Write Up

Andie Creel

2023-06-23

Background

Questions of interest:

- Substitution between indoor and outdoor rec under different climate scenarios
- How does that substitution change during seasons
- How does it change for people living in an urban heat island

Data set up:

1. Coded if something is:
    - indoor leisure
        - at home
        - away from home
    - outdoor recreation
        - at home
        - away from home
2. Calculated quantity demanded for each activity:
    - home leisure
    - away leisure
    - home recreation
    - away recreation
    - no leisure
3. Calculated travel time for activities with positive demand and 0 demand
    - Assumed at home activities have travel time of 0
    - Away from home activities with positive demand: used travel time from ATUS to get total travel time for activity that day, as well as average travel time per activity (ex. if someone did 5 away leisure activities and spent a total of 60 min traveling for away leisure, their average is 12 and total is 60.)
    - Away from home activities with 0 demand (no trip): I need to have the travel time even when a trip is not taken. I calculate it in two ways
        - group by state, get average travel time and use a person's state's average travel time for a given activity
        - group by race, "
4. Merged in county weather by day from Jude's gridMET (only done for 2021)

2021 initial results

All the data is process, but still need to merge in other years of weather

Testing effect of grouping travel by state or race

Currently looking at extensive margin only (did you take a trip) and ignoring all intensive margins (number of trips taken that day, length of trip).

Dependent variable is choice probabilities.

Reference level is at home leisure.

% Table created by stargazer v.5.2.3 by Marek Hlavac, Social Policy Institute. E-mail: marek.hlavac at gmail.com % Date and time: Mon, Jun 26, 2023 - 16:29:45

It doesn't seem to matter what kind of travel time is used for when people do not take a trip. Travel time is always negative and temperature is always positive.

Seasons

% Table created by stargazer v.5.2.3 by Marek Hlavac, Social Policy Institute. E-mail: marek.hlavac at gmail.com % Date and time: Mon, Jun 26, 2023 - 16:29:51

Temperature has a positive affect on away from home activities in winter, but a negative affect in summer and no affect in the spring and fall. That positive affect seen early may be primarily driven by increased recreation in the the cold months, but could eventually be offset by negative affects in summer.

Table 1: Effect of calculating no trip travel time differently

	Dependent variable:			
	choice			
	avg, race	avg, state	total, race	total, state
	(1)	(2)	(3)	(4)
(Intercept):leisure_away	−3.870***	−3.866***	−3.858***	−3.849***
	(0.211)	(0.211)	(0.211)	(0.211)
(Intercept):rec_away	−12.747***	−12.736***	−12.706***	−12.679***
	(0.473)	(0.473)	(0.473)	(0.473)
(Intercept):rec_home	−12.355***	−12.357***	−12.355***	−12.357***
	(0.405)	(0.405)	(0.405)	(0.405)
travel_time_avg_race	−0.003***			
	(0.0003)			
travel_time_avg_state		−0.004***		
		(0.0003)		
travel_time_total_race			−0.003***	
			(0.0002)	
travel_time_total_state				−0.004***
				(0.0002)
fam_inc_mid:leisure_away	0.00001***	0.00001***	0.00001***	0.00001***
	(0.00000)	(0.00000)	(0.00000)	(0.00000)
fam_inc_mid:rec_away	0.00001***	0.00001***	0.00001***	0.00001***
	(0.00000)	(0.00000)	(0.00000)	(0.00000)
fam_inc_mid:rec_home	0.00001***	0.00001***	0.00001***	0.00001***
	(0.00000)	(0.00000)	(0.00000)	(0.00000)
tmmx:leisure_away	0.012***	0.012***	0.012***	0.012***
	(0.001)	(0.001)	(0.001)	(0.001)
tmmx:rec_away	0.035***	0.035***	0.035***	0.035***
	(0.002)	(0.002)	(0.002)	(0.002)
tmmx:rec_home	0.035***	0.035***	0.035***	0.035***
	(0.001)	(0.001)	(0.001)	(0.001)
Observations	134,115	134,115	134,115	134,115
R^2	0.235	0.235	0.234	0.235
Log Likelihood	−47,736.660	−47,725.660	−47,768.010	−47,752.270
LR Test (df = 10)	154,019.700***	154,041.700***	153,957.000***	153,988.500***
Note:				*p<0.1; **p<0.05; ***p<0.01

Table 2: The effect of temperature changes given the season.

	Dependent variable:			
	choice			
	jan-march	april-june	july - sept	oct - dec
	(1)	(2)	(3)	(4)
(Intercept):leisure_away	-4.100^{***}	-1.491^{**}	1.994^{**}	-5.040^{***}
	(0.440)	(0.647)	(0.962)	(0.499)
(Intercept):rec_away	-16.030^{***}	-5.643^{***}	1.987	-15.525^{***}
	(1.087)	(1.235)	(1.729)	(1.169)
(Intercept):rec_home	-10.164^{***}	-9.507^{***}	-5.721^{***}	-12.249^{***}
	(0.881)	(1.093)	(1.550)	(1.026)
travel_time_avg_state	-0.009^{***}	-0.002^{***}	-0.002^{***}	-0.005^{***}
	(0.001)	(0.001)	(0.001)	(0.001)
fam_inc_mid:leisure_away	0.00001^{***}	0.00001^{***}	0.00001^{***}	0.00001^{***}
	(0.00000)	(0.00000)	(0.00000)	(0.00000)
fam_inc_mid:rec_away	0.00001^{***}	0.00001^{***}	0.00001^{***}	0.00001^{***}
	(0.00000)	(0.00000)	(0.00000)	(0.00000)
fam_inc_mid:rec_home	0.00001^{***}	0.00001^{***}	0.00001^{***}	0.00001^{***}
	(0.00000)	(0.00000)	(0.00000)	(0.00000)
tmmx:leisure_away	0.014^{***}	0.004^{**}	-0.007^{**}	0.017^{***}
	(0.002)	(0.002)	(0.003)	(0.002)
tmmx:rec_away	0.047^{***}	0.012^{***}	-0.014^{**}	0.045^{***}
	(0.004)	(0.004)	(0.006)	(0.004)
tmmx:rec_home	0.027^{***}	0.026^{***}	0.012^{**}	0.034^{***}
	(0.003)	(0.004)	(0.005)	(0.004)
Observations	35,299	33,437	33,496	31,883
R^2	0.256	0.217	0.214	0.252
Log Likelihood	−11,612.040	−12,464.580	−12,899.400	−10,631.670
LR Test (df = 10)	$39{,}388.820^{***}$	$39{,}333.490^{***}$	$39{,}495.390^{***}$	$35{,}627.130^{***}$
Note:				*p<0.1; **p<0.05; ***p<0.01