

Air Travel Market Segments *A New England Case Study*

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INTRODUCTION

The 1995 American Travel Survey (ATS) is the first comprehensive survey of long-distance travel patterns in two decades. The survey, conducted for the Bureau of Transportation Statistics (BTS) by the Bureau of the Census, provides detailed information about the characteristics of long-distance travel, including demographic information about the individuals and households who are traveling. It is, therefore, a useful resource for transportation planning purposes as well as travel market research.

This paper describes the results of using the New England region as a case study in air travel market research. Air travel market classifications are developed from the ATS data. The characteristics of the resulting market segments are explored in detail using additional information from the survey database. Some of the characteristics of the air travel market for New England are also compared to survey data available for Boston's Logan International Airport, the principal airport in the region.

IMPORTANCE OF AIR TRAVEL MARKET RESEARCH

Although air travel accounts for a small proportion of the total travel activity in the United States, approximately 16 percent of all person-trips in 1995, it has grown significantly over the last 20 years. Increases in air travel have made ground access an important issue for many large airports and for the cities served by these airports. The ground transportation choices of an air traveler on his way to and from an airport are very different from those of a daily commuter. Therefore, information about the air travel market is important to planning transportation alternatives or systems that serve the traveler's needs. The type of information available in ATS can only be replicated through individual airport passenger surveys.

TYPES OF AIR TRAVEL TRIPS

In broadly defined categories there are two basic trip purposes: the one taken primarily for business and the one taken for any number of non-business reasons, such as vacation, school, personal business, visiting relatives, etc. The ATS includes a variable describing the reason for a particular trip. For purposes of this analysis, a trip is considered a business trip if the reason given is business, combined business/pleasure, or convention, conference, or seminar. All other reasons are considered non-business in nature.

Traditionally, the airlines have segmented the air travel market into business and non-business classes and marketed their services accordingly. In addition to trip purpose,

airport planners have further segmented the air travel market according to the geographic location in which the air traveler resides. Whether a traveler is a resident or non-resident of a region in which an airport is located has implications for the type of ground access mode that will be used to reach the airport. The two types of travelers make use of different access modes.

Four market segments result from classifying travelers according to where they live and the purpose of their trip. They are resident business, resident non-business, non-resident business, and non-resident non-business. ATS trips originating from a region are used to represent resident trips; trips destined for a region represent non-resident trips. This paper focuses specifically on those trips made by resident air travelers from New England, i.e., the air traveler who lives in New England and begins his or her trip from a major airport serving the region (a traveler is considered a resident if he travels to an airport by land-based modes).

The purpose of this research is to expand the traditional market classifications of air travelers to include demographic characteristics. These characteristics provide some insight into the various population groups that are traveling by commercial airline.

NEW ENGLAND TRAVEL

The ATS defines a trip as “each time a person goes to a place at least 100 miles away from home and returns.” The ATS provides this trip information in two ways, in terms of persons and in terms of households. The ATS person-trip description utilized in this paper is defined as a trip taken by an individual. Therefore, two people taking a trip equals two person-trips or one person making two trips is also two person-trips. A trip by air is any trip in which a commercial airplane was used to travel most of the distance. All references to trips or air travel trips in this paper imply person-trips, whether or not explicitly stated. In 1995, commercial air trips accounted for 20 percent of all person-trips originating in New England with auto responsible for almost all the remaining trips from the region. Figure 1 illustrates that 46 percent of the trips by commercial airline from the New England region are for business reasons and 54 percent are made for non-business reasons. For all modes combined, trips taken primarily for business represent only 26 percent of total trips.

MARKET SEGMENTATION PROCEDURE

Extracted from the ATS person-trip file were all records meeting the following criteria: the origin region is New England, the principal mode of travel from origin to destination is commercial airline, and the age of the person is over 19 years. SPSS Diamond, a software package that generates visual displays of statistically correlated variables, was used to identify demographic variables in describing air traveler market segments. The tested variables included information about the person traveling and characteristics of the household in which the traveler lived. The following variables were evaluated: race, Hispanic origin, gender, marital status, educational attainment, age, vehicles, household type, household size, and household income.

The five variables having some association with commercial air trips originating in

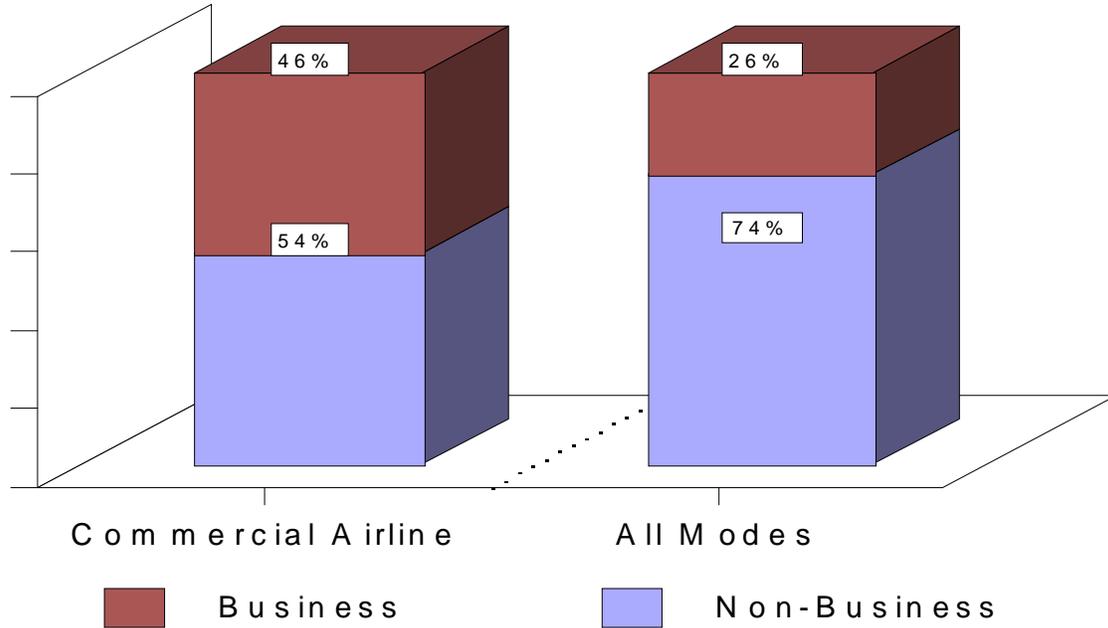


FIGURE 1 New England travel by purpose.

New England are trip purpose, education, household income, gender, and household type. The database for New England then was analyzed by AnswerTree, a software package that can be used in market segmentation analyses. The software allows the user to develop a classification system using various algorithms. The algorithms summarize statistically significant patterns and relationships among the fields and make decision rules. At each successive step, the decision rules are used to partition or segment the data into subgroups.

The decision tree is built on a focus or “root” variable. In this case gender is used as the focus variable. Trip purpose, household type, household income, and education are used to divide air travel person-trips into successively smaller groupings. Based on the previous statistical correlation of the variables and a number of iterations of AnswerTree, the income variable was removed from the segmentation analysis. Income proved to be less important than education in the classification of air trips by gender. Furthermore, the addition of the income variable had a minimal impact on improving the performance of the segmentation analysis. The performance of the AnswerTree model is measured by what is termed a misclassification index. For this analysis the resulting misclassification index is 0.26, meaning that 74 percent of the person-trips were accurately classified according to gender.

New England Air Travel Market Segments

Nine market segments resulted from the segmentation analysis: three business classes and six non-business classes. The classifying variables are trip purpose, gender, household type, and education. A small number of trips did not fit into any of the nine segments. These trips are placed in a category termed “miscellaneous.”

One variable, household type, composed of 16 categories in the ATS, is collapsed

into 10 categories for this analysis. Married-couple family household categories 1 through 3 are collapsed into one category of family households with children under 18 years of age. Similarly, one parent family household ATS categories 5 through 7 and one parent family household ATS categories 9 through 11 each become one category of one parent family households with children under 18 years of age. All other household categories remain the same.

The market segments are homogeneous classes of trips based on the segmentation variables, but these variables alone do not provide sufficient information about the individuals responsible for the trips in each segment. Demographic variables, such as age and household income, that were not significant in classifying air travel trips can be useful in helping to understand the types of travelers that make trips. Therefore, to expand upon the information provided by the segmentation process, each market segment is described using additional demographic information from the ATS. One of the segmentation variables, “trip purpose,” divides trips into two classes, business and non-business. Business trips are then divided into three additional classes and non-business trips into six additional classes. The term “educated” or “well-educated,” used in the following market segment descriptions, denotes an educational attainment of at least a 4-year college degree and the term “lesser education” denotes less than a 4-year college degree.

Business Market Segments

Business trips are divided into three classes of trips based on “gender” and “household type” variables. Figure 2 illustrates the proportional distribution of the business trip market segments.

Segment 1: Business trip by a male from a family household. The single largest market category, accounting for 31 percent of all commercial air trips from the region and 68 percent of business trips, is composed of men from predominately married couple, family households. Only 11 percent of the trips are by men from single-person or two-person non-family households. Fifty-one percent of the trips are made by an individual from a family with children under 18 years of age, 35 percent by individuals from families without young children. Eighty percent of the trips are made by men from households with incomes greater than \$60,000. This is the highest income distribution of any market segment. Seventy-seven percent of the trips are made by an individual with an education of a bachelor’s degree or higher. Almost 39 percent of the trips are attributable to men between the ages of 40 and 49 years.

Segment 2: Business trip by a female from a single person household. This market segment accounts for 13 percent of business trips by air. Female travelers from single person households account for 66 percent of the trips and the remaining 33 percent are either one-parent family households (19 percent) or non-family households where the female is living with another person (13 percent). Almost all of the trips are made by a female who is either divorced or has never married. Seventy-five percent of the trips are evenly distributed among each of three 10-year age groupings, i.e., 30 to 39, 40 to 49, 50

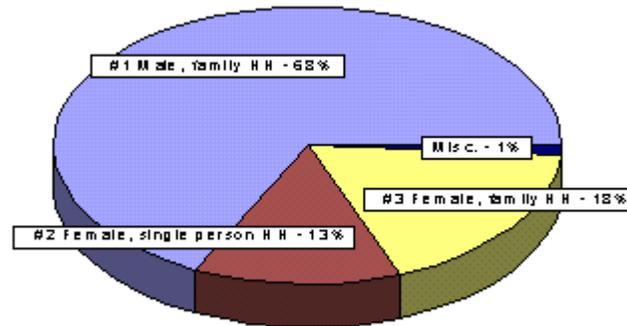


FIGURE 2 Business market segments.

to 59. Eighty-four percent of the trips are attributable to women with an education of a bachelor's degree or higher. Only 42 percent of the trips are taken by women with household incomes exceeding \$60,000.

Segment 3: Business trip by a female from a family household. This market segment, accounting for 18 percent of commercial air trips, is composed of women from married-couple, two or more person, family households. There is a concentration of 33 percent of the trips in the 40 to 49 year age bracket and another 25 percent each in the next younger (30 to 39) and older (50 to 59) age brackets. The women responsible for trips in this category are almost equally divided into family households with and without children under the age of 18. Almost two-thirds of the trips are made by women with a bachelor's degree or higher and three-quarters of the trips are from households where the income is above \$60,000. Over 90 percent of the trips are made by women who are married.

Non-Business Market Segments

Non-business trips are divided into market segments based on "gender" and "household type" variables. However, the variable "educational attainment" is also significant in classifying non-business trips. Six segments resulted from the classification process. They are displayed graphically in Figure 3.

Segment 4: Non-business trip by a well-educated female from a family household. Nineteen percent of non-business air trips from New England are represented by this class. All but 11 percent of the trips in the category are made by women from married couple, two or more person, family households, two-thirds of which have no children under 18 present. Slightly over half of the households are comprised of two persons, the remaining proportion is made of larger sized households. There are no trips by women from single person households in this group, but 11 percent of the trips are made by women living with another person in a non-family household. Eighty-three percent of the

trips are made by married women with the remainder by women who have never married. All of the trips are by women with at least a bachelor's degree and 66 percent of the household incomes exceed \$60,000. In contrast to the business trip segments, only 63 percent of the trips are by a woman who is employed full-time, another 16 percent are employed part-time, and 14 percent are full-time homemakers. There is a fairly even distribution of three-quarters of the trips across the three age categories of less than 30, 30 to 39, and 40 to 49 years.

Segment 5: Non-business trip by a well-educated male from a family household.

The male counterpart of the previous class accounts for 22 percent of non-business air trips from New England (Table 1). The distribution of household types is very similar to Segment 4. All but 8 percent of the trips are made by men from family households, 58 percent of which have no children under the age of 18 present. There are no trips by men from single person households in this group. Similar to Segment 4, 82 percent of the trips are by married men with the rest by men who have never married. Seven percent of the trips are by African American men. All of the trips are made by men with a bachelor's degree or higher. Household incomes exceed \$60,000 in 70 percent of the cases. Twenty-nine percent of the trips are by men between the ages of 40 and 49.

Segment 5: Non-business trip by a well-educated male from a family household.

The male counterpart of the previous class accounts for 22 percent of non-business air trips from New England (Table 1). The distribution of household types is very similar to Segment 4. All but 8 percent of the trips are made by men from family households, 58 percent of which have no children under the age of 18 present. There are no trips by men from single person households in this group. Similar to Segment 4, 82 percent of the trips are by married men with the rest by men who have never married. Seven percent of the trips are by African American men. All of the trips are made by men with a bachelor's degree or higher. Household incomes exceed \$60,000 in 70 percent of the cases. Twenty-nine percent of the trips are by men between the ages of 40 and 49.

Segment 6: Non-business trip by a female with lesser education from a family household.

This market segment accounts for 16 percent of New England non-business air trips (Table 2). The trips are made by women from family households, 63 percent of which have no young children present. There are no trips by women from single person households in this group. Eighty-four percent of the trips are made by women who are married and 13 percent by women who have never married. The highest level of education achieved by individuals in this group is less than that required for a bachelor's degree. Household incomes exceed \$60,000 in only 45 percent of the trips taken. The highest concentration of trips in this segment is in the age bracket of over 60 years.

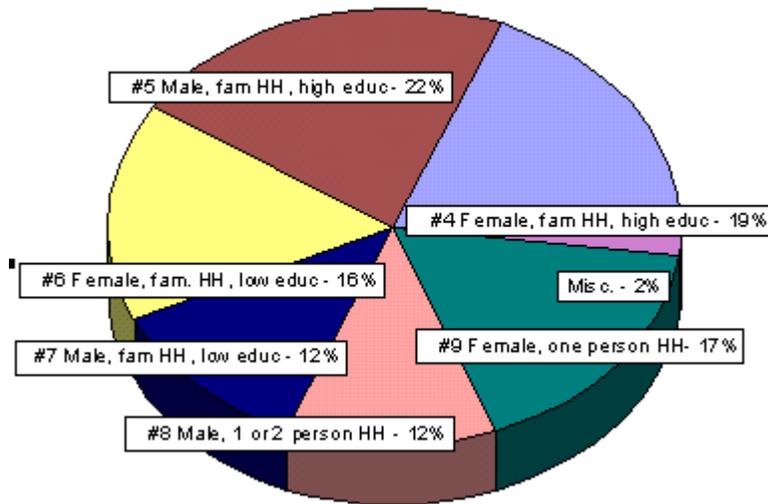


FIGURE 3 Non-business market segments.

Segment 7: Non-business trip by a male with lesser education from a family household. This market accounts for 12 percent of New England non-business air trips. This class of trips is made by individuals who are the male counterparts of Segment 6. The trips in this group are made by men from family households, 65 percent of which have no young children present. There are no trips by men from single person households in this group. Eighty-three percent of the trips are made by married men and 12 percent by men who have never married. Educational attainment does not exceed “some college” for this group. Household income levels exceed \$60,000 in 55 percent of the cases. As in Segment 6, there is a concentration of trips by men over the age of 60 (25 percent).

Segment 8: Non-business trip by a male from a single person or two person household. This segment accounts for 12 percent of New England non-business air trips. There is a small proportion of trips (14 percent) by men who are head of single parent family households with no children under the age of 18. The vast majority of trips are made by men from non-family households where they are living alone (43 percent) or living with another person (42 percent). There is a concentration of 34 percent of the trips in the 30 to 39 year age bracket. Household income exceeds \$60,000 in 50 percent of the trips. Thirty percent of the trips are by men who are divorced or widowed and 63 percent by men who have never married.

Segment 9: Non-business trip by a female from a single person or one parent family household. This group accounts for 17 percent of New England non-business air trips. Women responsible for the trips in this category live in predominantly single person households (59 percent), the remaining 41 percent of trips are made by women from single-adult family household, (17 percent of these households have no young children and 24 percent have young children present). Only 22 percent of the trips are by a woman with a household income in excess of \$60,000; 13 percent of the trips are by non-White

women, and about 5 percent by Hispanic women. Almost all of the trips are made by widowed (25 percent), divorced (30 percent), or never married (39 percent) women. About 44 percent of the trips are made by women who have received a four-year college degree or higher. Twenty-eight percent of the trips are by women over the age of 60. This is the highest concentration of any market segment in the over 60-year age bracket.

Comparison of Air Travelers to Travelers Using All Modes

A demographic profile of long-distance trips from New England by all modes is presented in Tables 1 and 2 and used as a base from which the demographic profiles of the air travel market segments can be reviewed. By comparing each market segment to all travelers from the New England region, one can evaluate the relative importance of groups of individuals to the makeup of the segment. Summary descriptions of market segment attributes are presented at the end of each table.

Summary of Air Travel Market Segments

Clearly the most significant class of trips are those made by the male business traveler, married with children, educated, and with very high household income. This group has the highest proportion of households with more than two persons. If one considers this segment as roughly one-third of all air travel trips, another one-third is composed of the next three largest market segments, and the final one-third is comprised of the remaining five segments. This distribution is illustrated in Figure 4.

The second largest segment is also composed of men, in this case on a non-business trip. This group of trips is made by men who have the same characteristics as the male business market segment. In comparison to all long-distance trips by men from New England, Segment 2 and Segment 5 have a higher proportion of household incomes over \$60,000 and a higher proportion of educated and married men. There is a higher proportion of larger-sized households for Segment 1 when compared with the region.

The third largest market group, Segment 4, is composed of married women on non-business trips. This group accounts for 10 percent of all commercial airline trips from New England. This group is the female counterpart to Segment 5, married men on non-business trips. The principal difference is that all of the trips in Segment 5 are made by women who have received at least a four-year college degree. As is the case for their male counterparts, this group has a higher proportion of married women, a higher proportion of household incomes over \$60,000, and a similar proportion of households with more than two persons. The age distribution of this group is similar to that of all female travelers. What is perhaps the most interesting of the top four market segments is Segment 9. This market segment is composed of two different classes. One of the groups is young unmarried women under the age of 30. The income of this group is lower than that for all New England women who travel and only 44 percent have a 4-year college degree. This is to be expected since over one-third of the trips are made by women attending school. About 60 percent live alone and the rest live in a one parent family household. The other concentration of trips in this segment is that of older, retired women. The majority are widowed and living alone. Both groups in large part are traveling to visit relatives or friends.

TABLE 1 New England—Long-distance Travel by Men

	Trips by All Modes	Trips by Commercial Airline			
		Market Segments			
	New England Male	#1 Male Business	#5 Male Non-Business	#7 Male Non-Business	#8 Male Non-Business
		<i>HH Type: Family</i>	<i>HH Type: Family, Education – higher</i>	<i>HH Type: Family, Education – lesser</i>	<i>HH Type: 1- or 2-person</i>
Age <30	15%	6%	16%	14%	27%
30–39	22%	26%	22%	18%	34%
40–49	28%	39%	29%	21%	16%
50–59	18%	20%	15%	23%	8%
>60	17%	9%	18%	25%	16%
HH size >2	54%	65%	53%	51%	37%
Income >\$60,000	56%	80%	70%	42%	50%
White	96%	96%	91%	95%	91%
Married	71%	86%	82%	83%	4%
Divorced	5%	5%	0%	4%	14%
Single	21%	8%	16%	12%	64%
Min. of 4 years of college	58%	77%	100%	0%	68%
Summary descriptions of market segments		High income, educated, married male, family HH; some men from 1- or 2-person HH	High income, educated, married male, family HH	Lower income, lesser educated, married male, family HH	Average income, educated, young, unmarried male

TABLE 2 New England—Long-Distance Travel by Women

	Trips by All Modes	Trips by Commercial Airline				
		Market Segments				
		#2 Female Business	#3 Female Business	#4 Female Non-Business	#6 Female Non-Business	#9 Female Non-Business
	New England Female	<i>HH Type: 1-person/1-parent</i>	<i>HH Type: Family</i>	<i>HH Type: Family; Education -higher</i>	<i>HH Type: Family; Education -lesser</i>	<i>HH Type: 1-person/1-parent</i>
Age <30	15%	16%	15%	24%	16%	23%
30–39	25%	25%	26%	26%	17%	14%
40–49	24%	26%	33%	23%	22%	13%
50–59	18%	27%	21%	16%	20%	23%
>60	18%	6%	7%	11%	25%	28%
HH size >2	46%	10%	60%	49%	58%	14%
Income >\$60,000	46%	42%	74%	66%	45%	22%
White	96%	97%	95%	97%	93%	87%
Married	63%	0%	92%	83%	84%	3%
Divorced	9%	36%	2%	0%	1%	30%
Single	21%	57%	4%	16%	13%	39%
Min. of 4 years of college	47%	84%	65%	100%	0%	20%
Summary descriptions of market segment		Low income, educated, unmarried female from 1-person HH; some 1-parent family HHs	High income, educated, married female from a family HH	High income, educated, younger, married female from a family HH	Low income, lesser education, older, married, female from a family HH	Low income, lesser educated, older and younger, unmarried female from a 1-person HH

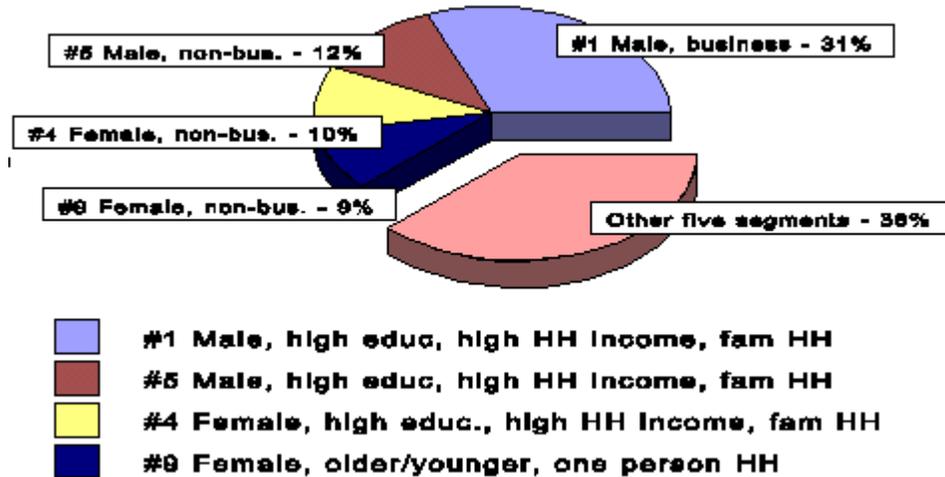


FIGURE 4 New England air travel.

The remaining five market segments equal 38 percent of all commercial airline trips. Two of the Segments, 2 and 3, are females on business trips. Segment 2 represents 6 percent of all air travel trips and is primarily well educated, unmarried women from one-person households. Segment 3 represents 8 percent of all air travel trips and is an educated, married female from a family household with high household income.

Segments 6 and 7 have similar demographic distributions and represent the female and male versions of the same traveler, a married individual with lesser education and lower household income from a family household. There are considerable numbers of older persons in these two segments. The segments account for 8 percent and 6 percent of all trips, respectively.

COMPARISON OF ATS DATA TO AIRPORT PASSENGER SURVEY DATA

Some airports, such as Boston's Logan International Airport, conduct periodic surveys of air passengers (Table 3). The information obtained from these surveys is used in support of various business and planning projects. The 1995 Logan Air Passenger Survey was conducted during a two-week period in April 1995 and administered to passengers waiting in departure lounges. The survey collected data on both resident and non-resident travelers from the region. Boston's Logan Airport is the largest in the region and handled the majority of New England's air travelers in 1995.

The Logan Air Passenger Survey defines resident air travelers, those who live in the region and begin their trip from a local origin, as residents of three states: Massachusetts, New Hampshire, and Rhode Island. Trips from the New England region were limited to air travel trips originating in the three states in order to compare the Logan Airport survey data to comparable ATS data. The Logan survey has a limited number of demographic variables, i.e., age, household income, household size, and gender in addition to trip purpose. The principal purpose of the survey is to collect information on travelers' air travel trips and their access choices to Logan Airport. Trip purpose based on ATS data for the Logan Airport resident market area is compared with the trip purpose distribution of resident air trips from the Logan Passenger Survey. In both cases the business/non-business

split of travelers is the same, 46 percent and 54 percent respectively. Table 3 provides a comparison of the distribution of trips according to the four demographic variables common to both surveys. Any disaggregation of the four variables beyond what is shown is limited by the sample sizes of the Logan Air Passenger Survey. Household size, household income, and gender distributions for business and non-business trips are consistent between the two surveys. The age distribution of business trips for the Logan is more heavily weighted toward younger age groupings than the ATS. The age distribution for non-business trips is similar between the two surveys.

SUMMARY AND CONCLUSIONS

Men from family households who are traveling on business account for almost one-third of the resident-based air travel market from New England. The remaining two-thirds of the New England market can be described using eight additional classes of trips. These groups range in size from 6 percent to 12 percent of total trips. Two of the largest combined, accounting for 22 percent of all trips, are men and women from family households on non-business trips. All three of these market segments are well educated and have higher household incomes than the other air-travel segments.

TABLE 3 Boston Logan Airport Resident Air Travel Market

		Logan Air Passengers ¹ (Trips by Resident Air Travelers Only)		New England Air Travelers ² (Trips from MA, NH, and RI Only)	
		Business	Non- Business	Business	Non- Business
Gender	Male	71%	41%	68%	47%
	Female	29%	59%	32%	53%
	Total	100%	100%	100%	100%
Age	<30	16%	23%	10%	24%
	30–39	32%	23%	27%	22%
	40–49	30%	21%	34%	20%
	50–59	17%	15%	21%	16%
	60+	5%	15%	7%	18%
	Total	100%	100%	100%	100%
Household Size	>2	49%	40%	47%	42%
Household Income	% >\$60,000	79%	55%	75%	49%

¹ 1995 Logan Air Passenger Survey, Massachusetts Port Authority

² 1995 ATS

Air travelers with quite different demographic characteristics from the largest three market segments are responsible for the remaining 47 percent of air travel trips from New England. Some of these groups of travelers, such as retirees or college students are spread across a number of market segments. This reflects socioeconomic variations in the composition of these groups. The basis of this case study has been to explore the usefulness of demographic variables in describing air travelers and the trips they make. Although some groups are relatively homogeneous in their composition, others are not.

The value of segmenting air travel trips by means of demographic variables stems from what we learn about the life style characteristics of the travelers in each group. These life style characteristics are helpful in understanding reasons for using various airport access modes and planning services to meet travelers' needs. Likewise, life style characteristics of various air travel markets is of interest to airlines for marketing purposes.