Online Appendix

Quantifying the impact of COVID-19 on the travel behavior of people in different socio-economic segments

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Appendix A. States in low- and high- ED/income segment

	ED rank	ED	States		Median income rank	Median income	States
High- ED segment	1	16044	DC	High- income segment	1	84342	MD
	2	574	NJ		2	82604	DC
	3	393	MA		3	80536	NJ
	4	336	RI		4	78970	MA
	5	316	CT		5	78728	HI
	6	230	MD		6	78484	VA
	7	192	DE		7	77608	CT
	8	172	NY		8	76682	AK
	9	160	FL		9	75508	NH
	10	131	PA		10	73056	CA
	11	118	OH		11	72070	WA
	12	112	IL		12	70336	CO
	13	109	CA		13	70160	MN
	14	92	VA		14	69170	NY
	15	79	IN		15	68981	UT
	16	77	NH		16	66401	DE
	17	76	NC		17	65468	IL
	18	65	GA		18	63822	ND
	18	65	TN		19	63344	RI
	20	60	SC		20	62752	WY
	21	59	HI		21	61252	PA
	22	46	WA		22	60794	OR
	22	46	KY		23	60766	VT
	24	45	MN		24	60697	TX
	25	44	WI		25	60234	WI
Low-ED segment	26	43	MI	Low- income segment	26	59764	NE
	27	41	TX		27	59470	KS
	28	40	MO		28	59060	IA
	29	39	LA		29	57757	NV
	30	37	AL		30	57606	GA
	31	37	WV		31	56869	AZ
	32	36	VT		32	56590	SD
	33	27	CO		33	56460	ME
	33	27	IA		34	56352	MI

35	25	MS		35	55651	OH
36	24	AZ	2	36	55523	IN
37	23	AR		37	54873	MO
38	22	OK		38	53877	NC
39	20	OR		39	53719	ID
40	19	ME		40	53576	FL
41	16	UT		41	52853	MT
41	16	KS		42	52328	TN
41	16	NV		43	51821	OK
44	12	NE		44	51588	SC
45	11	ID		45	49623	KY
46	9	NM		46	49154	AL
47	8	ND		47	48627	NM
48	6	SD		48	48568	LA
49	4	WY		49	46562	AR
49	4	MT		50	45649	WV
51	1	AK		51	44445	MS

Appendix B: Variable explanation

Variables	Explanation
New COVID cases	Number of COVID-19 daily new cases. Source: <u>JHU COVID-19 data repository</u>.
Imported COVID cases	Number of daily external trips by infectious persons from out of state/county. Calculated by MTI.
COVID exposure/1000 people	Number of residents already exposed to coronavirus per 1000 people. Calculated by MTI.
# Days: decreasing COVID cases	Number of days with decreasing COVID-19 cases. Calculated by MTI based on weekly pattern of new daily cases.
Testing capacity gap	Ability to provide enough tests based on World Health Organization-recommended positive test rate proxy. High positive test rates indicate a lack of sufficient testing and testing capacity gap. Source: <u>The COVID tracking project</u>.
Tests done/1000 people	Number of COVID-19 tests already completed per 1000 people. Source: <u>The COVID tracking project</u>.
% Hospital bed utilization	% Hospital beds occupied with patients. Calculated by MTI using <u>ESRI: US Hospital Beds Dashboard</u> and <u>IMHE COVID-19 projections</u>
% ICU utilization	% ICU unites occupied with COVID-19 patients. Calculated by MTI using <u>ESRI: US Hospital Beds Dashboard</u> , <u>The COVID Tracking Project</u> , and <u>IMHE COVID-19 projections</u>.
Ventilator needs	Number of ventilators needed for COVID-19 patients. Source: <u>IHME COVID-19 projections</u>.
% Working from home	Percentage of workforce working from home based on UMD models. Calculated by MTI based on changes in work trips and unemployment claims.
% Out-of-state trips* Miles/person	Percentage of all trips that cross state borders. Calculated by MTI. Average person-miles travelled on all modes (car, train, bus, plane, bike, walk, etc.) per person per day. Calculated by MTI.
Work trips/person	Number of work trips per person per day (where a "work trip" is defined as going to or coming home from work location). Calculated by MTI.
Non-work trips/person	Number of non-work trips per person per day. Additional information on trip purpose (grocery, park, restaurant, etc.) is available, but not currently shown on the platform. Calculated by MTI.

Appendix C: Detailed results of the FE panel regression model

Appendix Table 1-1 Coefficients of the panel regression model for low employment density.

Variables	Non-work trips person					
	Coefficient	Robust Standard Error	t	P	95% Confidence Interval	
New cases/1000 people	0.03	0.07	0.38	0.71	-0.11	0.16
hospital bed utilization	-0.03	0.01	-4.66	0.00	-0.04	-0.02
Tests done 1000 people	2.5E-04	9.9E-05	2.52	0.01	5.5E-05	4.4E-04
ICU utilization	-0.01	2.6E-03	-2.33	0.02	-0.01	-9.6E-04
Ventilator needs	1.7E-04	3.7E-05	4.46	0.00	9.3E-05	2.4E-04
Imported COVID cases	2.1E-05	7.0E-06	2.95	3.0E-03	6.9E-06	3.5E-05
COVID exposure/1000 people	0.01	4.6E-03	3.13	2.0E-03	0.01	0.02
days decreasing Cases	1.1E-03	2.3E-04	4.80	0.00	6.6E-04	1.6E-03
COVID death rate	-1.6E-03	1.6E-03	-1.02	0.31	-4.8E-03	1.5E-03
Constant	4.05	0.26	15.51	0.00	3.54	4.56
R-square: within			0.27			
R-square: between			0.05			
R-square: overall			0.14			
Wald chi2(9)			364.65			
Prob > chi2			0.00			
Observations			12,376			

Appendix Table 1-2 Coefficients of the panel regression model for low employment density.

Variables	Work trips person					
	Coefficient	Robust Standard Error	t	P	95% Confidence Interval	
New cases/1000 people	-0.03	0.01	-2.91	4.0E-03	-0.05	-0.01
hospital bed utilization	1.4E-03	7.2E-04	1.99	0.05	2.1E-05	2.8E-03
Tests done 1000 people	-1.7E-05	1.0E-05	-1.63	0.10	-3.8E-05	3.4E-06
ICU utilization	-1.8E-03	4.4E-04	-4.13	0.00	-2.7E-03	-9.5E-04
Ventilator needs	2.2E-05	1.1E-05	2.06	0.04	1.0E-06	4.2E-05
Imported COVID cases	-5.0E-06	1.7E-06	-2.94	3.0E-03	-8.3E-06	-1.7E-06
COVID exposure/1000 people	2.4E-03	4.9E-04	4.81	0.00	1.4E-03	3.3E-03
days decreasing Cases	-1.4E-04	3.1E-05	-4.62	0.00	-2.0E-04	-8.3E-05
COVID death rate	-3.2E-03	2.7E-04	-11.77	0.00	-3.7E-03	-2.6E-03
Constant	0.44	0.03	13.15	0.00	0.38	0.51
R-square: within			0.10			
R-square: between			0.04			
R-square: overall			0.09			
Wald chi2(9)			498.68			
Prob > chi2			0.00			
Observations			12376			

Appendix Table 1-3 Coefficients of the panel regression model for low employment density.

Variables	Miles/person					
	Coefficient	Robust Standard Error	t	P	95% Confidence Interval	
New cases/1000 people	1.85	2.36	0.79	0.43	-2.77	6.47
hospital bed utilization	-0.47	0.06	-7.82	0.0E+00	-0.59	-0.35
Tests done 1000 people	1.6E-03	1.0E-03	1.58	0.12	-3.9E-04	3.6E-03
ICU utilization	0.06	0.05	1.20	0.23	-0.04	0.16
Ventilator needs	1.4E-03	4.3E-04	3.14	2.0E-03	5.1E-04	2.2E-03
Imported COVID cases	3.4E-04	1.9E-04	1.82	0.07	-2.6E-05	7.1E-04
COVID exposure/1000 people	0.26	0.06	3.97	0.0E+00	0.13	0.38
days decreasing Cases	0.02	2.7E-03	6.23	0.0E+00	0.01	0.02
COVID death rate	-0.22	0.04	-5.01	0.0E+00	-0.31	-0.14
Constant	61.51	3.03	20.31	0.0E+00	55.58	67.45
R-square: within			0.07			
R-square: between			0.26			
R-square: overall			0.07			
Wald chi2(9)			728.73			
Prob > chi2			0.00			
Observations			12376			

Appendix Table 1-4 Coefficients of the panel regression model for low employment density.

Variables	Out of state trips					
	Coefficient	Robust Standard Error	t	P	95% Confidence Interval	
New cases/1000 people	-0.12	0.10	-4.60	0.00	-0.32	0.09
hospital bed utilization	-0.03	0.01	-3.33	1.0E-03	-0.04	-0.01
Tests done 1000 people	-2.1E-04	2.2E-04	-0.95	0.34	-6.3E-04	2.2E-04
ICU utilization	0.01	4.4E-03	3.11	2.0E-03	0.01	0.02
Ventilator needs	3.9E-06	7.0E-05	0.06	0.96	-1.3E-04	1.4E-04
Imported COVID cases	5.1E-05	2.6E-05	2.00	0.05	9.8E-07	1.0E-04
COVID exposure/1000 people	-0.01	0.01	-0.87	0.39	-0.02	0.01
days decreasing Cases	7.0E-04	6.0E-04	1.16	0.25	-4.8E-04	1.9E-03
COVID death rate	-0.01	3.2E-03	-4.60	0.00	-0.02	-0.01
Constant	6.89	0.74	9.25	0.00	5.43	8.35
R-square: within			0.05			
R-square: between			0.00			
R-square: overall			0.00			
Wald chi2(9)			54.47			
Prob > chi2			0.00			
Observations			12376			

Appendix Table 1-5 Coefficients of the panel regression model for low employment density.

Variables	Coefficient	Robust Standard Error	t	P	95% Confidence Interval	
			Working from home			
New cases/1000 people	5.51	1.72	3.20	1.0E-03	2.14	8.88
hospital bed utilization	-0.28	0.13	-2.07	0.04	-0.54	-0.02
Tests done 1000 people	3.6E-03	2.3E-03	1.57	0.12	-9.0E-04	0.01
ICU utilization	0.39	0.08	4.92	0.00	0.24	0.55
Ventilator needs	-3.5E-03	2.1E-03	-1.68	0.09	-0.01	6.0E-04
Imported COVID cases	9.8E-04	2.9E-04	3.37	1.0E-03	4.1E-04	1.6E-03
COVID exposure/1000 people	-0.36	0.11	-3.34	1.0E-03	-0.58	-0.15
days decreasing Cases	0.04	0.01	6.18	0.00	0.02	0.05
COVID death rate	0.51	0.05	10.67	0.00	0.42	0.61
Constant	27.04	5.70	4.74	0.00	15.86	38.22
R-square: within			0.48			
R-square: between			0.04			
R-square: overall			0.38			
Wald chi2(9)			838.78			
Prob > chi2			0.00			
Observations			12376			

Appendix Table 2-1 Coefficients of the panel regression model for high employment density.

Variables	Coefficient	Robust Standard Error	t	P	95% Confidence Interval	
			Non-work trips person			
New cases/1000 people	-0.26	0.08	-3.09	2.0E-03	-0.42	-0.09
hospital bed utilization	-0.01	3.3E-03	-3.14	2.0E-03	-0.02	-3.9E-03
Tests done 1000 people	5.4E-05	6.3E-05	0.86	0.39	-7.0E-05	1.8E-04
ICU utilization	-0.01	1.9E-03	-3.93	0.00	-0.01	-3.7E-03
Ventilator needs	5.5E-06	2.7E-05	0.21	0.84	-4.6E-05	5.7E-05
Imported COVID cases	1.2E-05	3.9E-06	3.03	2.0E-03	4.1E-06	1.9E-05
COVID exposure/1000 people	0.03	0.01	5.33	0.00	0.02	0.04
days decreasing Cases	8.3E-04	1.7E-04	4.95	0.00	5.0E-04	1.2E-03
COVID death rate	1.4E-03	1.2E-03	1.09	0.28	-1.1E-03	3.8E-03
Constant	3.35	0.18	18.27	0.00	2.99	3.71
R-square: within			0.31			
R-square: between			0.09			
R-square: overall			0.26			
Wald chi2(9)			686.98			
Prob > chi2			0.00			
Observations			11900			

Appendix Table 2-2 Coefficients of the panel regression model for high employment density.

Variables	Coefficient	Robust Standard Error	t	P	95% Confidence Interval	
					Work trips person	
New cases/1000 people	-0.03	0.03	1.02	0.31	-0.10	0.03
hospital bed utilization	7.4E-04	5.9E-04	1.26	0.21	-4.1E-04	1.9E-03
Tests done 1000 people	-6.4E-06	1.4E-05	0.47	0.64	-3.3E-05	2.1E-05
ICU utilization	-1.0E-03	4.2E-04	2.45	0.01	-1.9E-03	-2.0E-04
Ventilator needs	2.2E-05	1.1E-05	1.97	0.05	8.0E-08	4.4E-05
Imported COVID cases	-3.4E-06	1.0E-06	3.30	1.0E-03	-5.4E-06	-1.4E-06
COVID exposure/1000 people	8.6E-04	9.3E-04	0.92	0.36	-9.7E-04	2.7E-03
days decreasing Cases	-1.6E-04	3.7E-05	4.45	0. 00	-2.3E-04	-9.1E-05
COVID death rate	-3.9E-03	4.2E-04	9.24	0. 0	-4.7E-03	-3.1E-03
Constant	0.49	0.05	9.85	0. 0	0.39	0.59
R-square: within			0.16			
R-square: between			0.09			
R-square: overall			0.07			
Wald chi2(9)			526.09			
Prob > chi2			0.00			
Observations			11900			

Appendix Table 2-3 Coefficients of the panel regression model for high employment density.

Variables	Coefficient	Robust Standard Error	t	P	95% Confidence Interval	
					Miles/person	
New cases/1000 people	-3.53	1.41	-2.51	0.01	-6.29	-0.78
hospital bed utilization	-0.19	0.08	-2.49	0.01	-0.33	-0.04
Tests done 1000 people	-8.1E-04	1.2E-03	-0.65	0.52	-3.2E-03	1.6E-03
ICU utilization	-0.09	0.04	-2.26	0.02	-0.16	-0.01
Ventilator needs	-1.7E-04	8.1E-04	-0.20	0.84	-1.8E-03	1.4E-03
Imported COVID cases	3.1E-04	5.0E-05	6.21	0.00	2.1E-04	4.1E-04
COVID exposure/1000 people	0.51	0.08	6.35	0.00	0.35	0.67
days decreasing Cases	0.02	3.6E-03	4.90	0.00	0.01	0.02
COVID death rate	-0.15	0.03	-4.78	0.00	-0.21	-0.09
Constant	46.98	4.21	11.17	0.00	38.73	55.22
R-square: within			0.4123			
R-square: between			0.3532			
R-square: overall			0.3967			
Wald chi2(9)			1280.09			
Prob > chi2			0.00			
Observations			11900			

Appendix Table 2-4 Coefficients of the panel regression model for high employment density.

	Out of state trips					
Variables	Coefficient	Robust Standard Error	t	P	95% Confidence Interval	
New cases/1000 people	-0.34	0.20	2.82	0.01	-0.74	0.06
hospital bed utilization	-3.6E-04	0.01	0.03	0.98	-0.03	0.03
Tests done 1000 people	-6.4E-04	2.0E-04	3.13	2.0E-03	-1.0E-03	-2.4E-04
ICU utilization	-0.01	0.01	1.91	0.06	-0.03	3.6E-04
Ventilator needs	1.0E-04	1.1E-04	0.96	0.34	-1.1E-04	3.1E-04
Imported COVID cases	3.7E-05	9.8E-06	3.74	0.00	1.7E-05	5.6E-05
COVID exposure/1000 people	0.01	0.01	1.13	0.26	-0.01	0.03
days decreasing cases	1.0E-03	4.8E-04	2.14	0.03	8.4E-05	2.0E-03
COVID death rate	-0.02	0.01	2.82	0.01	-0.03	-4.9E-03
Constant	8.64	1.49	5.81	0.00	5.73	11.56
R-square: within			0.07			
R-square: between			0.20			
R-square: overall			0.05			
Wald chi2(9)			87.52			
Prob > chi2			0.00			
Observations			11900			

Appendix Table 2-5 Coefficients of the panel regression model for high employment density.

	Working from home					
Variables	Coefficient	Robust Standard Error	t	P	95% Confidence Interval	
New cases/1000 people	9.78	3.54	2.76	0.01	2.84	16.72
hospital bed utilization	-0.06	0.11	-0.52	0.60	-0.27	0.16
Tests done 1000 people	7.4E-04	2.3E-03	0.33	0.74	-3.7E-03	0.01
ICU utilization	0.15	0.08	2.00	0.05	3.3E-03	0.30
Ventilator needs	-3.9E-03	1.7E-03	-2.31	0.02	-0.01	-5.8E-04
Imported COVID cases	5.4E-04	1.3E-04	4.24	0.00	2.9E-04	8.0E-04
COVID exposure/1000 people	-0.12	0.15	-0.78	0.44	-0.42	0.18
days decreasing cases	0.04	0.01	6.39	0.00	0.03	0.05
COVID death rate	0.57	0.04	14.62	0.00	0.49	0.64
Constant	17.59	5.98	2.94	3.0E-03	5.86	29.32
R-square: within			0.55			
R-square: between			0.06			
R-square: overall			0.45			
Wald chi2(9)			716.02			
Prob > chi2			0.00			
Observations			11900			

Appendix Table 3-1 Coefficients of the panel regression model for low population density.

	Non-work trips person					
Variables	Coefficient	Robust Standard Error	t	P	95% Confidence Interval	
New cases/1000 people	-2.4E-03	0.07	-0.04	0.97	-0.13	0.13
hospital bed utilization	-0.03	0.01	-4.28	0.00	-0.05	-0.02
Tests done 1000 people	2.6E-04	9.6E-05	2.72	0.01	7.3E-05	4.5E-04
ICU utilization	-3.8E-03	3.2E-03	-1.21	0.23	-0.01	2.4E-03
Ventilator needs	3.3E-04	2.1E-04	1.55	0.12	-8.9E-05	7.5E-04
Imported COVID cases	2.1E-05	7.8E-06	2.64	0.01	5.3E-06	3.6E-05
COVID exposure/1000 people	0.01	4.5E-03	2.78	0.01	3.7E-03	0.02
days decreasing cases	1.1E-03	2.6E-04	4.44	0.00	6.3E-04	1.6E-03
COVID death rate	-3.0E-03	8.3E-04	-3.65	0.00	-4.7E-03	-1.4E-03
Constant	4.24	0.32	13.40	0.00	3.62	4.86
R-square: within			0.26			
R-square: between			0.04			
R-square: overall			0.12			
Wald chi2(9)			355.50			
Prob > chi2			0.00			
Observations			12376			

Appendix Table 3-2 Coefficients of the panel regression model for low population density.

	Work trips person					
Variables	Coefficient	Robust Standard Error	t	P	95% Confidence Interval	
New cases/1000 people	-0.02	0.01	-2.04	0.04	-0.05	-9.4E-04
hospital bed utilization	1.0E-03	8.4E-04	1.21	0.23	-6.3E-04	2.7E-03
Tests done 1000 people	-1.6E-05	1.0E-05	-1.56	0.12	-3.6E-05	4.1E-06
ICU utilization	-2.2E-03	4.5E-04	-4.83	0.00	-3.0E-03	-1.3E-03
Ventilator needs	6.4E-05	3.2E-05	2.01	0.04	1.7E-06	1.3E-04
Imported COVID cases	-5.4E-06	1.8E-06	-2.98	3.0E-03	-9.0E-06	-1.9E-06
COVID exposure/1000 people	2.4E-03	5.1E-04	4.67	0.00	1.4E-03	3.4E-03
days decreasing Cases	-1.4E-04	3.0E-05	-4.85	0.00	-2.0E-04	-8.5E-05
COVID death rate	-3.3E-03	2.4E-04	-13.32	0.00	-3.7E-03	-2.8E-03
Constant	0.47	0.04	12.17	0.00	0.39	0.54
R-square: within			0.10			
R-square: between			0.03			
R-square: overall			0.08			
Wald chi2(9)			926.70			
Prob > chi2			0.00			
Observations			12376			

Appendix Table 3-3 Coefficients of the panel regression model for low population density.

Variables	Coefficient	Robust Standard Error	t	P	95% Confidence Interval	
					Miles/person	
New cases/1000 people	0.72	2.14	0.34	0.74	-3.47	4.91
hospital bed utilization	-0.53	0.08	-7.05	0.00	-0.68	-0.38
Tests done 1000 people	1.9E-03	1.1E-03	1.84	0.07	-1.3E-04	4.0E-03
ICU utilization	0.10	0.04	2.54	0.01	0.02	0.18
Ventilator needs	3.3E-03	2.1E-03	1.56	0.12	-8.5E-04	0.01
Imported COVID cases	3.3E-04	2.0E-04	1.59	0.11	-7.5E-05	7.3E-04
COVID exposure/1000 people	0.24	0.06	3.72	0.00	0.11	0.37
days decreasing Cases	0.02	2.8E-03	6.68	0.00	0.01	0.02
COVID death rate	-0.27	0.03	-8.31	0.00	-0.33	-0.20
Constant	64.46	3.46	18.65	0.00	57.68	71.23
R-square: within			0.07			
R-square: between			0.28			
R-square: overall			0.08			
Wald chi2(9)			570.11			
Prob > chi2			0.00			
Observations			12376			

Appendix Table 3-4 Coefficients of the panel regression model for low population density.

Variables	Coefficient	Robust Standard Error	t	P	95% Confidence Interval	
					Out of state trips	
New cases/1000 people	-0.15	0.11	-4.99	0.00	-0.37	0.07
hospital bed utilization	-0.03	0.01	-3.26	1.0E-03	-0.05	-0.01
Tests done 1000 people	-2.1E-04	2.2E-04	-0.96	0.34	-6.3E-04	2.2E-04
ICU utilization	0.02	4.8E-03	3.28	1.0E-03	0.01	0.03
Ventilator needs	1.7E-04	3.3E-04	0.51	0.61	-4.8E-04	8.3E-04
Imported COVID cases	5.3E-05	2.7E-05	1.99	0.05	7.0E-07	1.1E-04
COVID exposure/1000 people	-0.01	0.01	-0.92	0.36	-0.03	0.01
days decreasing Cases	8.3E-04	6.5E-04	1.28	0.20	-4.4E-04	2.1E-03
COVID death rate	-0.02	2.4E-03	-6.99	0.00	-0.02	-0.01
Constant	7.31	0.74	9.93	0.00	5.86	8.75
R-square: within			0.05			
R-square: between			0.00			
R-square: overall			0.00			
Wald chi2(9)			73.69			
Prob > chi2			0.00			
Observations			12376			

Appendix Table 3-5 Coefficients of the panel regression model for low population density.

Variables	Coefficient	Robust Standard Error	t	P	95% Confidence Interval	
					Working from home	
New cases/1000 people	3.21	1.79	1.79	0.07	-0.30	6.73
hospital bed utilization	-0.24	0.15	-1.52	0.13	-0.54	0.07
Tests done 1000 people	3.4E-03	2.2E-03	1.52	0.13	-9.9E-04	0.01
ICU utilization	0.49	0.07	6.60	0.00	0.35	0.64
Ventilator needs	-0.01	4.8E-03	-1.79	0.07	-0.02	8.0E-04
Imported COVID cases	1.0E-03	2.6E-04	4.04	0.00	5.3E-04	1.5E-03
COVID exposure/1000 people	-0.37	0.11	-3.27	1.0E-03	-0.59	-0.15
days decreasing Cases	0.03	0.01	6.28	0.00	0.02	0.05
COVID death rate	0.53	0.04	11.91	0.00	0.44	0.61
Constant	24.90	6.59	3.78	0.00	11.98	37.81
R-square: within			0.49			
R-square: between			0.03			
R-square: overall			0.40			
Wald chi2(9)			1562.97			
Prob > chi2			0.00			
Observations			12376			

Appendix Table 4-1 Coefficients of the panel regression model for high population density.

Variables	Coefficient	Robust Standard Error	t	P	95% Confidence Interval	
					Non-work trips person	
New cases/1000 people	-0.22	0.09	-2.54	0.01	-0.39	-0.05
hospital bed utilization	-0.01	3.4E-03	-2.82	0.01	-0.02	-2.9E-03
Tests done 1000 people	-1.0E-05	5.1E-05	-0.20	0.84	-1.1E-04	8.9E-05
ICU utilization	-0.01	2.1E-03	-4.08	0.00	-0.01	-4.5E-03
Ventilator needs	1.4E-05	2.5E-05	0.58	0.57	-3.4E-05	6.3E-05
Imported COVID cases	7.9E-06	3.7E-06	2.16	0.03	7.3E-07	1.5E-05
COVID exposure/1000 people	0.04	4.0E-03	8.85	0.00	0.03	0.04
days decreasing Cases	8.7E-04	1.5E-04	5.88	0.00	5.8E-04	1.2E-03
COVID death rate	2.2E-03	1.3E-03	1.65	0.10	-4.0E-04	4.7E-03
Constant	3.29	0.19	17.03	0.00	2.91	3.67
R-square: within			0.33			
R-square: between			0.06			
R-square: overall			0.28			
Wald chi2(9)			670.72			
Prob > chi2			0.00			
Observations			11900			

Appendix Table 4-2 Coefficients of the panel regression model for high population density.

	Work trips person				95% Confidence Interval	
Variables	Coefficient	Robust Standard Error	t	P		
New cases/1000 people	-0.03	0.03	0.93	0.35	-0.10	0.03
hospital bed utilization	6.7E-04	5.7E-04	1.17	0.24	-4.5E-04	1.8E-03
Tests done 1000 people	-4.5E-06	1.4E-05	0.32	0.75	-3.2E-05	2.3E-05
ICU utilization	-9.1E-04	3.5E-04	2.57	0.01	-1.6E-03	-2.2E-04
Ventilator needs	1.9E-05	9.2E-06	2.08	0.04	1.1E-06	3.7E-05
Imported COVID cases	-3.2E-06	9.9E-07	3.25	1.0E-03	-5.2E-06	-1.3E-06
COVID exposure/1000 people	6.1E-04	9.6E-04	0.64	0.52	-1.3E-03	2.5E-03
days decreasing Cases	-1.7E-04	4.0E-05	4.30	0.00	-2.5E-04	-9.3E-05
COVID death rate	-3.8E-03	4.5E-04	8.51	0.00	-4.7E-03	-3.0E-03
Constant	0.49	0.05	9.96	0.00	0.39	0.58
R-square: within			0.16			
R-square: between			0.03			
R-square: overall			0.08			
Wald chi2(9)			419.31			
Prob > chi2			0.00			
Observations			11900			

Appendix Table 4-3 Coefficients of the panel regression model for high population density.

	Miles/person				95% Confidence Interval	
Variables	Coefficient	Robust Standard Error	t	P		
New cases/1000 people	-2.46	1.39	-1.76	0.08	-5.19	0.27
hospital bed utilization	-0.17	0.07	-2.47	0.01	-0.30	-0.03
Tests done 1000 people	-1.2E-03	1.2E-03	-1.07	0.29	-3.5E-03	1.0E-03
ICU utilization	-0.13	0.04	-3.14	2.0E-03	-0.20	-0.05
Ventilator needs	1.9E-04	6.2E-04	0.31	0.76	-1.0E-03	1.4E-03
Imported COVID cases	3.0E-04	4.7E-05	6.44	0.00	2.1E-04	3.9E-04
COVID exposure/1000 people	0.55	0.08	7.01	0.00	0.39	0.70
days decreasing Cases	0.02	3.0E-03	5.43	0.00	0.01	0.02
COVID death rate	-0.11	0.03	-3.71	0.00	-0.17	-0.05
Constant	45.31	3.82	11.88	0.00	37.83	52.79
R-square: within			0.41			
R-square: between			0.19			
R-square: overall			0.36			
Wald chi2(9)			1337.07			
Prob > chi2			0.00			
Observations			11900			

Appendix Table 4-4 Coefficients of the panel regression model for high population density.

	Out of state trips					
Variables	Coefficient	Robust Standard Error	t	P	95% Confidence Interval	
New cases/1000 people	-0.37	0.23	2.59	0.01	-0.82	0.09
hospital bed utilization	-7.4E-04	0.01	0.05	0.96	-0.03	0.03
Tests done 1000 people	-6.2E-04	1.9E-04	3.22	1.0E-03	-1.0E-03	-2.4E-04
ICU utilization	-0.01	0.01	2.05	0.04	-0.02	-5.6E-04
Ventilator needs	1.1E-04	8.7E-05	1.31	0.19	-5.7E-05	2.8E-04
Imported COVID cases	3.7E-05	1.0E-05	3.65	0.00	1.7E-05	5.6E-05
COVID exposure/1000 people	0.01	0.01	1.21	0.23	-0.01	0.03
days decreasing Cases	9.1E-04	4.4E-04	2.09	0.04	5.9E-05	1.8E-03
COVID death rate	-0.01	0.01	2.52	0.01	-0.03	-3.2E-03
Constant	8.43	1.53	5.52	0.00	5.44	11.42
R-square: within			0.07			
R-square: between			0.20			
R-square: overall			0.05			
Wald chi2(9)			79.31			
Prob > chi2			0.00			
Observations			11900			

Appendix Table 4-5 Coefficients of the panel regression model for high population density.

	Working from home					
Variables	Coefficient	Robust Standard Error	t	P	95% Confidence Interval	
New cases/1000 people	10.78	3.89	2.77	0.01	3.16	18.41
hospital bed utilization	-0.06	0.11	-0.52	0.60	-0.26	0.15
Tests done 1000 people	2.8E-04	2.3E-03	0.12	0.90	-4.3E-03	4.8E-03
ICU utilization	0.12	0.07	1.85	0.06	-0.01	0.25
Ventilator needs	-3.1E-03	1.4E-03	-2.25	0.02	-0.01	-4.0E-04
Imported COVID cases	4.9E-04	1.3E-04	3.91	0.00	2.5E-04	7.4E-04
COVID exposure/1000 people	-0.06	0.15	-0.41	0.68	-0.37	0.24
days decreasing Cases	0.04	0.01	6.29	0.00	0.03	0.05
COVID death rate	0.56	0.04	12.79	0.00	0.48	0.65
Constant	17.54	5.96	2.94	3.0E-03	5.85	29.23
R-square: within			0.55			
R-square: between			0.06			
R-square: overall			0.45			
Wald chi2(9)			602.63			
Prob > chi2			0.00			
Observations			11900			

Appendix Table 5-1 Coefficients of the panel regression model for low median income.

Variables	Coefficient	Robust Standard Error	t	P	95% Confidence Interval	
			Non-work trips person			
New cases/1000 people	1.7E-04	0.08	0.0E+00	1.00	-0.16	0.16
hospital bed utilization	-0.03	4.5E-03	-6.31	0.00	-0.04	-0.02
Tests done 1000 people	4.3E-04	7.5E-05	5.76	0.00	2.9E-04	5.8E-04
ICU utilization	-3.7E-03	2.3E-03	-1.66	0.10	-0.01	6.8E-04
Ventilator needs	8.1E-05	4.9E-05	1.65	0.10	-1.5E-05	1.8E-04
Imported COVID cases	1.0E-05	4.4E-06	2.36	0.02	1.8E-06	1.9E-05
COVID exposure/1000 people	0.01	3.5E-03	4.27	0.00	0.01	0.02
days decreasing Cases	7.5E-04	1.7E-04	4.33	0.00	4.1E-04	1.1E-03
COVID death rate	-9.7E-04	1.6E-03	-0.61	0.54	-4.1E-03	2.2E-03
Constant	4.08	0.21	19.64	0.00	3.68	4.49
R-square: within			0.30			
R-square: between			0.16			
R-square: overall			0.21			
Wald chi2(9)			330.02			
Prob > chi2			0.00			
Observations			12376			

Appendix Table 5-2 Coefficients of the panel regression model for low median income.

Variables	Coefficient	Robust Standard Error	t	P	95% Confidence Interval	
			Work trips person			
New cases/1000 people	-0.03	0.01	-2.82	0.01	-0.04	-0.01
hospital bed utilization	9.8E-04	8.9E-04	1.10	0.27	-7.6E-04	2.7E-03
Tests done 1000 people	-2.1E-05	1.9E-05	-1.07	0.28	-5.8E-05	1.7E-05
ICU utilization	-1.8E-03	4.2E-04	-4.33	0.00	-2.6E-03	-9.9E-04
Ventilator needs	3.2E-05	2.1E-05	1.49	0.14	-1.0E-05	7.4E-05
Imported COVID cases	-4.1E-06	9.3E-07	-4.45	0.00	-5.9E-06	-2.3E-06
COVID exposure/1000 people	2.4E-03	6.6E-04	3.58	0.00	1.1E-03	3.6E-03
days decreasing Cases	-1.4E-04	3.2E-05	-4.18	0.00	-2.0E-04	-7.2E-05
COVID death rate	-2.9E-03	1.8E-04	-16.58	0.00	-3.3E-03	-2.6E-03
Constant	0.44	0.04	10.23	0.00	0.36	0.52
R-square: within			0.11			
R-square: between			0.00			
R-square: overall			0.08			
Wald chi2(9)			586.56			
Prob > chi2			0.00			
Observations			12376			

Appendix Table 5-3 Coefficients of the panel regression model for low median income.

Variables	Coefficient	Robust Standard Error	t	P	95% Confidence Interval	
New cases/1000 people	-0.24	1.42	-0.17	0.87	-3.01	2.54
hospital bed utilization	-0.47	0.06	-7.42	0.00	-0.60	-0.35
Tests done 1000 people	3.0E-03	1.7E-03	1.79	0.07	-2.9E-04	0.01
ICU utilization	0.07	0.05	1.46	0.15	-0.02	0.17
Ventilator needs	1.7E-04	8.9E-04	0.19	0.85	-1.6E-03	1.9E-03
Imported COVID cases	3.9E-04	6.1E-05	6.29	0.00	2.7E-04	5.1E-04
COVID exposure/1000 people	0.27	0.07	3.67	0.00	0.13	0.42
days decreasing Cases	0.02	2.4E-03	7.18	0.00	0.01	0.02
COVID death rate	-0.19	0.03	-5.47	0.00	-0.25	-0.12
Constant	59.82	2.92	20.46	0.00	54.09	65.55
R-square: within			0.37			
R-square: between			0.38			
R-square: overall			0.32			
Wald chi2(9)			881.08			
Prob > chi2			0.00			
Observations			12376			

Miles/person

Appendix Table 5-4 Coefficients of the panel regression model for low median income.

Variables	Coefficient	Robust Standard Error	t	P	95% Confidence Interval	
New cases/1000 people	-0.15	0.10	-2.68	0.01	-0.35	0.06
hospital bed utilization	-0.02	0.01	-2.18	0.03	-0.04	-2.0E-03
Tests done 1000 people	-5.8E-04	2.2E-04	-2.66	0.01	-1.0E-03	-1.5E-04
ICU utilization	0.01	4.1E-03	3.23	1.0E-03	0.01	0.02
Ventilator needs	-5.1E-06	1.2E-04	-0.04	0.97	-2.4E-04	2.3E-04
Imported COVID cases	3.8E-05	1.0E-05	3.81	0.00	1.9E-05	5.8E-05
COVID exposure/1000 people	0.01	0.01	0.66	0.51	-0.01	0.02
days decreasing Cases	6.9E-04	4.2E-04	1.66	0.10	-1.3E-04	1.5E-03
COVID death rate	-0.02	3.0E-03	-5.15	0.00	-0.02	-0.01
Constant	6.68	0.65	10.26	0.00	5.40	7.95
R-square: within			0.05			
R-square: between			0.13			
R-square: overall			0.09			
Wald chi2(9)			85.91			
Prob > chi2			0.00			
Observations			12376			

Out of state trips

Appendix Table 5-5 Coefficients of the panel regression model for low median income.

Variables	Coefficient	Robust Standard Error	t	P	95% Confidence Interval	
				Working from home		
New cases/1000 people	4.18	1.90	2.19	0.03	0.44	7.91
hospital bed utilization	-0.26	0.16	-1.67	0.10	-0.56	0.05
Tests done 1000 people	4.1E-03	4.0E-03	1.03	0.30	-3.7E-03	0.01
ICU utilization	0.44	0.08	5.46	0.00	0.28	0.59
Ventilator needs	-4.8E-03	4.0E-03	-1.20	0.23	-0.01	3.1E-03
Imported COVID cases	8.3E-04	1.8E-04	4.65	0.00	4.8E-04	1.2E-03
COVID exposure/1000 people	-0.35	0.14	-2.41	0.02	-0.63	-0.07
days decreasing Cases	0.04	0.01	5.70	0.00	0.02	0.05
COVID death rate	0.48	0.04	13.49	0.00	0.41	0.55
Constant	26.13	7.17	3.64	0.00	12.08	40.18
R-square: within			0.50			
R-square: between			2.2E-03			
R-square: overall			0.40			
Wald chi2(9)			732.99			
Prob > chi2			0.00			
Observations			12376			

Appendix Table 6-1 Coefficients of the panel regression model for high median income.

Variables	Coefficient	Robust Standard Error	t	P	95% Confidence Interval	
				Non-work trips person		
New cases/1000 people	-0.26	0.08	-3.09	2.0E-03	-0.42	-0.09
hospital bed utilization	-0.01	3.3E-03	-3.14	2.0E-03	-0.02	-3.9E-03
Tests done 1000 people	5.4E-05	6.3E-05	0.86	0.39	-7.0E-05	1.8E-04
ICU utilization	-0.01	1.9E-03	-3.93	0.00	-0.01	-3.7E-03
Ventilator needs	5.5E-06	2.7E-05	0.21	0.84	-4.6E-05	5.7E-05
Imported COVID cases	1.2E-05	3.9E-06	3.03	2.0E-03	4.1E-06	1.9E-05
COVID exposure/1000 people	0.03	0.01	5.33	0.00	0.02	0.04
days decreasing Cases	8.3E-04	1.7E-04	4.95	0.00	5.0E-04	1.2E-03
COVID death rate	1.4E-03	1.2E-03	1.09	0.28	-1.1E-03	3.8E-03
Constant	3.35	0.18	18.27	0.00	2.99	3.71
R-square: within			0.31			
R-square: between			0.09			
R-square: overall			0.26			
Wald chi2(9)			686.98			
Prob > chi2			0.00			
Observations			11900			

Appendix Table 6-2 Coefficients of the panel regression model for high median income.

	Work trips person					
Variables	Coefficient	Robust Standard Error	t	P	95% Confidence Interval	
New cases/1000 people	-0.03	0.03	1.02	0.31	-0.10	0.03
hospital bed utilization	7.4E-04	5.9E-04	1.26	0.21	-4.1E-04	1.9E-03
Tests done 1000 people	-6.4E-06	1.4E-05	0.47	0.64	-3.3E-05	2.1E-05
ICU utilization	-1.0E-03	4.2E-04	2.45	0.01	-1.9E-03	-2.0E-04
Ventilator needs	2.2E-05	1.1E-05	1.97	0.05	8.0E-08	4.4E-05
Imported COVID cases	-3.4E-06	1.0E-06	3.30	1.0E-03	-5.4E-06	-1.4E-06
COVID exposure/1000 people	8.6E-04	9.3E-04	0.92	0.36	-9.7E-04	2.7E-03
days decreasing Cases	-1.6E-04	3.7E-05	4.45	0.00	-2.3E-04	-9.1E-05
COVID death rate	-3.9E-03	4.2E-04	9.24	0.00	-4.7E-03	-3.1E-03
Constant	0.49	0.05	9.85	0.00	0.39	0.59
R-square: within			0.16			
R-square: between			0.09			
R-square: overall			0.07			
Wald chi2(9)			526.09			
Prob > chi2			0.00			
Observations			11900			

Appendix Table 6-3 Coefficients of the panel regression model for high median income.

	Miles/person					
Variables	Coefficient	Robust Standard Error	t	P	95% Confidence Interval	
New cases/1000 people	-3.53	1.41	-2.51	0.01	-6.29	-0.78
hospital bed utilization	-0.19	0.08	-2.49	0.01	-0.33	-0.04
Tests done 1000 people	-8.1E-04	1.2E-03	-0.65	0.52	-3.2E-03	1.6E-03
ICU utilization	-0.09	0.04	-2.26	0.02	-0.16	-0.01
Ventilator needs	-1.7E-04	8.1E-04	-0.20	0.84	-1.8E-03	1.4E-03
Imported COVID cases	3.1E-04	5.0E-05	6.21	0.00	2.1E-04	4.1E-04
COVID exposure/1000 people	0.51	0.08	6.35	0.00	0.35	0.67
days decreasing Cases	0.02	3.6E-03	4.90	0.00	0.01	0.02
COVID death rate	-0.15	0.03	-4.78	0.00	-0.21	-0.09
Constant	46.98	4.21	11.17	0.00	38.73	55.22
R-square: within			0.41			
R-square: between			0.35			
R-square: overall			0.40			
Wald chi2(9)			1280.09			
Prob > chi2			0.00			
Observations			11900			

Appendix Table 6-4 Coefficients of the panel regression model for high median income.

		Out of state trips				
Variables	Coefficient	Robust Standard Error	t	P	95% Confidence Interval	
New cases/1000 people	-0.34	0.20	2.65	0.01	-0.74	0.06
hospital bed utilization	-3.6E-04	0.01	0.03	0.98	-0.03	0.03
Tests done 1000 people	-6.4E-04	2.0E-04	3.13	2.0E-03	-1.0E-03	-2.4E-04
ICU utilization	-0.01	0.01	1.91	0.06	-0.03	3.6E-04
Ventilator needs	1.0E-04	1.1E-04	0.96	0.34	-1.1E-04	3.1E-04
Imported COVID cases	3.7E-05	9.8E-06	3.74	0.00	1.7E-05	5.6E-05
COVID exposure/1000 people	0.01	0.01	1.13	0.26	-0.01	0.03
days decreasing Cases	1.0E-03	4.8E-04	2.14	0.03	8.4E-05	2.0E-03
COVID death rate	-0.02	0.01	2.82	0.01	-0.03	-4.9E-03
Constant	8.64	1.49	5.81	0.00	5.73	11.56
R-square: within			0.07			
R-square: between			0.20			
R-square: overall			0.05			
Wald chi2(9)			87.52			
Prob > chi2			0.00			
Observations			11900			

Appendix Table 6-5 Coefficients of the panel regression model for high median income.

		Working from home				
Variables	Coefficient	Robust Standard Error	t	P	95% Confidence Interval	
New cases/1000 people	9.78	3.54	2.76	0.01	2.84	16.72
hospital bed utilization	-0.06	0.11	-0.52	0.60	-0.27	0.16
Tests done 1000 people	7.4E-04	2.3E-03	0.33	0.74	-3.7E-03	0.01
ICU utilization	0.15	0.08	2.00	0.05	3.3E-03	0.30
Ventilator needs	-3.9E-03	1.7E-03	-2.31	0.02	-0.01	-5.8E-04
Imported COVID cases	5.4E-04	1.3E-04	4.24	0.00	2.9E-04	8.0E-04
COVID exposure/1000 people	-0.12	0.15	-0.78	0.44	-0.42	0.18
days decreasing Cases	0.04	0.01	6.39	0.00	0.03	0.05
COVID death rate	0.57	0.04	14.62	0.00	0.49	0.64
Constant	17.59	5.98	2.94	3.0E-03	5.86	29.32
R-square: within			0.55			
R-square: between			0.06			
R-square: overall			0.45			
Wald chi2(9)			716.02			
Prob > chi2			0.00			
Observations			11900			