Modelling Intercity Route Choice Behaviour to Explore Road Users’ Response to Road Pricing Policy in Libya

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Abstract: Libya is one of the developing countries that faces increasing mobility in transportation. Increased traffic congestion and road accidents on intercity highways, along with the resulting heavy death toll and economic cost, are the negative effects of increasing mobility. The time is ripe for a policy that will improve intercity highways. One possible solution to the problem is including road pricing policy in transportation policies. However, the government is concerned about this road pricing policy. Therefore, this research aims to contribute more details by investigating drivers’ behavior on intercity route choices to better understand and explore driver responsiveness and attitudes toward road pricing. In addition, this study aims to determine the suitability of the proposed toll charges and to encourage use of the proposed coastal highways to reduce intercity road congestion, improve road safety, and hence prevent road accidents in Libya. This paper adopts a discrete choice model to predict driver behavior on intercity route choices and to determine attitudes toward road pricing based on stated preference data. Data collection was conducted through stated preference surveys handed out to intercity travelers in the major coastal cities in Libya. A binary choice logit model was developed, and the value of time for the road users was investigated using the model’s estimation results. The results show that drivers do not prefer the new toll highway for long-distance travel. They also prefer the existing roads for short-distance travel. Drivers who travel every day or once a week do not prefer the new toll highway. Drivers who take trips for work-related purposes prefer the new toll highway, whereas those who take trips for social purposes prefer the existing coastal roads. All income groups exhibit a positive attitude toward the new toll highway. This study intends to help the Libyan government in its effort to promote economic growth and development of the road transport infrastructure with the target of implementing a National Road Network. This research can also serve as a guide to assist decision makers at all levels to wisely allocate resources for improving road transport infrastructure and reducing the rate of accidents on intercity highways. This study, which is the first of its type in Libya, investigates and explores drivers’ response to road pricing policy.

Key words: route choice behavior, toll road, intercity driver’s behavior, binary logit model, road pricing analysis, transport policy, road transport infrastructure.

INTRODUCTION

Libya is one of the richest developing countries in the world because of its oil resource. The Libyan government has invested greatly in developing public utilities and facilities, particularly the transportation system. This development does not only gain merits, but also causes some problems. The Libyans prefer using private vehicles for intercity trips. Such behavior leads to the rise in traffic congestion, travel delays, and mental stress caused by unreliable road safety measures that bring significant damage to the quality of life. Therefore, the time is right to demand a policy that will improve intercity road infrastructure, public transport, and vehicle ownership regulations. The Libyan government has conducted several studies to overcome these problems (Manssour and Riza 2011, 2012), and is planning to introduce a road pricing policy for the country.

Santos (2000) reported that road pricing policy is the suitable solution to transportation system issues. Public acceptance is the most important factor to be considered before new road pricing policies can be fulfilled. The enforcement of pricing and operational policies is crucial because of the increasing transportation demands in Libya over the years. Road pricing can be seen as a market-based traffic control measure that can influence travel behavior to alleviate traffic congestion.

The ongoing road pricing strategies have been the subject of a growing number of studies and political attention. The methods and techniques present new challenges to transport researchers as they attempt to better understand and predict the impact of different pricing strategies on travel behavior. Understanding the behavior of drivers toward road pricing and public acceptance of new schemes are considered as the highest priorities for
generating a successful pricing policy. The behavioral response and attitude of the general public toward road pricing have received increasing attention in recent years. Consequently, many studies have focused on this topic (Reploge and Reinke, 1998; O’Grady et al., 2006; Schade and Schlag, 2003; Odeck and Brathen, 1997, 2002; Ubbels and Verhoef, 2003; Schade and Schlag, 2003; Amelsfort and Bliemer, 2005; Ison, 2000; Keuleers et al., 2006; Wong et al., 2005; Kockelman and Kalmanje 2005; Dissanayake and Kouli, 2007; Khademi and Timmermans, 2011). Wong et al. (2005) stated that public acceptance is an important issue that should be clarified or studied before implementing new road pricing policies. Odeck and Bråthen (1997, 2002) examined the changing attitudes of users toward the Oslo toll ring from 1989 to 1995, and found that users’ attitude became more positive toward tolls as the benefits of tolls accrued to them through better infrastructure. Dissanayake and Kouli (2007) developed discrete choice models to investigate drivers’ response to a proposed toll motorway project connecting the cities of Corinth and Patras in Greece. The binary logit model under discrete choice methods was found to be an analytically convenient modeling method. Results showed that drivers prefer the new toll motorway over existing alternative routes. Both travel time and cost coefficients were negative and highly significant in their study’s models, indicating that travel utility decreases with increasing travel time and cost.

Based on previous studies, the current researchers concluded that an understanding of road users’ attitudes toward road pricing measures is a prerequisite for the successful implementation of such systems. Therefore, this study predicted drivers’ behavior and attitudes toward pricing on the proposed toll roads connecting the coastal cities of Libya. This research developed a binary logit model using stated preference surveys to predict the effect of road pricing on drivers’ attitudes that influence intercity route choices in Libya.

Traffic Accidents In Libya:

More than 1.2 million people die in road accidents, whereas between 20 million to 50 million people get injured every year around the globe. In Libya, more than 50000 people have died in road accidents during the last 40 years (1969 to 2009). This fact was revealed recently in the 2008 Global Status Report on Road Safety by the World Health Organization (WHO).

The situation is worse in Libya. The highest mortality rate in Libya is brought about by road accidents. For the last 40 years or so, Libya has to acknowledge the fact that road accidents are a major cause of death and injury. A substantial amount of money has been spent on possible solutions to the road safety problem over this period. Based on WHO’s latest figures, Libya is the second Arab country with the highest number of road accidents next to Oman.

Most traffic accidents in Libya happen on intercity highways. The accident rate on intercity highways is about one-ninth of that on ordinary roads. However, once an accident occurs, the number of fatalities can be so high because public awareness on traffic safety on these highways is low. In recent years, 1200 to 1800 people have been killed on intercity highways in Libya.

Compared with European countries and the United States, Arab countries have very high road accident fatality rates. In 2001, 22.3 persons, 14.8 persons, and 7.3 persons per 10000 vehicles were killed in Libya, Saudi, and Qatar, respectively (Bener et al., 2003). Moreover, one of the major modes of personal transport in Libya is the private vehicle because it is affordable and more dependable than other modes of transport available in the country. Thus, about 73% of the registered vehicles in the country are private vehicles. The number of private vehicles has increased tremendously from 578924 in 2001 to 1343422 in 2010. Consequently, private vehicle accidents have also increased from 10855 to 15655 (Public Administration of Traffic, 2010).

<table>
<thead>
<tr>
<th>Year</th>
<th>No. of Registered Vehicles</th>
<th>No. of Accidents</th>
<th>No. of Vehicles Involved in Road Accidents</th>
<th>No. of Deaths</th>
<th>No. of Injured</th>
</tr>
</thead>
<tbody>
<tr>
<td>2001</td>
<td>809056</td>
<td>10855</td>
<td>12495</td>
<td>1320</td>
<td>3256</td>
</tr>
<tr>
<td>2002</td>
<td>1008528</td>
<td>12017</td>
<td>13952</td>
<td>1751</td>
<td>6575</td>
</tr>
<tr>
<td>2003</td>
<td>1126901</td>
<td>12154</td>
<td>13918</td>
<td>1758</td>
<td>6023</td>
</tr>
<tr>
<td>2004</td>
<td>1255704</td>
<td>11643</td>
<td>14171</td>
<td>1783</td>
<td>5596</td>
</tr>
<tr>
<td>2005</td>
<td>1310530</td>
<td>11898</td>
<td>14620</td>
<td>1800</td>
<td>6161</td>
</tr>
<tr>
<td>2006</td>
<td>1508662</td>
<td>11982</td>
<td>16919</td>
<td>1866</td>
<td>6501</td>
</tr>
<tr>
<td>2007</td>
<td>1826533</td>
<td>13165</td>
<td>17859</td>
<td>2138</td>
<td>7547</td>
</tr>
<tr>
<td>2008</td>
<td>2024665</td>
<td>14325</td>
<td>18069</td>
<td>2332</td>
<td>7064</td>
</tr>
<tr>
<td>2009</td>
<td>2342536</td>
<td>13250</td>
<td>17736</td>
<td>2301</td>
<td>7338</td>
</tr>
<tr>
<td>2010</td>
<td>2424385</td>
<td>15655</td>
<td>18901</td>
<td>2375</td>
<td>7259</td>
</tr>
</tbody>
</table>
Selection Of The Study Area:

Libya, a prosperous and economically flourishing country, exhibits a high increase in private vehicle ownership that causes traffic problems. The increase is further caused by the trend to privatize commerce, transportation of goods, and the liberalization of trade with neighboring countries. The practice in other countries shows vehicle ownership to exponentially increase in relation to economic growth. The adverse effects of such increase, such as congestion, accidents, and air pollution, are well-known and should be avoided as much as possible. The need to improve the road transport infrastructure prompts the Libyan government to undertake various studies to deal with the problem of road accidents.

The main mode of intercity land transport is currently road transport, although rail transport is foreseen. To efficiently use existing and future land transport facilities, the development of road transport service needs to be closely coordinated along with sea and air transport services. Libya has invested greatly in developing a motorway network. The main regions with significant current and future concentrations of road traffic are coastal corridors (the coastal highway that links major coastal cities).

Intercity road network has steadily increased more than four times in 2000 compared to in 1970. Two main axes carry the bulk of intercity travel at present. The first is the coastal highway that connects the coastal cities in Libya to other countries, such as Tunisia in the west and Egypt in the east. This highway is considered an important part of the Cairo-Dakar Trans-African Highway (Figure 2, section 1 Cairo-Dakar). The Cairo-Dakar Trans-African Highway runs along the Mediterranean Coast of North Africa, and continues down the Atlantic Coast of northwest Africa. The second axis connects the north of Libya (that is, Tripoli City) to other cities in the center and continues to southwest Libya (that is, Sabha City). This highway is considered an important part of the Tripoli-Windhoek Trans-African Highway that links north and South Africa (that is, Libya and Namibia, as shown in Figure 2). In fact, these highways pass through the most populated areas of Libya, and basically serve as collectors of traffic from the remote and sparse populations and activity concentrations.

Fig. 2: Map of the Trans-African Highway Network.
Existing intercity highway networks in Libya exhibit poor geometric characteristics and low levels of service which result to high accident rates on intercity highways. This situation affects the country’s growth. The Libyan government, in its aim to enhance economic growth, has firmly stressed the development of transport infrastructure on roads with the aim of implementing a national road network. Under the present plan, a number of major roads will be subjected to instant improvement to become dual carriageways. The coastal highway is one of the important roads in the country in which the Libyan government has started investing by renewing this highway. The purpose of investing in a new coastal highway is to link different economic activity zones, cities, and settlements with one another to improve the level of service and to link Libya with surrounding countries to achieve integrity with African states. Improving transport safety is one of the major concerns of this proposal. The proposal includes central reservations or safety barriers, two-lane or three-lane designs for dual carriageway, an observation system for drivers who exceed the speed limit, emergency systems in case of accidents, bilingual road signs and road lights to reduce congestion and accidents on coastal highways.

The proposed coastal highway is 2000 km long and is significantly important because it covers the greater length of the country by connecting 20 cities, 12 ports, 5 ports of oil, and 8 airports. Therefore, the proposed coastal highway will be a key undertaking in terms of the country’s economic growth and will provide access from Libyan cities to other countries like Tunisia in the west and Egypt in the east, as shown in Figure 3. As such, the proposed coastal highway is also important in terms of international freight transport in Africa because the coastal highway in Libya is considered as the most important section of the Cairo-Dakar Trans-African Highway (Figure 2). Libya also handles regional trade among northern countries in Africa. Similarly, new highways will play important roles in the transportation of locally produced goods as well as in overseas imports and exports. Indications that the trans-border traffic in this part of the corridor is growing are observed.

**Fig. 3:** The proposed coastal highway project in Libya.

**Modeling The InterCity Route Choice:**

Route choice models play a critical role in many transport applications. A discrete choice model is a mathematical function that predicts an individual’s choice based on utility or relative attractiveness (Ben-Akiva and Lerman, 1985). According to the aim of this study, the binary logit model under discrete choice methods is found to be an analytically convenient modeling method. For the binary models, let \( i \) and \( j \) be the two alternatives in the choice set of each individual.

\[
U_{in} = V_{in} + \epsilon_{in} \\
U_{jn} = V_{jn} + \epsilon_{jn}
\]

Hence, \( P_{in} = \text{Prob} \left[ U_{in} \geq U_{jn} \right] \)

\[
= \text{Prob} \left[ V_{in} + \epsilon_{in} \geq V_{jn} + \epsilon_{jn} \right] \\
= \text{Prob} \left[ V_{in} - V_{jn} \geq \epsilon_{jn} - \epsilon_{in} \right] \\
= \text{Prob} \left[ V_{in} - V_{jn} \geq \epsilon_{n} \right], \quad \epsilon_{n} = (\epsilon_{jn} - \epsilon_{in})
\]

The probability that individual \( n \) chooses alternative \( i \) \( (P_{in}) \) is proposed by Ben-Akiva and Lerman (1985), as follows:

\[
P_{in} = \frac{1}{1 + e^{-\gamma_n}} = \frac{e^{\gamma_{in}}}{e^{\gamma_{in}} + e^{\gamma_{jn}}}
\]

\( P_{in} \) is the probability that individual \( n \) chooses alternative \( i \).
The construction of discrete choice models is based on the principles of the utility theory. The utility theory assumes that a driver will choose the route that will maximize his or her travel utility. In other words, a driver, in his or her choice process, will try to maximize his or her benefit by reducing his or her travel time and cost, and will maximize his or her convenience and comfort (Ben-Akiva and Lerman, 1985).

In the coastal corridors selected for this study, the transportation routes consist of the new toll highway and the existing roads, which include existing coastal roads and other roads. The behavior of travelers cannot be predicted with 100% certainty, thus we can only estimate the probability of a traveler’s choice. The utility functions can be presented mathematically as:

\[
U_{\text{NTH}} = V_{\text{NTH}} + \epsilon_{\text{NTH}}, \quad V_{\text{NTH}} = \beta x_{\text{NTH}}
\]

\[
U_{\text{NTH}} = \beta_0 + \beta_1 x_{\text{age}} + \beta_2 x_G + \beta_3 x_N + \beta_4 x_{EL} + \beta_5 x_{TTT} + \beta_6 x_{TTC} + \beta_7 x_{INC} + \beta_8 x_{TFQ} + \beta_9 x_{TPLNT} + \beta_{10} x_{POT} + \epsilon_{\text{NTH}}
\]

\[
U_{\text{ER}} = V_{\text{ER}} + \epsilon_{\text{ER}}, \quad V_{\text{ER}} = \beta x_{\text{ER}}
\]

\[
U_{\text{ER}} = \beta_0 + \beta_1 x_{\text{age}} + \beta_2 x_G + \beta_3 x_N + \beta_4 x_{EL} + \beta_5 x_{TTT} + \beta_6 x_{TTC} + \beta_7 x_{TFQ} + \beta_8 x_{TPLNT} + \beta_9 x_{POT} + \epsilon_{\text{ER}}
\]

where \((U_{\text{NTH}})\) is the utility function of the new toll highway, \((V_{\text{NTH}})\) is the systematic component of the utility function of the new toll highway, \((\epsilon_{\text{NTH}})\) is the random error component of the utility function of the new toll highway, \((x_{\text{NTH}})\) is the value of attributes related to the new toll highway, \((U_{\text{ER}})\) is the utility function of the existing road (coastal road), \((V_{\text{ER}})\) is the systematic component of the utility function of the existing road, \((\epsilon_{\text{ER}})\) is the random error component of the utility function of the existing road, \((x_{\text{ER}})\) is the value of attributes related to the existing road, \((G)\) is gender, \((N)\) is nationality, \((EL)\) is educational level, \((TPLNT)\) is the trip length in kilometers, \((TTT)\) is total travel time in hours, \((TTC)\) is total travel cost in Libyan dinar \((LYD)\), \((INC)\) is the monthly income in Libyan dinar, \((POT)\) is the purpose of travel, \((TFQ)\) is the travel frequency, \((\beta_0)\) is constant, and \(\beta_1, \beta_2, \beta_3, ... \beta_{10}\) are the coefficients of variables. The probability that a driver will choose the new toll highway can be written as:

\[
P_{\text{NTH}} = \frac{e^{V_{\text{NTH}}}}{e^{V_{\text{NTH}}} + e^{V_{\text{ER}}}} = \frac{e^\beta x_{\text{NTH}}}{e^\beta x_{\text{NTH}} + e^\beta x_{\text{ER}}}
\]

where \(P_{\text{NTH}}\) is the probability that individual \(n\) chooses the new toll highway.

**Methodology And Data Collection:**

According to (Ortuzar and Willumsen, 2001), the data in this study were obtained from a stated preference survey. A total of 677 respondents were questioned over three months, conducted in 2010. The stated preference survey was designed to satisfy the requirements for the development of an intercity route choice behavior model, to investigate the willingness of drivers to pay, and to estimate the value of time in determining toll charges.

Many intercity travelers in Libya are from different countries whose primary languages are Arabic and English, thus the questionnaire was written in both Arabic and English. One set of questionnaire was used in all types of trips, including long and short trips. The questions were arranged based on their relevance to the respondents’ travel experiences. The questionnaire comprises two parts. The first part collects basic information about the respondents, such as demographic and socioeconomic characteristics (age, gender, nationality, educational level, and monthly income) and travel characteristics (origin, destination, distance, road type, purpose, duration, and frequency). The second part aims to analyze driver responses to two basic route-related attributes and journey time for both the new highway and the existing roads.

The only way to ensure the practicality of the questionnaire is to test it with actual respondents. Hence, a pilot study was undertaken prior to formal data collection. The pilot survey was designed to test items used in the main survey instrument. Random samples of 100 observations from intercity drivers during the study period were collected and carefully analyzed. The analysis revealed that some questions need to be omitted from the questionnaire because participants had either not answered them or had answered them erroneously. The other questions were modified or rewritten. After the questionnaire was developed, the required data for the main survey were collected. Respondents were randomly selected based on a stratified sampling approach to obtain a representative sample that reflects demographic and socioeconomic profiles. The drivers were advised about the proposed toll coastal highway project to make them understand that the project is real before collecting data. The survey and interviews were conducted safely without obstructing traffic flow. The interviews were conducted in rest areas, service areas, and gasoline stations located midway between the coastal cities being studied. Specifically, the study was conducted in corridors in five major coastal cities in Libya: Tripoli, Benghazi, Surt, Misrath, and Tobruk. A total of 677 responses are found in the questionnaire. Each questionnaire form comprises 13 choices. Accordingly, the database consists of 8801 stated preference choice responses.
RESULTS AND DISCUSSION

A summary of estimations from the model are presented in Table 1. Several variables, which have been found in the review of literature, have been tried during the calibration process. All the variables presented in the table have significant parameter estimates and logical signs. The attributes selected for modeling are specific constants for alternative (ASCs), total travel time (TTT), total travel cost (TTC), and specific dummies of alternative. Travel cost was calculated by the operating cost of the existing coastal roads and the new toll highways. Travel cost only consists of the operating cost because no toll charge for coastal roads is yet implemented. In the stated preference survey, driver preferences were only collected for the new highways and coastal roads.

Accordingly, the best possible way to analyze data is with a binary logit model. Therefore, the utility functions in the model were formulated for the two alternatives. Route choice decisions were expected to be contingent upon travel distance or trip length, travel frequency, purpose of travel, and monthly income; hence, a model was developed to enumerate those relationships. The specific constant for existing roads was initially set to zero to estimate other parameters. The specific constant for the new toll highway is significant and positive, indicating driver preference for the proposed new toll highway over existing alternative routes. The coefficients for travel time and cost were negative and highly significant in the model, implying that travel utility decreases against increasing travel time and cost. According to the estimation results, drivers do not prefer the new toll highway for travel distances of ≤300 kilometers. Drivers prefer the existing roads for short-distance travel of ≤100 kilometers. Short or frequent trips were not revealed as time-saving options, therefore, drivers were likely to be less willing to pay the toll for short-distance travel of ≤300 kilometers or frequent trips either on a daily or weekly basis. The results were similar to previous research (Van and Raza 2006).

Travel frequency data were categorized into five groups before they were tested as dummy variables (codes 1-5) in the model. Drivers who travel every day or once a week do not prefer the new toll highway because the coefficient is negative. Trip purpose data were also categorized into five groups and were coded using a scale of 1-5 (work, social, personal business, study, and others) before they were analyzed as dummy variables in the model. Drivers who travel for work and personal business prefer the new toll highway because the coefficient was positive and significant. Consequently, drivers who travel for social, recreational, study, and other related purposes prefer existing coastal roads. The findings have similar trend to that presented by (Diamandis et al., 1997; Dissanayake and Kouli 2007).

Monthly income was categorized into five groups before they were tested as dummy variables (codes 1-5) in the model and were analyzed to estimate driver preference of the new toll highway. We only selected four income categories because the fifth category had a low percentage. The coefficients for all income groups were positive and significant, indicating a positive attitude toward the new toll highway. The coefficients imply that
an increase in income will increase the magnitude of the estimates. Model estimation was based on a significant number of samples.

### Table 2: Estimation results for the binary logit model.

<table>
<thead>
<tr>
<th>Independent Variables</th>
<th>Coefficient</th>
<th>t-statistic</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASCs ( x_1 )</td>
<td>0</td>
<td>---</td>
</tr>
<tr>
<td>ASCs ( x_{12} )</td>
<td>0.43</td>
<td>5.2</td>
</tr>
<tr>
<td>TTC in (Libyan dinar)</td>
<td>-0.41</td>
<td>-24.3</td>
</tr>
<tr>
<td>TTC in (hours)</td>
<td>-2.2</td>
<td>-15.56</td>
</tr>
<tr>
<td>TFQ - Every day or once a week ( x_{13} )</td>
<td>-0.04</td>
<td>-0.85</td>
</tr>
<tr>
<td>POT1 - Work/Personal business ( x_{14} )</td>
<td>0.16</td>
<td>3.2</td>
</tr>
<tr>
<td>POT2 - Social/Recreation and education ( x_{15} )</td>
<td>0.48</td>
<td>6.2</td>
</tr>
<tr>
<td>TPLNT1 ( \leq 300 ) kilometer for ( x_{16} )</td>
<td>-0.15</td>
<td>-3.1</td>
</tr>
<tr>
<td>TPLNT2 ( \leq 100 ) kilometer for ( x_{17} )</td>
<td>0.53</td>
<td>5.2</td>
</tr>
<tr>
<td>INC1 - less than 300 Libyan dinar ( x_{18} )</td>
<td>0.25</td>
<td>3.03</td>
</tr>
<tr>
<td>INC2 - 300 to 400 Libyan dinar ( x_{19} )</td>
<td>0.36</td>
<td>4.30</td>
</tr>
<tr>
<td>INC3 - 400 to 500 Libyan dinar ( x_{20} )</td>
<td>0.75</td>
<td>7.98</td>
</tr>
<tr>
<td>INC4 - 500 to 600 Libyan dinar ( x_{21} )</td>
<td>0.85</td>
<td>8.30</td>
</tr>
</tbody>
</table>

Summary of Statistics

| Number of (SP) observation | 8801 | LOG LIKELIHOOD \( LL(\beta) \) | -3983.72 | LOG LIKELIHOOD \( LL(0) \) | -6438.22 | RHO SQUARED \( \rho^2 \) | 0.381 | RHO-BAR SQUARED \( \bar{\rho}^2 \) | 0.380 | Value of time (LYD/hr) | 5.37 |

The goodness-of-fit of the model, rho-square \( \rho^2 = 0.381 \), and the adjusted likelihood ratio index (rho-squared bar \( \bar{\rho}^2 = 0.380 \)) indicate the acceptable level of model fit. The coefficients of travel cost and time of the developed binary logit model were used to calculate the value of time is found to be \( 5.37 \) LYD/hr = 3.31 Euros/hr. According to studies conducted in India, South Africa and Greece the value of time lies between 3.09 Euros/hr and 3.59 Euros/hr for non-business travelers and 4.5-5.33 Euros/hr for business travelers (Van and Raza 2006, Diamandis et al., 1997). However, in Greece the value of time, according to a recent study, is about 3.31 Euros/hr, which is noticeably lower than the values obtained by earlier studies between 4.57 Euros/hr and 5.28 Euros/hr (Dissanayake and Kouli 2007).

**Conclusion:**

A general approach to calibrate intercity route choice behavior model in Libya was presented. Behavioral intercity route choice model was successfully built and validated. This study developed discrete choice model to investigate driver behavior on intercity route choices and to explore driver responsiveness and attitudes toward road pricing in Libya. The value of time for road users was investigated using the estimation results in the model. The study also reveals that long-distance travelers are willing to pay for the new toll highway. Therefore, drivers were likely to be less willing to pay the toll for short-distance travel of \( \leq 300 \) kilometer. However, the modeling of route choice in this study was designed to obtain behavioral realism on intercity travel. The choice was based on the given stated preference scenarios. The specification of model utility will help future studies focus on determining which data are essential. Road pricing does not solve all transportation problems in Libya, but it is certainly not politically popular. However, the study has shown that road pricing can help reduce congestion and pollution, both in theory and practice, and may also be modified to reduce accidents. The study is intended to help Libyan Government in its effort to promote economic growth and development of the road transport infrastructure including the National Road Network. It also can serve as a guide to assist decision-makers at all levels to allocate resources wisely in improving road transport infrastructure and reduce the rate of accidents on intercity highways. The Libyan Government should, therefore, encourage public/private participation in the provision of transport services. It should also provide enabling environment that would guarantee efficient and adequate vehicular movement system within the Libyan cities. The implementation of road pricing should be continually conducted both in metropolitan areas and other areas. The road pricing policy aims to improve Libya’s transportation system. Further studies on this new toll coastal highway project are required to determine welfare and equity impacts as well as infrastructure funding and other related issues.

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