Assessing Equity and Access to Long Distance Travel using the 2017 NHTS Data

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Research Questions

1. Does participation in long-distance travel vary by socioeconomic group to suggest possible access or equity issues?

2. Can methods to estimate the air access between long-distance trip ends be developed to facilitate mode choice models?
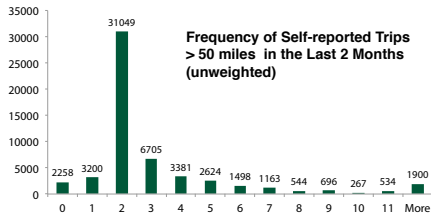
Data Summary

In the NHTS 2017, 3.7% of respondents were away-from-home for the whole travel day (California 7.8%), 0.4% were out-of-country for the whole travel day (California 0.5%), 0.6% used an airplane for travel (California 0.6%).

Of the trips recorded in the National NHTS, 6.7%, 4.4% and 0.2% were over 50, 100 and 250 miles one-way.

Self-reported Recall

CalTrans Add-On

Frequency of Self-reported Trips > 50 miles in the Last 2 Months (unweighted)

Trips	Count
0	2258
1	3200
2	31049
3	6705
4	3381
5	2624
6	1498
7	1163
8	544
9	696
10	267
11	534
More	1900

Trips > 50 miles by Purpose in the Last 2 Months

N=55,819 *weighted		Business Mean	Business SD	Personal Mean	Personal SD	Other Mean	Other SD
Age (Years)	< 18	0.2	2.2	5.5	10.5	0.4	1.5
	18-25	2.2	9.6	4.5	7.4	0.4	1.9
	25-40	2.2	6.1	5.1	10.1	0.5	2.7
	40-55	3.0	8.9	5.0	9.0	1.0	6.4
	55-70	2.5	7.1	4.6	6.4	0.9	4.4
	>= 70	0.9	2.9	4.3	7.1	0.7	2.7
Sex	Male	2.7	7.9	4.9	8.2	0.8	5.1
	Female	1.7	6.3	5.0	9.5	0.6	2.8
Race	White	2.2	7.1	5.0	9.0	0.5	3.0
	Black	3.2	10.6	5.0	8.0	1.1	2.8
	Asian	2.3	7.4	4.9	9.0	1.2	7.6
Income	< 25k	2.2	7.8	5.3	10.8	0.9	2.2
	25k to 49.99kk	2.3	9.3	6.3	12.1	0.9	4.0
	50k to 99.99kk	2.1	6.1	4.4	6.7	0.7	4.6
	100k to 149.99k	2.4	7.4	4.8	8.4	0.3	2.0
	150k to 199.99kk	2.8	8.1	5.0	9.6	0.8	7.6
	>200k	2.2	5.1	4.1	5.9	0.5	2.9
Education	< high school	1.5	5.6	4.5	8.0	0.5	1.7
	High school or GED	3.5	11.3	5.0	9.2	0.9	5.2
	Some coll/assoc Deg	2.4	8.2	5.0	8.4	1.0	5.1
	Bachelor's Degree	2.5	6.6	5.1	9.9	0.5	3.9
	Grad/Prof degree	1.9	4.9	4.4	6.7	0.5	3.4

Travel Day Log *National Data*

N=264,234 (weighted)		Out of Town	Out of Country	Used Airplane
Age (Years)	<18	3.4%	0.2%	0.2%
	18-24	6.0%	0.4%	0.4%
	25-39	3.3%	0.6%	0.5%
	40-54	3.0%	0.5%	0.6%
	55-69	3.1%	0.4%	0.6%
	>=70	2.2%	0.5%	0.4%
Sex	Male	3.6%	0.4%	0.6%
	Female	3.3%	0.4%	0.4%
Race	White	3.6%	0.4%	0.5%
	Black	2.9%	0.2%	0.3%
	Asian	3.3%	1.0%	0.4%
Income	<25k	1.7%	0.3%	0.1%
	25-49.99k	2.8%	0.2%	0.1%
	50k-99.99k	3.3%	0.4%	0.4%
	100k-149.99k	4.2%	0.4%	0.7%
	150k-199.99k	5.8%	0.8%	1.0%
	> 200k	6.5%	0.9%	1.4%
Education	Appropriate skip	3.7%	0.2%	0.2%
	< High School graduate	2.4%	0.3%	0.2%
	Bachelor's Degree	3.5%	0.5%	0.9%
	Grad/Prof degree	4.6%	0.8%	1.0%

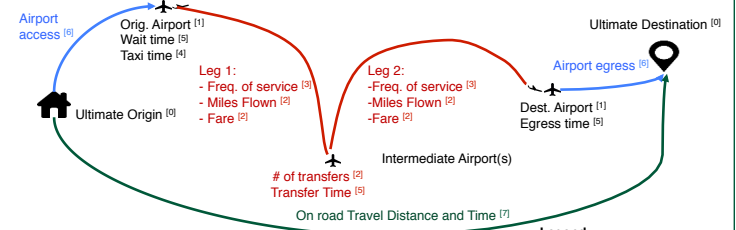**Maximum Distance from Home on Travel Day Based On Destination Geocodes** (National Data)

N=236,196 *weighted		>50 Mi n=17,647 or 6.7% Mean	Med	SD	>100 Mi n=11,454 or 4.4% Mean	Med	SD	>250 Mi n=588 or 0.2% Mean	Med	SD	Max Dist.
Age (Years)	< 18	365	147	514	497	232	571	887	654	641	5,047
	18-25	316	129	551	468	221	658	879	534	839	7,602
	25-40	375	142	559	544	239	636	947	724	714	7,710
	40-55	376	144	588	560	280	680	909	576	775	7,662
	55-70	407	152	670	595	308	775	941	644	898	10,034
	>= 70	369	137	543	540	221	619	1,006	949	668	6,722
Sex	Male	371	141	583	543	263	671	909	648	775	8,449
	Female	373	145	586	540	240	674	948	652	785	10,034
Race	White	360	142	560	520	247	644	891	620	752	10,034
	Black	373	124	559	621	399	657	921	656	702	5,047
	Asian	564	206	857	724	329	931	1,170	798	1,044	7,602
HH Income	< 25k	265	101	448	436	201	558	909	687	675	5,047
	25k to 49.99kk	271	114	446	431	194	550	862	619	688	10,034
	50k to 99.99kk	362	133	598	544	233	702	990	762	800	6,982
	100k to 149.99k	375	163	554	524	276	623	816	540	712	5,094
	150k to 199.99kk	419	158	641	570	284	716	938	670	819	8,024
	>200k	540	218	745	694	332	802	1,036	685	870	8,449
Education	< high school	329	128	505	475	200	582	931	688	668	4,831
	High school or GED	280	122	413	431	220	487	781	574	564	5,047
	Some coll/Assoc. deg	289	114	466	457	220	564	833	590	679	10,034
	Bachelor's Degree	436	160	696	606	285	786	982	629	909	7,710
	Grad/Prof degree	480	181	692	653	330	762	1,016	724	836	8,449
MSA Category	MSA 1Ml+ w/ rail	476	171	732	672	311	823	1,070	747	917	7,696
	MSA 1M+ w/ out rail	440	181	600	581	305	651	914	686	714	7,710
	MSA < 1M	320	128	522	475	213	615	889	588	748	8,449
	Not in MSA	218	101	344	362	201	435	678	499	557	10,034

Conclusions Question 1

There is significant long distance travel (with significant variation between individuals).

In general, there is little difference in long distance travel by age, race and sex.

Long distance travel increases with income and education (with exceptions in CA add-on recall data).

There is more personal, than business, long distance travel.

Choice of distance threshold is important for analysts.

Multivariate modeling will be an important next step.

Measuring Air Access

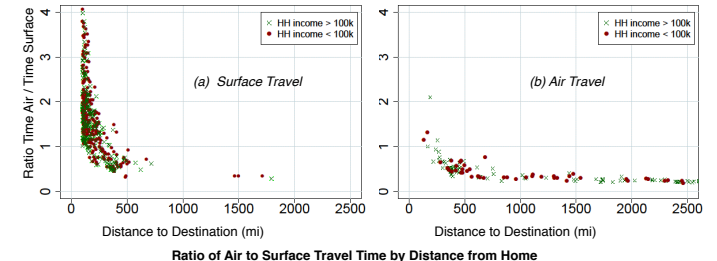CalTrans NHTS 2017 Add-On Data – 624 people with destinations > 100 miles from home.

Legend:
[0] CalTrans Add – On Data
[1] Proposed Airport Set
[2] DB1B Market Data
[3] T-100 Segment Data
[4] On-time Performance Data
[5] Assumed value(s)
[6] Estimated value(s)
[7] Google API Distance Matrix

Percent air for LD trips by distance, relative travel times and income

N=624 Distance Range	Air Faster than Road Count	%	Air-Selected Mode Count	%
100-199 miles (N=328)	14	4.3%	4	1.2%
HH income <100k			2	1.1%
>100k			2	1.1%
200-299 miles (N=87)	33	37.9%	8	9.2%
HH income <100k			1	1.1%
>100k			6	7.0%
300-399 miles (N=75)	70	93.3%	28	37.3%
HH income <100k			4	5.3%
>100k			23	30.7%
400 - 499 miles (N=41)	40	97.5%	18	43.9%
HH income <100k			8	19.5%
>100k			9	22.0%
>499 miles (N=93)	93	100%	80	86.0%
HH income <100k			29	31.2%
>100k			49	52.7%

Mode Choice by Estimated TT

N=624		Air Fastest Yes	No
Air Selected	Yes	133 (21.3%)	5 (0.8%)
	No	117 (18.8%)	369 (59.1%)

(a) Surface Travel

(b) Air Travel

Ratio of Air to Surface Travel Time by Distance from Home

Conclusions Question 2

Methods to estimate attributes of the unchosen air alternatives are viable and will be needed for long-distance mode choice models.

Surface modes dominate < 500 miles as expected, but some still drive longer distances.

Those with higher incomes appear more likely than those with lower incomes to fly, including trips under 500 miles.

Acknowledgments

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