

Causal Relationship Study: COVID-19 Caseload & June 2021 Vacation Travel in Texas

**Section 8 - Team 1:
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August 5, 2021**

Research question

Primary: Do COVID-19 cases impact vacation travel trips for Texas for June, 2021?

Secondary: Do income, population density, age, and/or county type (rural or urban) per county impact traveling for Texas residents?



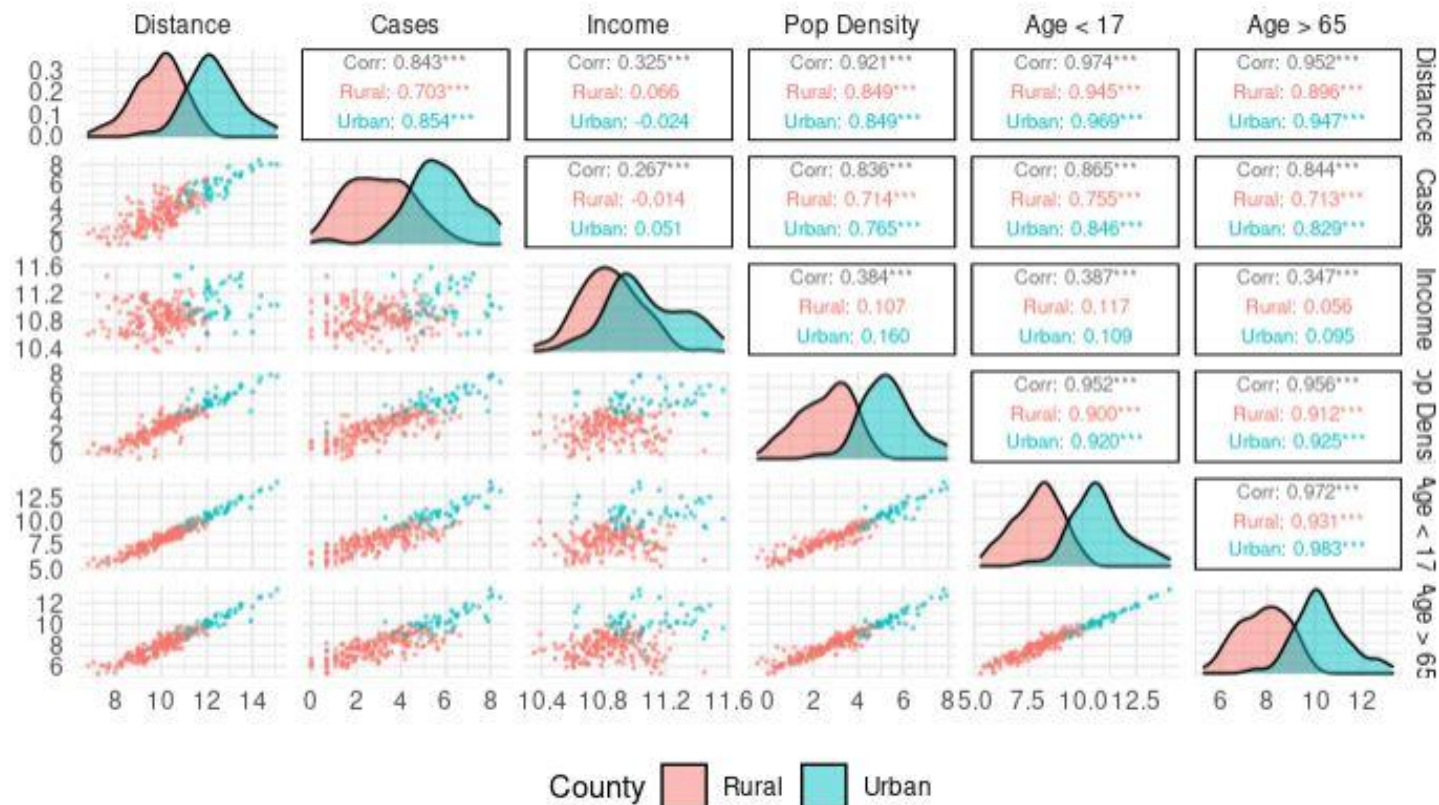
Data Descriptions and Operationalization

- Measurement
- Units of observation
- Operationalization
- Raw Distribution

Source	County Variable(s) of Interest	Variable Name
Trips by Distance Bureau of Transportation Statistics: U.S. Dept. of Transportation	Number of trips taken (>100 miles)	'long_trip'
Coronavirus (COVID-19) Data in the United States The New York Times	Average cases per 100k	'cases'
2019 American Community Survey - 2010 Decennial Census U.S. Census Bureau	Urban vs. rural populations	'is_rural'
County Information Program Texas Association of Counties	Median income (county)	'median_income'
	Population Density	'density'
	Age (%) > 65 years	'gt65'
	Age (%) < 17 year	'lt17'

EDA: ggpairs plot

Figure 5: Variable Characteristics



Model Results

Results

Dependent variable:			
	(1)	log(long_trip) (2)	(3)
log(cases + 1)	0.546*** (0.033)	0.188*** (0.036)	-0.007 (0.024)
is_rural	-0.974*** (0.147)	-0.252** (0.126)	0.097 (0.079)
log(median_income + 1)		-0.213 (0.182)	-0.342*** (0.112)
log(density)		0.620*** (0.045)	-0.076 (0.048)
log(lt17)			0.887*** (0.065)
log(gt65)			0.121* (0.071)
Constant	9.197*** (0.214)	10.295*** (2.005)	5.724*** (1.278)
Observations	230	230	230
R2	0.758	0.868	0.952
Adjusted R2	0.755	0.866	0.951
Residual Std. Error	0.740 (df = 227)	0.548 (df = 225)	0.331 (df = 223)
F Statistic	354.725*** (df = 2; 227)	371.006*** (df = 4; 225)	741.836*** (df = 6; 223)
Note: *p<0.1; **p<0.05; ***p<0.01			

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log(cases + 1)	is_rural	log(median_income + 1)	log(density)		
3.381817	2.137567	1.271337	4.316096		
log(cases + 1)	is_rural	log(median_income + 1)	log(density)	log(lt17)	log(gt65)
4.095585	2.261371	1.312913	13.398763	24.483624	22.940062

Conclusion & Next Steps

- There is evidence to support a direct causal relationship between COVID-19 case counts and an increase in vacation travel in Texas in June of 2021.
- All variables in our model considered, the strongest causal relationship with long trips (i.e., vacations) are:
 - Case counts
 - County density

Next steps:

- Repeat model for counties in other states
- Experiment with trip distances
- Explore additional variables- i.e., vaccination rates and county-level COVID-19 policies

Q & A
(5 mins)
