0.28	0.30	-3.10	0.86
	Radius Matching (caliper =0.5*SD)				Kernel Matching (bandwidth =0.06)			
	Mean Treated	Mean Control	%bias	P value	Mean Treated	Mean Control	%bias	P value
Age	4.68	4.66	3.10	0.87	4.68	4.64	6.00	0.75
Age square	22.58	22.35	3.20	0.87	22.58	22.12	6.30	0.73
Gender	1.40	1.40	0.50	0.98	1.40	1.38	4.30	0.82
Education	3.23	3.25	-1.30	0.95	3.23	3.26	-2.30	0.90
Age*Education	14.83	14.94	-1.90	0.92	14.83	14.89	-1.00	0.96
Education*Gender	4.45	4.44	0.40	0.99	4.45	4.40	2.50	0.90
No of Children in Household	0.52	0.55	-2.80	0.86	0.52	0.58	-6.40	0.69
Rural	0.10	0.09	1.70	0.92	0.10	0.10	-0.80	0.96
Small Town	0.28	0.29	-0.40	0.98	0.28	0.27	2.50	0.89
Micropolitan	0.17	0.16	1.80	0.92	0.17	0.16	2.10	0.91
Boat Activity	0.42	0.45	-5.80	0.75	0.42	0.46	-8.40	0.65
Hunting	0.02	0.03	-4.40	0.75	0.02	0.03	-6.30	0.66
Fishing	0.48	0.50	-3.80	0.84	0.48	0.50	-3.80	0.84
Total Number of Trips	4.78	4.78	0.00	1.00	4.78	5.01	-2.70	0.87
Take overnight Trips	0.28	0.31	-5.50	0.76	0.28	0.32	-8.20	0.65

Note: For each matching algorithm, the balancing of covariates is assessed based on two criterions: (a) the difference between mean of treated and matched control group, and (b) standardized mean difference of the covariates between the treatment and control group. The standardized difference of means is calculated as

$$\frac{Mean_{treated} - Mean_{control}}{\sqrt{\frac{1}{2} * (Variance_{treated} + Variance_{control})}}$$

. A standardized difference of means of 25 is considered large (Rosenbaum and Rubin 1983; Imbens and Woolridge 2009).

Table B3
Placebo Exercise— Balancing of Covariates After Matching with All Covariates for Treatment Group 3
(Retired)

	Nearest Neighbor with replacement				Nearest 5 Neighbors with replacement			
	Mean Treated	Mean Control	%bias	P value	Mean Treated	Mean Control	%bias	P value
Age	5.42	5.37	6.5	0.61	5.42	5.38	5.1	0.69
Age square	29.71	29.15	8.4	0.54	29.71	29.29	6.3	0.66
Gender	1.29	1.33	-7.5	0.63	1.29	1.27	4.9	0.75
Education	3.34	3.47	-12.6	0.42	3.34	3.52	-17.5	0.27
Age*Education	17.78	18.58	-14.1	0.36	17.78	18.34	-9.8	0.56
Education*Gender	4.19	4.56	-17.9	0.26	4.19	4.37	-8.7	0.60
No of Children in Household	0.19	0.25	-5.9	0.52	0.19	0.24	-4.9	0.61
Rural	0.11	0.06	16.6	0.18	0.11	0.10	3.4	0.80
Small Town	0.16	0.18	-5.8	0.69	0.16	0.17	-4.1	0.78
Micropolitan	0.13	0.11	6.6	0.65	0.13	0.13	2.5	0.87
Boat Activity	0.44	0.42	4.5	0.76	0.44	0.43	1.8	0.90
Hunting	0.06	0.10	-18.9	0.27	0.06	0.05	1.6	0.91
Fishing	0.52	0.57	-11.2	0.46	0.52	0.52	0	1.00
Total Number of Trips	8.84	10.72	-15.6	0.36	8.84	9.70	-7.1	0.67
Take overnight Trips	0.45	0.49	-9	0.55	0.45	0.45	-0.5	0.98
	Radius Matching (caliper =0.5*SD)				Kernel Matching bandwidth =0.06)			
	Mean Treated	Mean Control	%bias	P value	Mean Treated	Mean Control	%bias	P value
Age	5.41	5.34	10.60	0.46	5.41	5.37	5.00	0.72
Age square	29.64	28.94	10.40	0.49	29.64	29.30	5.00	0.74
Gender	1.30	1.27	5.40	0.72	1.30	1.27	6.50	0.67
Education	3.33	3.49	-14.80	0.35	3.33	3.50	-15.80	0.32
Age*Education	17.71	18.21	-8.70	0.60	17.71	18.43	-12.50	0.45
Education*Gender	4.19	4.34	-6.90	0.67	4.19	4.35	-7.50	0.64
No of Children in Household	0.19	0.26	-7.30	0.48	0.19	0.23	-3.90	0.69
Rural	0.11	0.12	-0.40	0.98	0.11	0.11	0.40	0.98
Small Town	0.16	0.18	-4.50	0.76	0.16	0.18	-5.10	0.73
Micropolitan	0.14	0.13	2.80	0.86	0.14	0.13	2.70	0.86
Boat Activity	0.43	0.46	-5.90	0.70	0.43	0.44	-1.80	0.90
Hunting	0.06	0.06	0.60	0.97	0.06	0.06	0.10	1.00
Fishing	0.51	0.49	4.10	0.79	0.51	0.49	4.30	0.78
Total Number of Trips	8.44	8.78	-2.90	0.86	8.44	8.75	-2.60	0.87
Take overnight Trips	0.44	0.47	-4.40	0.77	0.44	0.46	-3.70	0.81

Note: For each matching algorithm, the balancing of covariates is assessed based on two criteria: (a) the difference between mean of treated and matched control group, and (b) standardized mean difference of the covariates between the treatment and control group. The standardized difference of means is calculated as

$$\frac{Mean_{treated} - Mean_{control}}{\sqrt{\frac{1}{2} * (Variance_{treated} + Variance_{control})}}$$

. A standardized difference of means of 25 is considered large (Rosenbaum and Rubin 1983; Imbens and Woolridge 2009).

Table B4

Placebo Effect - Estimates of Average Treatment Effect on the Treated for Lake Recreation (Between 2005 and 2014)

	Participation in 2014	Difference in Participation	Total Trip in 2014	Difference in Total Trip
	I	II	III	IV
(a) Treatment group 1: Unemployed, Part-time, and Retired				
Nearest Neighbor with replacement	-0.065 [0.0798]	-0.055 [0.0875]	-0.223 [1.560]	-0.184 [1.779]
Nearest 5 Neighbors with replacement	-0.020 [0.0630]	0.014 [0.0756]	-0.258 [1.269]	-0.549 [1.473]
Radius Matching (caliper =0.5*SD)	-0.012 [0.0610]	0.030 [0.0688]	-0.543 [1.139]	-0.190 [1.152]
Kernel Matching	-0.011 [0.0607]	0.037 [0.0696]	-0.627 [1.160]	-0.040 [1.229]
(b) Treatment group 2: Unemployed and Part-time				
Nearest Neighbor with replacement	0.050 [0.108]	0.000 [0.120]	0.550 [2.539]	2.200 [2.282]
Nearest 5 Neighbors with replacement	0.155* [0.0824]	0.014 [0.100]	2.813 [2.090]	1.997 [2.011]
Radius Matching (caliper =0.5*SD)	0.102 [0.0849]	0.027 [0.111]	1.765 [1.938]	1.493 [1.838]
Kernel Matching	0.085 [0.0829]	0.016 [0.108]	1.638 [1.882]	1.593 [1.854]
(c) Treatment group 3: Retired				
Nearest Neighbor with replacement	-0.056 [0.0934]	-0.024 [0.0931]	-1.074 [2.347]	-2.328 [2.349]
Nearest 5 Neighbors with replacement	-0.086 [0.0773]	0.006 [0.0845]	-1.590 [1.500]	-2.713 [1.801]
Radius Matching (caliper =0.5*SD)	-0.07 [0.079]	0.03 [0.090]	-1.70 [1.483]	-2.38 [1.474]
Kernel Matching	-0.07 [0.08]	0.04 [0.09]	-1.65 [1.55]	-2.46 [1.56]

Note: ***, **, and * indicate statistical significance at the 1 percent, 5 percent, and 10 percent levels, respectively. Caliper is chosen as 1/2 of standard deviation of propensity score. Standard errors reported for nearest neighbor estimators are Abadie-Imbens (AI) robust standard errors. Standard errors reported for radius matching and kernel matching estimators are obtained from bootstrapping with 1000 replications.