



## Driving behaviors and accident risk under lifetime license revocation

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### ABSTRACT

This study explored the driving behaviors and crash risk of 768 drivers who were under administrative lifetime driver's license revocation (ALLR). It was found that most of the ALLR offenders (83.2%) were still driving and only a few (16.8%) of them gave up driving completely. Of the offenders still driving, 67.6% experienced encountering a police roadside check, but were not detained or ticketed by the police. Within this group, 50.6% continued driving while encountering a police check, 18.0% of them made an immediate U-turn and 9.5% of them parked and exited their car. As to crash risk, 15.2% of the ALLR offenders had at least one crash experience after the ALLR had been imposed. The results of the logistic regression models showed that the offenders' crash risk while under the ALLR was significantly correlated with their personal characteristics (personal income), penalty status (incarceration, civil compensation and the time elapsed since license revocation), annual distance driven, and needs for driving (working, commuting and driving kids). Low-income offenders were more inclined to have a crash while driving under the ALLR. Offenders penalized by being incarcerated or by paying a high civil compensation drove more carefully and were less of a crash risk under the ALLR. The results also showed there were no differences in crash risk under the ALLR between hit-and-run offences and drunk driving offences or for offenders with a professional license or an ordinary license. Generally, ALLR offenders drove somewhat more carefully and were less of a crash risk (4.3 crashes per million km driven) than legal licensed drivers (23.1 crashes per million km driven). Moreover, they seemed to drive more carefully than drivers who were under short-term license suspension/revocation which previous studies have found.

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### 1. Introduction

In traffic safety research, it is often of interest to explore driving behaviors and quantify the risk of crash involvement of certain groups of drivers. Many studies have focused on exploring the effectiveness of license suspension/revocation (S/R) (Hagen et al., 1980; Williams et al., 1984; Ross and Gonzales, 1988; Smith and Maisey, 1990; Deyoung, 1999; Malenfant et al., 2002), and have consistently demonstrated that this sanction is effective for reducing the subsequent accident and traffic conviction rate of high-risk drivers over a short term (McKnight and Voas, 1991; Mann et al., 1991; Peck, 1991; Siskind, 1996; DeYoung et al., 1997). Some studies have found that such disqualified drivers who venture out on the road are likely to drive in such a way as to avoid attracting the attention

of the police (Ross and Gonzales, 1988; Smith and Maisey, 1990), drive less, and drive somewhat more carefully (Hagen et al., 1980; Ross and Gonzales, 1988; Voas and DeYoung, 2002). Hence, license S/R was by far the most effective treatment for both accidents and violations. Since one of the objectives of license S/R is to eliminate driving for the period of the suspension, it is possible that much or all of the effect is due to reduced exposure and/or more careful driving during the suspension interval (Masten and Peck, 2004). Siskind (1996) found that the accident rate of these suspension offenders during periods of disqualification is about one third of the rate during periods of legal driving; however it is difficult to distinguish between reduced driving levels and more cautious traffic behavior during periods of license restriction.

In the face of serious traffic violation problems, a common deterrent has been to increase the penalties for offenders. However, driving while under a short term S/R is difficult to detect, it can only be reached when the driver of a vehicle has been stopped by the police for committing another traffic offence (Voas and DeYoung, 2002). License S/R is usually implemented within a few years. It seems more difficult to gather an available empirical data for long term license S/R. Therefore, few studies have explored the effectiveness of administrative license revocation over the long term

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**Table 1**  
Legal driver, ALLR population and its components.

|                                   | Legal driver population in 2002 |      | ALLR population (1993–2002) |      | Respondents |      | Non-respondents (includes invalid questionnaires) |      |
|-----------------------------------|---------------------------------|------|-----------------------------|------|-------------|------|---|------|
|                                   | N = 9611,677                    | %    | N = 2554                    | %    | N = 768     | %    | N = 1786  | %    |
| Gender                            |                                 |      |                             |      |             |      |   |      |
| Male                              | 5,853,511                       | 60.9 | 2517                        | 98.6 | 755         | 98.3 | 1762  | 98.7 |
| Female                            | 3,758,166                       | 39.1 | 37                          | 1.4  | 23          | 1.7  | 24  | 1.3  |
| License category                  |                                 |      |                             |      |             |      |   |      |
| Professional license <sup>a</sup> | 479,541                         | 5.0  | 536                         | 21.0 | 128         | 23.7 | 408   | 22.8 |
| Ordinary license                  | 9,132,136                       | 95.0 | 2018                        | 79.0 | 640         | 76.3 | 1378  | 78.2 |

<sup>a</sup> Professional license is defined as a license which qualified a driver to dedicate driving as a job, including driving a car, truck and bus according to these different driving vehicles' requirements distinctively.

(Siskind, 1996), especially focusing on driving behavior or accident risk over a long term S/R. It appears only Chang et al. (2006) explored administrative lifetime driver's license revocation (ALLR) and found that the percentage of such offenders who continue to drive is higher than those with short-term license S/R that may introduce one more societal inequity.

This study is a serial research of Chang et al. (2006). While Chang et al. (2006) explored the effectiveness of the ALLR and highlighted the appropriateness of the ALLR policy and its impact on offenders, the present study emphasized the driving behaviors and crash risk of the ALLR offenders after the ALLR had been imposed. For those offenders who were still driving, driving behaviors included driving alterations, reactions to encountering a police roadside check, and receiving a penalty such as a ticket were explored in this study. For offenders who completely gave up driving, transportation alternatives were also investigated. As to the crash risk under the ALLR, two objectives were highlighted. First, the punishment for an ALLR offender is much more severe than for a short term S/R offender, so the research question asked if drivers who drove under the ALLR penalty were more cautious and were a relatively lower crash risk than drivers who drove under a short term S/R penalty. Therefore, the present study quantified the crash rate under the ALLR and investigated the safety improvement that resulted from the effects of the ALLR. A general comparison of the safety effects between present ALLR and prior short-term S/R studies located in the literature demonstrated whether the ALLR drivers drive more carefully than short-term S/R drivers. Second, this study investigated all the ALLR offenders' driving crash records to explore what kinds of ALLR offenders were higher crash risks and what kinds of ALLR offenders were less of a crash risk. Therefore, logistic regression models were then employed to show how an offenders' crash risk was associated with their characteristics, penalty status, annual distance driven, and needs for driving. Finally, a general effectiveness of the ALLR, the opinion of the Taiwan constitutional court on this punishment, and the current development of the ALLR policy are discussed in this paper.

## 2. Methods

### 2.1. Data

The data source was the same as the previous study (Chang et al., 2006) that collected data from offenders who had been punished by ALLR as a result of being involved in either a hit-and-run offence causing death/or injury, or a drunk driving offence causing death/or serious injury in Taiwan from 1993 to 2002. There were 2554 drivers punished by ALLR. The ALLR population is shown in Table 1. Since these ALLR offenders were expelled from the Department of Motor Vehicles, objective records of driving behaviors and crash information were not available. Self-report data came from a two-stage survey collected from the ALLR offenders. In the first stage, a questionnaire census for all ALLR offenders from 1993 to

2002 was conducted in September of 2003. The information of the ALLR offenders' characteristics and their driving status were collected which included: (1) Basic personal characteristics: gender, age, marital status, income, education, and license category before revocation; (2) Penalty status: criminal penalty, civil compensation, and the time elapsed since license revocation; (3) Driving status: driving alterations, reactions of encountering police roadside checks (not stopped), penalty received when stopped by the police, transportation alternatives, and crash occurrence after the ALLR; and (4) Driving needs: the reasons for driving under the ALLR, including job activities (e.g. working and commuting) and family activities (e.g. shopping, traveling for touring/or leisure, visiting relatives/or friends and driving kids). In the second stage, annual distance driven was collected by a telephone interview by trained personnel. In addition, in order to determine a more accurate crash rate, crash information was further stated deeply by offenders in the second stage interview and compared with the first stage questionnaire. The percentage of questionnaires returned unclaimed by the postal service due to invalid addresses was 32%. A total of 895 questionnaires were collected. When the questionnaire return rate was corrected for those returned unclaimed, the actual return rate was 52%. There were 768 offenders who completed the two-stage survey, and this data was used in the final analysis (Table 2).

### 2.2. Measures and variables

Offenders' driving information included driving behaviors and crash events. For the driving behaviors while driving under the ALLR, responses when encountering a police roadside check (but not stopped), penalties for having been stopped by a police roadside check, driving alterations for offenders still driving, and transportation alternatives for offenders who completely gave up driving were collected with the questionnaire. For the accident risk under the ALLR, the research focused on two points. First, from a macro view, this study quantified the accident risk of the ALLR policy and compared these offenders' crash risk with that of previous short-term license S/R findings. Prior short-term studies quantified the drivers' driving risk performance based on a measure of fatality, injury, or property damage. Siskind (1996) found that the crash rate of short-term suspension offenders during periods of disqualification was about one third of the rate during legal driving. In this study, we quantified the crash rate of the ALLR offenders and compared it to the crash rate of legal driving. Then, the crash risk performance under the influence of the ALLR policy was analyzed. By comparing the crash risk performance between the ALLR policy and short term S/R that the previous study found, our hypothesis that drivers who drove under the ALLR might drive more carefully and have relatively higher safety performance records than drivers who drove under a short term S/R can be demonstrated. Second, from a micro view, this research investigated all the ALLR offenders' crash rate to explore the crash risk factors and identify what kinds of ALLR offenders drove unsafely and experienced more crashes,

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