

REPORT OF RESEARCH RESULTS

- A. Title :** Study of Association between the Acceptance and Influence of UBI Pricing Factors and Driving Behavior
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- C. Summary:**

Car insurance premium is determined by drivers' socio-demographic characteristics and driving records (e.g. occurrence of traffic accidents and violations of traffic rules) in Taiwan. Even though the records of accident and violation are included in the calculation formula of car insurance premium, the driving risk of customers are not justified by the insurance premium they paid. In 2008, Progressive, an American auto insurance company offered an auto insurance policy, the usage-based insurance (UBI), that insurance premium was calculated based on driving behavior data recorded with a plug-in telematics device or a mobile APP on board. UBI program provides lower insurance premium for lower-risk drivers and charges more for higher-risk drivers. UBI insurance policy is not only providing a decent insurance premium, it is also an effective measure to change driving behavior. A good UBI pricing factors can help risky drivers to reduce their risk of involving in traffic accidents. In recent years, a lot of insurance companies provide UBI program worldwide because of the boost of the revolution of communication technology. By the end of 2018, more than 20 million UBI auto insurance policies have been sold in 58 foreign countries worldwide, including Italy, U.S.A., UK, China, Australia, etc. In recent years, several insurance companies in Taiwan offer UBI insurance policy. Between years 2016 and 2019, there were eight insurance companies providing UBI insurance policies proved by Financial Supervisory Commission (FSC). However, this innovated insurance policy did not attract people's attention. The possible reason that UBI policy failed might be the insurance premium were simply measured by distance traveled. To understand customers' attitude towards UBI insurance policy and find out appropriate UBI pricing factors, this study designed a questionnaire to collect survey data. The questionnaire contains 4 parts: a self-evaluated DBQ, a quiz in liability coverage of car insurance, attitude towards UBI pricing factors, and characteristics of respondents. A total of 580 valid samples were obtained.

This study found people in general, are not familiar with the liability coverage of car insurance. Respondents with less distance traveled per week and young adults have relatively little knowledge about car insurance. Respondents are not familiar with UBI car insurance. Only 8.98% of respondents are aware of UBI and 4 used UBI insurance before. Regarding to the attitude towards pricing factors, those who self-evaluated their driving behavior as poor are less likely to accept UBI insurance policy but more likely to be influenced by UBI pricing factors. The factors of hand-held mobile phone usage, speeding, sudden lane-changing, and following distance are more acceptable to the public. These four UBI pricing factors are also influential to those with poor driving behavior. To campaign UBI policy, we suggest to provide customers a valuable opportunity to learn more about the telemetric and UBI pricing system by experiencing the on-board telemetric in their own cars. It will help to increasing the public's acceptance of UBI insurance policy. Insurers can provide a diagnosis report card to help customers examining their driving behavior. In addition, insurers can provide a quotation and a chart comparing the UBI premium with their current car insurance premium to help customers learning more about UBI.

D. Aim of Research

The aims of research are in three folds:

1. To examine the knowledge of the liability coverage of car insurance.
2. To investigate the attitude (acceptance and influence) towards UBI pricing factors in two aspects, traffic exposure-related and driving behavior-related.
3. To examine the associations between attitude towards UBI pricing factors, driving behavior, and understanding of car insurance.

E. Method of Research & Progression

This study selects potential pricing factors based on the investigation results of prior studies and empirical experience from foreign countries to develop a questionnaire. The questionnaire is divided into four parts. The questions in the first section are self-evaluated driving behavior. A Likert 5-point measurement scale is used to evaluate respondent's driving behavior, in forms of errors, lapses, violations, and positive behavior. The second section is designed to test the knowledge of car insurance liability. The questions investigated in the third section are divided into two parts: self-reported acceptance and influence of UBI pricing factors on respondent's driving behavior. A Likert 5-point scale is used to evaluate respondent's acceptance of each UBI pricing

factor and the influence of each factor on driving behavior. The last section contains socio-demographic characteristics and driving experience of respondents.

F. Results of Research

Knowledge of car insurance liability

This study found people in general, are not familiar with the liability coverage of car insurance. Respondents with less distance traveled per week and young adults have relatively little knowledge about car insurance. For those who have been involving in a traffic accident or violating traffic rules do not have better understanding of liability coverage of car insurance. Most respondents do not know what the property damage insurance can be applied to. In addition, the liability coverage of mandatory car insurance and third-party liability insurance are not clearly known. Most respondents do not understand that the liability of mandatory car insurance applies to the injury cost of passenger(s) in own car. It is essential to increase the public's awareness of car insurance.

Associations between driving behavior and knowledge of car insurance liability

- (1) Respondents with better understanding of car insurance have better self-evaluated driving behavior.
- (2) Respondents with longer distance traveled per week are more likely to have lapses and violations when driving.
- (3) Respondents who have a motorbike/ motorcycle license, are more likely to have higher self-evaluated DBQ scores of speed-related driving behavior. It means that motorbike/ motorcycle riders are more likely to drive faster on roads. Nevertheless, respondents without motorbike/ motorcycle license are more likely to have violations, lapses and errors when driving.
- (4) Respondents who committed traffic violations in the past 3 years are more likely to have a lower self-evaluated DBQ scores. It indicates that traffic violations are highly related to poor driving behavior.

Attitude towards UBI pricing factors

- (1) The factor of distance traveled is relatively more acceptable to young adults. However, young adults are less likely to accept hard braking as a pricing factor.
- (2) The factor of Speeding is less influential to those whose age is over 50 years old.
- (3) In general, the acceptance of UBI pricing factors is relatively low for those who travel longer distances per week.
- (4) The factor of mobile phone usage is influential for those who travel 50-200

kilometers per week.

(5) Those who had experienced traffic accidents in the past 3 years are relatively less likely to accept the factors of speeding, hard acceleration, and sudden braking as pricing factors.

(6) Respondents with traffic violation records are less likely to accept nighttime driving, sudden braking, following distance as pricing factors. For those who violated traffic rule in the past 3 years, behavior-related pricing factors are more influential than to those who had no violation record.

Relatively more acceptable UBI pricing factors for the public

The factors of hand-held mobile phone usage, speeding, sudden lane-changing, and following distance are more acceptable to the public. These four UBI pricing factors are also influential to those with poor driving behavior.

G. Future Areas to Take Note of, and Going Forward

1. Many behavior-related pricing factors proposed in this study are associated with the risk of traffic accidents, for example speeding, hard acceleration and sudden braking. However, it is difficult to use any forms to present those behavior-related factors in detail when conducting our survey. We suggest that more sophisticated research on these pricing factors is needed.
2. We also suggest that data collected from the telemetric need further study and should be analyzed and compared with the records of car insurance claims. The effects of with-and-without UBI policy on driving behavior by using the data collected from telemetric are worth further study.
3. We believe the awareness of UBI car insurance and its pricing scheme is essential to help people releasing their doubts and increasing acceptance of the public. The design of a successful campaign to boost the public's awareness of UBI is essential.

H. Means of Official Announcement of Research Results

Propose to rewrite the final report and submit the manuscript to an international conference, the Transportation Research Board (TRB) Annual meeting for the year 2023. The Transportation Research Board (TRB) 102nd Annual Meeting is being held January 8–12, 2023 in Washington, D.C. The deadline for paper submission is August 1, 2022.

TRB Annual meeting is an information-packed program that attract approximately 9,000 transportation professionals from around the world annually. It is a good opportunity to share our knowledge and perspectives with colleagues from other countries and to learn about the latest developments in transportation research, policy, and practice.