

# Drive Tourists' Lodging Demand Determinants for Highway Hotels and Motels in U.S.

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## ABSTRACT

*The current research examines drive tourists' lodging demand determinants and effects of external environment changes (e.g. fuel price fluctuation and seasonality) on tourism. The authors assumed economic, socio-demographic and trip-related variables influence lodging demand for highway hotels and motels. Through 2SLS model, the effects of the variables were statistically tested. On the contrary to OLS estimation, 2SLS model showed a good performance to deal with endogeneity problem and accurate results. The model verified economic variable's effects on lodging demand. According to the descriptive analysis, typical profile of a drive tourist is a tourist takes approximately 400 miles round trip and stays two nights at the hotel. It was revealed that gas price was highly influenced by seasonality. In a demand model, gas price has played as instrument variable to reflect seasonal effect and travel cost. It was showed that fuel price/travel cost and income are most influential determinants for lodging demand in highway hotel and motel industry.*

Keywords: 2SLS model, Drive tourism, Gas price, Highway hotel and motel, Lodging demand

## INTRODUCTION

Americans like to travel by car for both work and vacation, and drive tourism has important implications for the lodging industry. In 2001, the Americans took 2.3 billion personal vehicle trips and 56 percent of trips were for leisure purposes (Bureau of Transportation Statistics., 2003). Of these trips, 26 percent were intrastate travel with a proportion of these travelers using highway hotels and motels as a component of their travel experience. 56 percent of hotel guests are leisure travelers, and 77 percent of typical leisure travelers traveled by auto vehicles. The lodging industry has responded to this demand and, according to the American Hotel & Lodging Association (AHLA, 2007), 6,770 highway hotel and motel properties are located in interstate highway.

Prideaux, Wei, and Ruys (2001) describe the drive tourism as “tourism that centre on travelling from an origin point to a destination by car.....” and explained how and why drive tourism flourished in western countries. Drive tourism consists of car touring related elements such as road infrastructure, tourism attractions and, of course, accommodation and lodging facilities (Pennington-Gray, 2003). Nevertheless, even though drive travelers make considerable contribution to tourism in general and specifically the hotel industry, a limited number of studies have been conducted on drive tourism and tourists behaviors. In addition, drive tourism has been affected by external economic and social factors like gas price fluctuation, seasonality, and perceived risk, but these factors have been largely ignored in empirical studies. Few studies attempted to examine the effects of external environment change on the lodging industry. (Becken; Trent & Pollard, 1983; Walsh, Enz, & Canina, 2004).

The current research has been conducted to assist drive tourism and the lodging industry by providing better understanding of their consumers. National surveys which were conducted by U.S. government agency have released valuable data and fundamental information about the tourism and travel industry. The research is a output of government released data analysis. With respect to drive tourism and the highway hotel and motel industry, the current study attempts to achieve the following research objectives:

- 1) To explore drive tourists’ lodging demand seasonality empirically
- 2) To examine the effects of tourism environment changes (e.g. gas price fluctuation) on lodging demand of highway hotels and models.
- 3) To investigate how drive tourists’ socio-demographic variables and travel preferences affect lodging demand.

Academically, this study aims to apply a two stage equation models to identify lodging demand determinants for highway hotel and motel.

## LITERATURE REVIEW

Lodging demand can be viewed as a category of derivative demand of tourism and travel industry because there is a close relationship between hospitality and tourism industry. In highway hotels and motels' room demand mostly comes from leisure drive tourists' trips and business persons' visits. In this paper, lodging demand determinant for leisure drive tourists are main research interests. Comprehensive reviews are presented as follows:

Tourism demand studies have been conducted using either macro or micro level approaches. The macro level research examined demand at the destination level or regional level. A main goal of the macro level approach is to estimate coefficients of demand model (i.e. the extent to which variables affect overall demand) and predict future demand (Wong, Song, & Chon, 2006). Demand information is vital for destination marketers to make strategic plans for tourism destinations. A micro level approach is to explore the effects of guests' socio-demographic variables and travel related variable on individual's demand determinants. It is assumed that the demand model reflects an individual's demand function, and demand determinants can be indentified through statistical test for coefficients. The microscopic approach is based on individual consumer expenditure theory at the individual level. Therefore, it used not aggregated data but micro-data in tourism demand studies (Hu, 2002). Traditional economic theory explained the effects of income and product price on demand. There is limited explanation on customers' need and preferences which are core of modern marketing. It was viewed as a gap between theory and practice and more realistic approach had been developed. Michael and Becker (1973) developed new theory of consumer behavior. Their theory was derived from traditional consumer theory and the application of taste and preference variables. They argued that tastes are highly useful variables to account for observed behavior, and it was represented by demographic variables such as family size, family age-structure, education, housing tenure, occupation, race, socio-economic status or other proxy variable. In this light, numerous studies have been conducted and empirically tested (Cai, 1996; Cannon & Ford, 2002; Palakurthi & Parks, 2000; Pollak & Wales, 1981).

Previous lodging demand studies have been concerned with the specific effects of economic factors such as income, and own price of lodging service (Palakurthi & Parks, 2000). Likewise, the unit of analysis for lodging demand studies was not at the property level, but rather regional or county (Canina & Carvell, 2005). However, emerging research needs at property level and tourist behavior settings have altered research trends from aggregated tourism demand to individual consumer's behavior in lodging demand. The other hand, in terms of derived demand, lodging demand is closely related to its economic and market environmental condition (Lee, 1984; Walsh, et al., 2004). Based on previous studies and economic theory, ten research hypotheses were generated as below:

H1a: Total trip distance affects the lodging demand.

H1b: Auto fuel price affects the lodging demand.

H2: Household income affects the lodging demand.

H3a: Age affects the lodging demand.

H3b: Gender affects the lodging demand.

H3c: Type of auto vehicle affects the lodging demand.

H4a: The number of trip members affects the lodging demand.

H4b: Weekend trip affects the lodging demand.

H5: The event of 11th September 2001 affects the lodging demand.

H6: Travel season affects gas price.

## **METHODOLOGY**

### **Data and sample**

The data used in this study was from the long-distance trip from the National Household Travel Survey (NHTS, 2001). It has been conducted since 1969 by the Federal Highway Administration (FHWA), and the survey has become one of the nation's representative travel surveys to quantify traveler's trip-related behavior. The survey results have provided traveler's behavior, socio-demographic information by all modes of transportation, travelers' trip purposes, and all travel distances. The NHTS 2001 was conducted from April 2001 through May 2002 with Computer-Assisted Telephone Interviewing (CATI) technology, which collected travel data from a national sample. Total 66,000 households telephone interviewed were made for the NHTS 2010. Additionally, U.S. regular conventional retail gas prices index was obtained from U.S. Energy Information Administration website. In order to analyze the effects of external environment changes on tourism, these data sets were combined into one data set by monthly record.

The target population of this research was those who traveled for pleasure and stayed hotels or motels during trip in Midwest region. In order to investigate drive tourist's travel characteristics and lodging demand determinants, a sub-sample of 1,122 respondents was selected. With regard to the sample size, it meets the requirements for the chosen statistical analysis. With small sample sizes, an assumption of normality is essential, but, in case of large sample size, it has a unique statistical property, named "asymptotic properties." Under this assumption, even it doesn't meet the normality assumption, calculated t and F statistics approximately follows t and F distributions (Wooldridge, 2008).

## Research model

In order to estimate more accurate effects of drive tourists' socio-demographic variable and external environment changes, two-stage least square regression model (2SLS) was utilized in the study because 2SLS model can deal with endogeneity issue appropriately. 2SLS model used an instrumental variable, which was known as a solution for endogeneity in economic relationship. The model combines multiple potential instruments into an optimal instrument. This method is based on the idea that "economically endogenous variables are determined by each other and some additional economically exogenous variables" (Baum, 2006). A conceptual lodging demand model is as follows:

$$\text{First stage: Gas price} = f(\text{seasonality}) \text{ ----- (1)}$$

$$\text{Second stage: Lodging demand} = f(\text{income, trip distance, gas price, age, travel mode, trip party size, education level, weekend trip, event of 9/11}) \text{ ----- (2)}$$

Underlying thought on these models is that lodging demand for highway hotel and motel was directly affected by drive tourists' socio-demographic variable and travel related variable. Gas price is a function of seasonality, and it indirectly affects lodging demand. STATA version 10 was used in estimating coefficients of 2SLS model and tested whether or not endogeneity problems is.

## RESULTS

In order to test endogeneity in estimation model, first-stage regression was conducted. The first- stage regression model is to estimate coefficients between gas price and seasonality when

all exogenous variables are controlled. The result was presented in Table 1 and Table 2. R-square was 0.795 and seasonal dummy variables are significant except sead2 (i.e. from Sep. to Nov. 2001).

Table 1  
Results of Instrument Variable Estimation through First-stage regressions

	Coef.	Std. Err.	t	P> t
lnincome	-0.003	0.0033343	-0.82	0.411
lntpnum	0.009	0.0041392	2.15	0.032
educ1	0.002	0.0042818	0.47	0.638
educ2	-0.007	0.0064214	-1.17	0.244
dsex	0.001	0.0038962	0.31	0.759
dumage	-0.007	0.0056879	-1.24	0.217
dumweek	-0.002	0.004243	-0.64	0.525
dum911	-0.195	0.0060521	-32.32	0.000
dummode1	-0.000	0.0043965	-0.21	0.834
dummode2	0.004	0.0059695	0.71	0.475
lnmile	0.009	0.0026188	3.4	0.001
sead1*	-0.077	0.0061748	-12.53	0.000
sead2	-0.002	0.0058791	-0.41	0.682
sead3*	-0.150	0.0058804	-25.61	0.000
_cons	0.378	0.016228	23.31	0.000
R-squared	0.795			
F( 14, 1107)	306.67		Prob > F	0.000

Table 2  
Results of Endogeneity Test with First-stage Regression Summary Statistics

Variable	Adjusted R <sup>2</sup>	Partial R <sup>2</sup>	R <sup>2</sup>	F(3,1107)	Prob > F
lnfuel	0.7950	0.7924	0.4892	353.446	0.0000

Based on results from endogeneity test, new instrument variable can be obtained and plugged into second stage regression model. In table 3, the coefficients of OLS model and 2SLS model were compared. OLS model showed that income and some demographic variables are significant. F- statistics was 51.02 with less than 0.0001 p-values and R-squared is 0.452.

Table 3  
Results of OLS Model and Second Stage Regression of 2SLS Model

	OLS model				2SLS model			
	Coef.	Robust Std. Err.	t	P> t	Coef.	Std. Err.	t	P> t
lnfuel	0.048	0.238	0.20	0.839	<b>-0.449*</b>	0.247	-1.82	0.069
lnincome	<b>-0.152**</b>	0.026	-5.83	0.000	<b>-0.157</b>	0.027	-5.88	0.000
lntpnum	<b>-0.066**</b>	0.032	-2.11	0.035	<b>-0.059*</b>	0.033	-1.78	0.075
edud1	0.051	0.034	1.49	0.137	0.046	0.034	1.36	0.175
edud2	<b>0.086*</b>	0.047	1.84	0.066	<b>0.085*</b>	0.051	1.65	0.098
dsex	<b>-0.0691**</b>	0.031	-2.24	0.025	<b>-0.070**</b>	0.031	-2.23	0.026
dumage	<b>0.088*</b>	0.047	1.85	0.064	<b>0.084*</b>	0.046	1.83	0.067
dumweek	<b>0.313**</b>	0.039	8.11	0.000	<b>0.308**</b>	0.034	9.05	0.000
dum911	0.090	0.068	1.33	0.184	<b>-0.136**</b>	0.062	-2.19	0.028
dummode1	0.016	0.035	0.46	0.644	0.017	0.035	0.47	0.638
dummode2	<b>-0.087**</b>	0.043	-2.00	0.046	<b>-0.094**</b>	0.048	-1.97	0.049
lnmile	<b>0.533**</b>	0.023	23.02	0.000	<b>0.539**</b>	0.021	25.56	0.000
sead1	<b>0.1530**</b>	0.052	2.93	0.003	<b>-1.891**</b>	0.154	-12.24	0.000
sead2	<b>-0.095**</b>	0.048	-1.99	0.047				
sead3	-0.019	0.059	-0.32	0.748				
cons	-2.139	0.173	-12.38	0.000				
R-squared	0.452				0.444			
F-statistics	F( 15, 1106) = 51.2				F( 12, 1109) = 74.05			
	Prob > F = 0.000				Prob > F = 0.000			

\* Significant at .10 significance level; \*\* Significant at .05 significance level

However, the travel cost was insignificant even though it was known as one of most important economic variable. On the contrary to OLS results, 2SLS results showed that all of economic variables (e.g. price/cost and income), most of demographic, and travel related variables are significant. Especially, expected influence of economic variables on lodging demand followed economic theory. For example, fuel price has negative elasticity on lodging demand. F- statistics of 2SLS model was 74.05 with less than 0.0001 p-values and R-squared is 0.444. Even though 2SLS model's  $R^2$  was slightly low, 2SLS model is superior to OLS model because endogeneity problem exists and inaccurate coefficients were provided. 2SLS model showed relatively good model fitness.

## DISCUSSION AND CONCLUSION

According to the descriptive analysis, a typical profile of drive tourists is a person takes approximately 400 miles round trip and stays two nights at the hotel. It was also revealed that gas price was highly influenced by seasonality, and gas price can play as an instrument variable to reflect seasonal effect and travel cost. Moreover, classical economic model assumed that main independent variables are tourists' (i.e. hotel guests) income level and product price (i.e. travel cost). For drive tourists, product price can be derived from total traveled mileage and gas price. Since gas price's coefficient was negative, this result supports an economic theory. However, income effect's coefficient was negative, and it indicated that drive tourists are economical. And, drive tourism market can be viewed as a budget market because higher income tourists may take long distance air flight trip during vacation than middle and low income tourists take ground trip. Economic theory states that an increase in consumer income can cause changes in the demand for products because an income increase gives consumers more disposable income (Mankiw, 2001). This principle can be applied to drive tourism. However, its impact causes both positive and negative changes on the tourism demand (Crouch, 1992). With an increase in income, local tourists may realize they could travel more. But at the same time, they also realized that they could choose to travel to a more desirable and expensive destination. For example, an increase in income with a family living in Indiana that usually spends its summer vacations at Indiana beach state park may choose to visit Miami Beach, Florida or Cancun, Mexico—and fly. In this case, the increased income can be a crucial factor negatively affecting the tourism. Gender effect also exists. Female guests are less likely to stay highway hotel. As this study was conducted between 2001 march and 2002 April, the survey captured the effect of 9/11. The 9/11 event also negatively affected drive tourism and lodging demand. This study examined the effect of transportation mode. Car, minivan and SUV users showed identical pattern but pickup truck and RV user are less likely to stay hotel and motel because they have different motivation and need.

The current research explores drive tourists' lodging demand determinants and effects of external environment on tourism based on analysis of the National Household Travel Survey data. The authors assumed socio-demographic and trip-related variables influence drive tourist's lodging demand. Hypotheses were statistically tested, and it was revealed that most of hypotheses are significant, resulting in the identification of the drive tourism market's characteristics and lodging demand determinants. The authors used 2SLS model, which are viewed as good method to deal with endogeneity issue. It was shown how 2SLS model is appropriate in estimating demand coefficients in drive tourism market. According to the results, lodging demand is affected by gas price fluctuation, tourists' income level, trip distance, weekend trip, and type of transportation mode. Given the results, drive tourism markets have diversified market segments as well as lodging demand also can be differentiated by segmented markets.



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