



Modelling the choice and timing of acquiring a driver's license: Revelations from a hazard model applied to the University students in Toronto



Khandker Nurul Habib

Civil & Mineral Engineering, University of Toronto, Toronto M5S1A4, Canada

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ABSTRACT

The declining rate of acquiring drivers' licenses by young adults in developed countries has elicited concern among transportation researchers because of the potential consequences for future urban transportation systems. The study uses a dataset collected through a large-scale survey of the students of all four universities in Toronto. The specific aim of the study is to improve understanding of factors affecting the choice of acquiring driver's license by university students in Toronto. Unlike similar studies, it employs econometric approach for the disaggregate analysis using a unique dataset of social-economic, personal, transportation system and land use related variables. Results reveal that the living conditions of university students in the form of living with parents/family show the highest influence in delaying in acquiring drivers' licenses. However, the empirical model also identifies that better transit accessibility plays the second most critical role in delaying the choice of acquiring a driver's license. Public transit pass ownership is proven to be an important mobility tool that discourages the acquiring of drivers' licenses by the students. Students living in densely populated neighborhoods are more likely to delay or do not acquire a driver's license. Students who delay acquiring their driver's license may remain transit-users during their time as students and may also continue to have similar public transit use in future.

1. Introduction and background

The enthusiasm and the urgency felt for acquiring a driver's license by young adults started to decrease in developed countries in the early 1990s (Noble, 2005; Sivak and Schoettle, 2012a, 2012b, Hjorthol, 2016). Canada, like other developed countries, is also experiencing a gradual and consistent decline in the rate of driver's license acquisition by young adults between the ages of 15–35 (Sivak and Schoettle, 2011). Various stakeholders are concerned about the prospect of the next generation of workers becoming active in economic and social sectors with a smaller percentage holding driver's licenses compared to current and previous generations. This is also a concern to automobile manufacturers as it signals possible impending negative economic consequences or at least a shift in the economic landscape in developing nations. However, for transportation planners and public health officials, there is optimism that a decline in the reliance on private automobile means an increase in public transit ridership as well as an increase in walking and bicycling for transportation (Newman and Kenworthy, 2011; Metz, 2013).

Various factors have been posited as being responsible for the decline in acquiring a driver's licenses by young adults in developed countries. Among the most discussed factors are the increasing: cost of car ownership while delaying entry to full-time labour force;

E-mail address: khandker.nurulhabib@utoronto.ca.

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investment in public transport and active transportation infrastructures; and technological innovations that eliminate the need for physical travel for many activities, etc. (Delbosc and Currie, 2014; Hjorthol, 2016; Le Vine et al., 2014). It is also widely speculated that with the continuous creation of new electronic gadgets and the multitude of online activities, car ownership may no longer be perceived as an indicator of freedom, wealth or success by the current generation of young people compared to that of previous generations. In addition, changing patterns of living arrangements of young people in many developed countries, especially in terms of delaying leaving home and/or living with parents during student life may be a factor (Cobb-Clark, 2008).

From the perspective of transportation planning a declining rate of license acquisition by young adults is important as they are the next generation of workers and will, therefore, have a long-term influence on the needs and performance of future urban transportation systems. Among young adults, post-secondary students require particular attention for two reasons. First, this group will likely become leaders in the financial and technological sectors and will have a strong influence on many aspects of society (Zhou, 2012). Second, post-secondary students are a sub-group of the general population that are often under-represented in household travel surveys used in regional transportation planning and policy investigations (Lavery et al., 2013). For example, post-secondary students represent more than 5 percent of the total population of the Greater Toronto Area (GTA) and the Hamilton area. A large-scale (5 percent sample) household travel survey of this region, conducted by the *Transportation Tomorrow Survey (2011)*, captured 2 percent of the sample share that belongs to post-secondary students.

While research on driver's license acquisition by young adults in many developed countries are evident in literature, most of the studies are of descriptive in nature. Not enough empirical investigations are available that are based on reasoning or correlations between the choice and timing of driver's license acquisition and various socio-economic, transportation and land use factors. This paper contributes to the growing literature of empirical investigations on factors affecting the choice and timing of acquiring a driver's license by young adults. It uses a unique dataset collected jointly by the four universities in Toronto in 2015. The Ontario College of Art and Design (OCAD) University, Ryerson University, the University of Toronto and York University formed a team in 2015 to conduct a travel behaviour survey of 184,000 students. Its purpose was to obtain a better understanding of their travel behaviour by presenting a more accurate representation of their in regional travel in the GTA. The paper employs an advanced econometric model to investigate the factors that have a significant effect on the choice and timing of acquiring a driver's license by post-secondary students. Contrary to similar studies, it investigates role of detailed personal and household attributes as well as transportation and land use attributes. Results of the study provide a clear understanding of this group's travel-related behaviour and thus have robust policy relevance.

The remainder of the paper is organized as follows. The second section offers a brief review of the literature on empirical investigations of driver's license acquisition by young adults. The third section presents an overview of the dataset available for the current investigation. The fourth section contains the econometric formulation of the model used for empirical investigation. The fifth section discusses the empirical investigation. The paper concludes with key findings and recommendations for further research.

2. Literature review

The body of literature investigating the rate of driver's license acquisition by young adults and factors that influence the choice and/or timing of that acquisition is limited, but growing. The aspects of driver's license acquisition by young adults that have been investigated by the various researchers include low (or declining) acquisition rate of driver's licenses, the choices of acquiring a driver's license and the delay in acquiring licenses.

Noble (2005) investigated various factor for the low acquisition rates among young people in the United Kingdom (UK) and found that a lack of affordability of both owning and maintaining cars was the main reason. This used descriptive statistics of travel survey datasets for the investigation. The study found that the increasing cost of training for acquiring a license might affect the choice of not acquiring a driver's license. As well, they found that there was no evidence of environmental concern that might influence the choices of not acquiring a license. Such inferences are based on sample statistics without any basis of the econometric investigation. Delbosc and Currie (2013a) further examined the trend toward a decline in acquiring driving licenses by young people in developed countries and noted previous studies may have established only a preliminary understanding of these reasons and causes despite having identified a series of factors/variables identified. They used a sample survey of size 216 and descriptive statistics for their investigation. While the survey was innovative, a descriptive analysis of sample data does not reveal the confidence in the findings and interpretation.

Through a synthesis of relevant studies and exploratory data analysis in another study, Delbosc and Currie (2013b) identified several factors that influence the decrease in acquiring a driver's license by young people. These factors include: living situation (living with parents); delay in forming family; increasing costs of maintaining a private car along with a decrease in income; economic recession; increased range of public transportation services; environmental consciousness thereby perceiving a private car as not being environmentally friendly; not considering a private car as a status symbol; better electronic communication, etc. Additionally, they presented a synthesis of various studies that highlighted these reasons. Ruud and Nordbakke (2005) presented a similar synthesis of studies on the delay in acquiring licenses by young people. They identified it as an opportunity for public transportation to play the role of a mobility tool and to influence their future travel behaviour. They identified that living with parents and innovations in telecommunication technologies could deter young peoples' interest in driving a car as something beyond just a means of travel or a mobility tool.

McDonald and Trowbridge (2009) investigated the effects of land use characteristics of home locations on the choice of acquiring a driver's license by youth aged 16–19. They used a 2001 American National Household Travel survey data to evaluate the impacts of population density on the probability of acquiring licenses by youth. They used a data matching approach for the investigation and found that youths from densely populated neighborhoods are more likely to delay their acquiring of driver's licenses in the United States (US). Although results of such investigation reveal interesting results, these are mostly descriptive information of the specific

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