



# An empirical analysis of risk-taking in car driving and other aspects of life



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## ABSTRACT

The link between risk-taking behavior in various aspects of life has long been an area of debate among economists and psychologists. Using an extensive data set from Denmark, this study provides an empirical investigation of the link between risky driving and risk taking in other aspects of life, including risk-taking behavior in financial and labor-market decisions. Specifically, we establish significant positive correlations between individuals' risk-taking behavior in car driving and their risk-taking behavior in financial and labor-market decisions. However, we find that the strength of these correlations vary significantly between genders, and across risk decisions. These correlations and their differences across genders get stronger when we construct more "homogenous" groups by restricting our sample to those individuals with at least some stock-market participation. Overall, the empirical results in this study suggest that risk-taking behavior in various aspects of life can be associated, and our results corroborate previous evidence on the link between individuals' risk preferences across various aspects of life. This implies that individuals' driving behavior, which is commonly unobservable, can be more fully understood using observable labor market and financial decisions of individuals.

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## 1. Introduction

The existing literature in economics and psychology suggests that the risk-taking behavior of individuals manifests itself in a number economic decisions and behavioral tendencies.<sup>1</sup> To this end, some studies have investigated whether risk-taking behavior is systemic to many behavioral decisions or is isolated to specific decisions or sub-groups of decisions. As suggested by Dohmen et al. (2011) and Einav et al. (2012), economists commonly argue that some underlying personality trait associated with general risk-taking behavior of individuals defines risk preferences across various aspects of life. However, other studies from the psychological literature document that risk-taking behavior can be isolated to specific decisions (for example, Weber et al., 2002). Along this line, some psychological studies associate individuals' inherent risk-

taking behavior with risky driving behavior (Constantinou et al., 2011; Sümer, 2003; Ulleberg and Rundmo, 2003). These studies argue that personality traits and associated risk-taking behavior are good predictors of risky-driving behavior, including driving beyond the speed limit and driving under the influence of alcohol. Despite previous research efforts, there exists substantial debate among economists and psychologists as to whether risk preferences are generic or domain-specific. This debate is further complicated by differences in risk aversion between males and females and the influence of unaccounted heterogeneities.<sup>2</sup>

This paper seeks to provide some empirical insight into the risk-preference debate by studying the relationship between observed driving risk and risk-taking behavior in financial and labor-market decisions. Studying the linkages between risk-taking behaviors in various aspects of life could potentially improve our under-

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<sup>1</sup> For example, Jaeger et al. (2010) find that the risk-taking behavior of individuals is associated with migration decisions, while Bonin et al. (2007) associate it with occupational choice.

<sup>2</sup> For example, some previous studies provide strong evidence for general gender differences in financial risk-taking behavior (Jianakoplos and Bernasek, 1998; Meier and Penz, 2008; Charness and Gneezy, 2012; Halko et al., 2012), and there are a number of research efforts from the accident-analysis literature that show strong gender differences relating to risky driving (Ulfarsson and Mannering, 2004; Islam and Mannering 2006; Morgan and Mannering, 2011; Behnood et al., 2014).

standing of the underlying behavioral mechanisms that define individuals' risk preferences. For example, it could potentially enhance our understanding of the neuropsychological and cognitive mechanisms underlying aggressive and risky driving. Such an investigation provides information relating to risky-driving behavior for insurance companies and governmental transportation safety agencies, which often have incomplete information relating to car users' driving behavior. This information may enable them to use indirect information on car users' risk-taking behavior in other aspects of life to better estimate risky-driving behavior and hence establish tailored insurance premiums.

We are not the first to investigate the link between driving behavior and risk-taking behavior in other aspects of life. Grinblatt and Keloharju (2009) examined the link between sensation seeking (measured by the number of speeding tickets) and trading activity (stock market participation). Our work extends this study by considering other unexplored dimensions of life and using different measures of driving, financial, and labor-market risk preferences. Having access to information on vehicle-kilometers driven (driving exposure) allows us to avoid potential endogeneities that may arise from heterogeneities associated with driving exposure. Unlike many previous studies which are based on small-scale interventions, our study is based on a large administrative sample which sufficiently allows for estimating the associations in risk-taking behavior across sub-groups of our data sample.

To examine the link between risky driving and risk-taking in other aspects of life, we compile a large data set from Denmark (by merging various registers including income/wealth, crime, car ownership and car inspection databases). These detailed data provide common measures and proxies for risk preferences in car driving, financial matters and labor-market decisions. As is standard practice in the finance literature, individuals' portfolio allocation (individuals' share of financial wealth allocated in risky assets) is used as a measure of financial risk taking. With regard to labor-market decisions, individuals' demand for unemployment insurance, reflecting their propensity to mitigate the effects of potential unemployment, is used as a measure of risk in labor-market decisions (Einav et al., 2012; Acemoglu and Shimer, 1999; Cohen and Einav, 2007). As for driving behavior, the annual traffic-offense data for Denmark are used to construct measures and indicators of risky-driving behavior. We will consider a number of alternative measures of risky-driving behavior and stock-market participation.

To quantify the association between these three measures of risk (driving, stock-market participation, and unemployment insurance), we estimate a series of trivariate models (to account for possible correlations among the various risk indicators). As will be shown, the estimation results indicate significant association between individuals' driving risk and their risk-taking behavior in financial and labor-market decisions. We particularly find a positive association between risk preference in car driving and financial risk-taking. Similarly, our findings show that risk-taking in car driving is negatively associated with demand for unemployment insurance, which in turn implies a positive association between risk preferences in car driving and labor-market decisions. However, the strength of these correlations varies between genders, across aspects of life, as well as across alternative measures of risk-taking behavior. These correlations get stronger when we construct more "homogenous" groups by restricting our sample to those individuals who have some stock-market participation, for example. Overall, the empirical results in this study suggest that risk-taking behavior in various aspects of life can be associated, and our results corroborate previous evidence on the link between individuals' risk-taking behavior across various aspects of life (Adams et al., 2014; Dohmen et al., 2011; Einav et al., 2012; Viscusi and Hersch, 2001). More specifically, these results corroborate recent studies

which argue that risk attitudes and risk-taking behavior in other aspects of life may help guide transportation and safety policies (Dixit et al., 2014, 2015).

The remainder of the paper begins by providing a review of the existing practices in measuring risk-taking behavior in various aspects of life. Then the data and sampling design are presented, followed by a description of the empirical estimation approach and model estimation results. The paper concludes with a summary and a discussion of the implications of the results.

## 2. Measuring risk-taking behavior in various aspects of life

### 2.1. Measuring risky driving

Psychologists use various measures of risky driving, commonly constructed from survey responses covering different aspects of driving behavior (Reason et al., 1990). Most of these measures are based on stated responses of drivers with regard to their safety attitude, safety skill, propensity to commit driving violations, and their general tendency to follow traffic laws. Previous studies have shown that these factors are potential predictors of traffic accidents and negative driving outcomes (Constantinou et al., 2011; Sümer, 2003). These indicators of unsafe driving behavior are, in turn, commonly manifested in traffic violations, and hence recorded as traffic offenses by the police. Our study uses these police-recorded traffic offenses as revealed (actual) measures of risky-driving behavior.<sup>3</sup> Traffic offenses are expected to be good measures of risky driving (and are frequently used by insurance companies to determine drivers' insurance rates), and thus are well-suited for the purpose of investigating the link between risky driving and risk-taking behavior in other aspects of life. This is particularly appealing for the reason that traffic offenses are objective measures of risky driving reported by third-party.

The annual traffic-offense database for Denmark provides detailed information on car users' frequency of traffic offenses, the types of traffic offenses, and the severity of these offenses. Following these traffic penalties, we consider two measures of risky driving; the number of traffic offenses committed per 100,000 kilometers driven over the study period, and the probability of committing more than one traffic offense over the study period. The first measure focuses on the total number of traffic offenses (for a given driving exposure measured in kilometers driven), which accounts for exposure affects. The second measure focuses more on habitual behavior by defining risky driving as the accumulation of two or more traffic offenses during the study period. The idea with the second measure is to distinguish between what might be considered an isolated event (committing just one traffic offense) and a measure that may be more reflective of pervasive risky-driving behavior (committing two or more offenses).

### 2.2. Financial risk taking

The standard finance literature typically uses portfolio allocation of individuals as a measure of financial risk-taking behavior. Specifically, individuals' share of wealth allocated in risky assets

<sup>3</sup> In Denmark, police enforce traffic rules using automated mobile-speed cameras making it difficult for risky drivers to systematically avoid traffic offenses by using countermeasures to traffic-law enforcement. This is in contrast to many other countries that have a high reliance on traditional traffic enforcement where risky drivers can reduce their probability of accumulating traffic offenses by investing in radar detectors and laser jammers which makes it difficult for law enforcement agencies to detect speeding.

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