

Section 7. Economics and management

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ANALYSIS OF THE PREDICTIVE FACTORS OF TRAVEL EXPENDITURES

Abstract

Background: Travel expenditures are important to consumers, and to the economy of the nation as a whole. Previous studies have found that there are differences in economic status and expenditure pattern among different racial/ethnic groups in the U. S. This study aimed to describe the travel expenditures and components in the United States in year 2017, and to evaluate if there is any racial difference in travel expenditures.

Methods: Data from the 2017 Quarterly Interviews of the Consumer Expenditure (CE) Surveys were used. Average annual travel expenditure, its components, and how much proportion it took among the total expenditure were described. Linear regression analysis was employed to examine if there is difference in the proportion of expenditure on travel among different racial groups.

Results: On average, consumers in the United States spend 4% of total expenditure on travel. Among all consumers in the nation, Asian consumers spend 1.4% more proportion of expenditure on travel than Whites. Black and Native Americans spend less (1.32% and 1.09%, respectively) than Whites.

Conclusion: There is any racial difference in proportion of expenditures on travel, with Asians higher than Whites, and Blacks and Native Americans lower than Whites.

Keywords: Travel expenditures, economics, race, model, linear regression.

1. Introduction

Travel expenditures are important to consumers, and to the economy of the nation as a whole [1; 2].

Previous studies have found that there are differences in economic status and expenditure pattern among different racial/ethnic groups in the U. S. [3].

2. Objectives

- To describe the travel expenditures and components in the United States in year 2017.

- To evaluate if there is any racial difference in travel expenditures

3. Steps

3.1 Data

This study used data from the 2017 Quarterly Interviews of the Consumer Expenditure (CE) Surveys. CE programs are conducted by the Bureau of Labor Statistics (BLS), and provide data on expenditures, income, and demographic characteristics of consum-

ers in the United States. Details of CE can be found on the website: <https://www.bls.gov/cex/home.htm>

The data are based on Consumer unit (CU). According to the CE glossary (<https://www.bls.gov/cex/2017/csxintvw.pdf>), a consumer unit comprises either:

(1) all members of a particular household who are related by blood, marriage, adoption, or other legal arrangements;

(2) a person living alone or sharing a household with others or living as a roomer in a private home or lodging house or in permanent living quarters in a hotel or motel, but who is financially independent; or

(3) two or more persons living together who use their income to make joint expenditures.

3.2 Analysis:

We first describe the average annual travel expenditure, its components, and how much proportion it took among the total expenditure. This was done in two type of samples:

- among all consumer unites, regardless of if ever traveled or not.
- among those who ever traveled in year 2017.

Then, we used linear regression to examine if there is difference in the proportion of expenditure on travel among different racial groups.

4. Results

4.1 How much consumers spent on travel

Average travel expenditures per consumer unit for 2017 was \$2400.

Table 1. Among all households

	national average
Annual income	\$ 73.379
Annual total expenditure	\$ 55.838
Annual expenditure on trips	\$ 2.400
1. Food and beverages	\$ 453
1.1 Food prepared by consumer unit on out-of-town trips	\$ 57
1.2 Food away from home	\$ 329
1.3 Alcoholic beverages	\$ 67
2. Lodging	\$ 504
3. Transportation	\$ 727
4. Fees and admissions	\$ 717

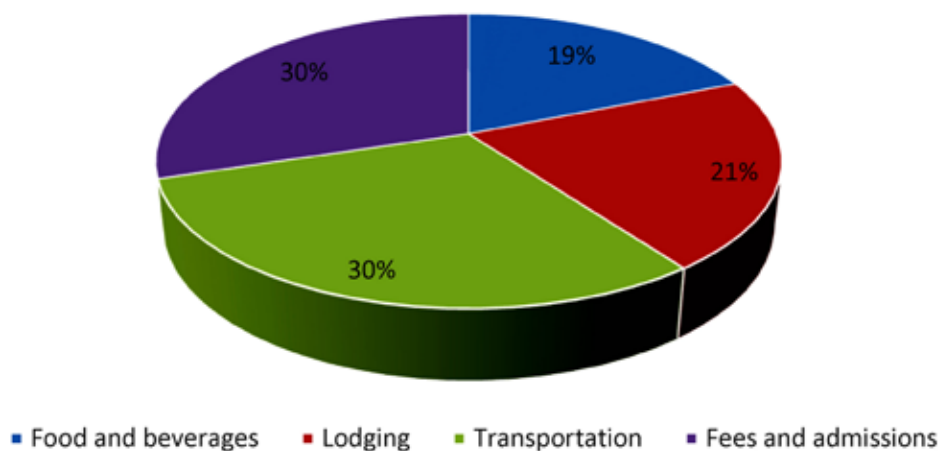


Figure 1. Breakdown of travel expenditures

Table 2. Among all consumers

proportion of travel expenses	State number
2.17	1
3.95	2
2.8	4
3.5	6
4.54	8
4.09	9
3.93	10
5.57	11
2.19	12
3.5	13
3.24	15
3.23	17
1.99	18
5.57	19
3.51	20
2.21	21
1.02	22
3.67	24
2.99	25
2.79	26
4.83	27
1.7	28
3.66	31
3.52	32
1.94	33
0.46	34
3.29	35
3.08	36

2.61	37
3.38	39
3.21	40
4.47	41
3.24	42
3.39	45
2.9	47
2.4	48
4.27	49
4.01	51
4.87	53
3.19	55

Table 3. Among all consumers

Family size	proportion of travel expenses
1	2.64
2	3.52
3	2.88
4	3.23
5	3.13
6	2.53
7	2.21
8	2.41
9	2.38
10	0.59
11	5.94
12	5.56
13	0
14	0
15	0

Table 4. Among all consumers

Family type	proportion of travel expenses
1	2
Married Couple only	4.03
Married Couple, own children only, oldest child < 6	2.87
Married Couple, own children only oldest child >= 6, <= 17	4.1
Married Couple, own children only, oldest child > 17	2.99
All other Married Couple families	2.37

<i>1</i>	<i>2</i>
One parent, male, own children at least one age < 18	2.26
One parent, female, own children, at least one age < 18	2.26
Single consumers	2.64
Other families	2.22

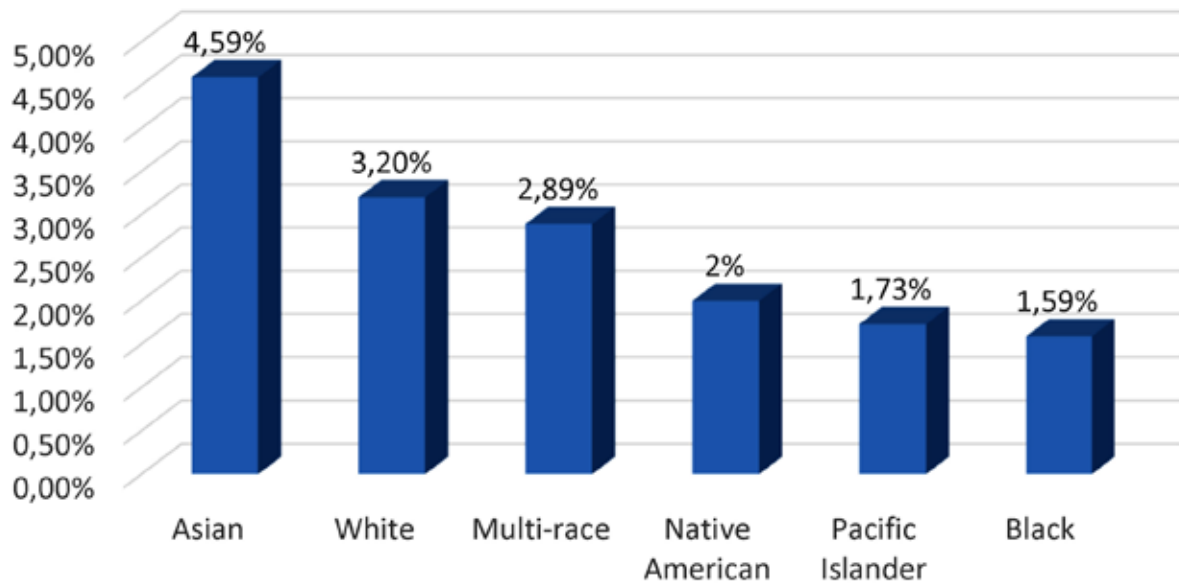


Figure 2. Proportion of travel expenses by race, among all households in the U.S.

It should be noted that the expenditures described so far represent the average values for all consumer units, **regardless of** if they travelled during the year.

4.2 A closer look at consumers who travelled:

Table 5. Among those with at least one trip

	average
Annual income	\$ 95.620
Annual total expenditure	\$ 72.517
Annual expenditure on trips	\$ 4.701
1. Food and beverages	\$ 887
1.1 Food prepared by consumer unit on out-of-town trips	\$ 112
1.2 Food away from home	\$ 644
1.3 Alcoholic beverages	\$ 131
2. Lodging	\$ 987
3. Transportation	\$ 1.424
4. Fees and admissions	\$ 1.404

Table 5. Among those with at least one trip

proportion of travel expenses	State number	State name
5.08	1	
6.94	2	
5.15	4	
6.1	6	
6.22	8	
6.55	9	
6.8	10	
8.53	11	
5.67	12	
6.79	13	
8.12	15	
6.16	17	
5.26	18	
12.11	19	
5.34	20	
5.77	21	
5.19	22	
6.97	24	
6.06	25	
5.53	26	
6.53	27	
4.84	28	
5.77	31	
5.5	32	
4.98	33	
7.69	34	
5.86	35	

6.71	36	
6.08	37	
6.17	39	
0.21	40	
5.75	41	
6.23	42	
6.03	45	
5.67	47	
5.26	48	
5.66	49	
6.22	51	
6.57	53	
5.36	55	

Table 6. Among those with at least one trip

Family size	proportion of travel expenses
1	6.3
2	6.51
3	5.43
4	5.32
5	5.62
6	4.87
7	5.01
8	4.55
9	3.85
10	0.98
11	7.92
12	5.56

Table 7. Among those with at least one trip

Family type	proportion of travel expenses
Married Couple only	7.11
Married Couple, own children only, oldest child < 6	4.75
Married Couple, own children only oldest child >= 6, <= 17	6.23
Married Couple, own children only, oldest child > 17	5.22
All other Married Couple families	5.04
One parent, male, own children at least one age < 18	4.48
One parent, female, own children, at least one age < 18	4.56
Single consumers	6.30

4.3 Results from linear regression:

Linear regression analysis is a commonly used statistical technique for continuous outcomes.

The model of linear regression is:

$$y = \beta_0 + \beta * X$$

In this study, the specific model is

Proportion of expenditure on travel = $\beta_0 + \beta * \text{race}$

β – is regression coefficient for X (race). A p -value of β will be generated from the analysis. If P is below 0.05, it means β is statistically significant, indicating that there is statistically significant association between X and Y . On the other hand, If P is above 0.05, it means β is not statistically significant, which further means that there is no statistically significant between X and Y .

When p -value is below 0.05, we can further look at the direction of β :

If β is above 0, it means that X is positively related to the outcome.

If β is below 0, it means that X is negatively related to the outcome.

We also included other two variables of “family size” and “family type” in the model, so that any confounding effect of these two is adjusted for. Therefore, the final model is

Proportion of expenditure on travel = $\beta_0 + \beta_1 * \text{race} + \beta_2 * \text{family size} + \beta_3 * \text{family type}$

Table 8. Regression coefficient from linear regression analysis: among all consumer units

Race				
reference: White	Regression coefficient	Standard error	t-value	P-value
Black	−1.3223	0.1294	−10.22	< 0.001
Native American	−1.0894	0.5244	−2.08	0.0378
Asian	1.4213	0.1797	7.91	< 0.001
Pacific Islander	−1.1401	0.606	−1.88	0.0599
Multi-race	−0.0619	0.3204	−0.19	0.8468
Family size	−0.1459	0.0514	−2.84	0.0045
Family type				
reference: Married Couple only				
Married Couple, own children only, oldest child < 6	−1.0424	0.2312	−4.51	< 0.001
Married Couple, own children only oldest child >= 6, <= 17	0.351	0.1839	1.91	0.0563
Married Couple, own children only, oldest child > 17	−0.8305	0.1976	−4.2	< 0.001
All other Married Couple families	−1.2761	0.2668	−4.78	< 0.001
One parent, male, own children at least one age < 18	−1.5121	0.4341	−3.48	<0.001
One parent, female, own children, at least one age < 18	−1.323	0.2192	−6.04	<0.001
Single consumers	−1.4168	0.1238	−11.44	<0.001
Other families	−1.5578	0.1401	−11.12	<0.001

The plot below illustrate predicted proportion of travel expenses by race groups among all households.

It can be seen that group 4 (Asian) has the highest values on average.

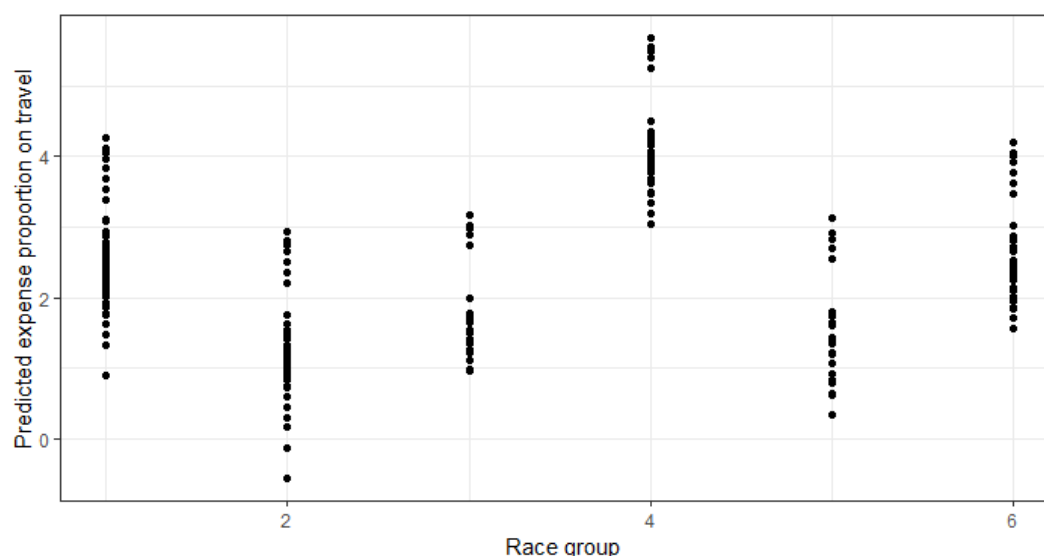


Figure 3. Among all households

Table 9. Regression coefficient from linear regression analysis: among those who traveled

Race	Regression coefficient	Standard error	t-value	P-value
reference: White				
Black	-1.3721	0.2604	-5.27	<0.001
Native American	-1.1015	0.9901	-1.11	0.2659
Asian	1.9007	0.29	6.56	<0.001
Pacific Islander	-1.2104	1.1917	-1.02	0.3098
Multi-race	-0.2039	0.5488	-0.37	0.7102
Family size	-0.2032	0.0903	-2.25	0.0245
Family type				
reference: Married Couple only				
Married Couple, own children only, oldest child < 6	-2.2448	0.3757	-5.98	<0.001
Married Couple, own children only oldest child >= 6, <= 17	-0.5101	0.2985	-1.71	0.0875
Married Couple, own children only, oldest child > 17	-1.5884	0.329	-4.83	<0.001
All other Married Couple families	-1.4974	0.4798	-3.12	0.0018
One parent, male, own children at least one age < 18	-2.2469	0.7543	-2.98	0.0029
One parent, female, own children, at least one age < 18	-2.107	0.3791	-5.56	<0.001
Single consumers	-0.9668	0.2176	-4.44	<0.001
Other families	-2.0086	0.244	-8.23	<0.001

The plot below illustrate predicted proportion of travel expenses by race groups among those with

at least one trip. Again, it can be seen that group 4 (Asian) has the highest values on average.

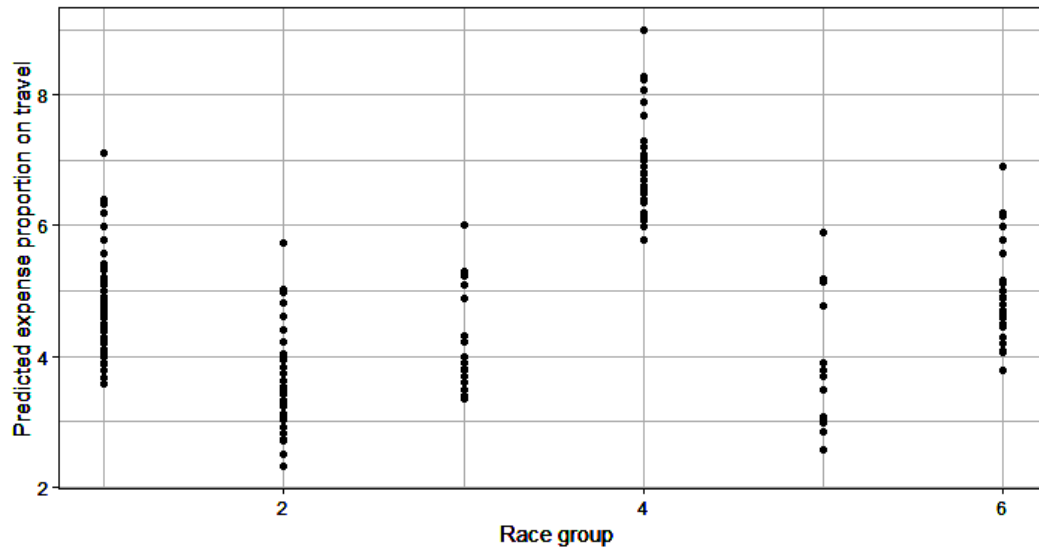


Figure 4. Among all households with at least one trip

5. Discussion

On average, consumers in the United States spend 3% (\$2,400 /\$73,379) of income on travel. The expenditure on travel is around 4% (\$2,400 /\$55,838) of total expenditure.

These proportions were higher among those who had at least one travel during the year: 5% and 6.5%, respectively.

Looking at the components of travel expenditure, transportation and fees/admissions take 30% each, followed by lodging (21%) and food/beverages (19%).

Comparison across states:

Among all consumers:

District of Columbia, Iowa, and Washington rank the highest in proportion of expenditure on travel.

New Jersey ranks the lowest.

Among those who traveled:

District of Columbia, Iowa, and Hawaii rank the highest in proportion of expenditure on travel.

Oklahoma ranks the lowest.

Comparison of family size:

Families with 2 members spend more than those with one member.

However, there is no linear association between family size and proportion of expenditure on travel.

Comparison of family type:

Married couples without children had the highest budget proportion on travel than other family types.

Linear regression results:

Among all consumers in the nation, Asian consumers spend 1.4% more budget on travel than Whites. Black and Native Americans spend less (1.32% and 1.09%, respectively) than Whites.

Results are similar among consumers who had at least one travel.

This is similar with previous findings on budget share differences between different racial/ethnic groups [3]. For example, Asians and Whites spent more proportion on entertainment and transportation than Blacks and Hispanics [3].

6. Summary

The research paper described the travel expenditures and components in the United States in year 2017. Meanwhile, by conducting multivariate linear regression analysis, this study found that there is any racial difference in proportion of expenditures on travel, with Asians higher than Whites, and Blacks and Native Americans lower than Whites.

References:

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