



Stated and revealed heterogeneous risk preferences in educational choice



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ABSTRACT

We develop a structural microeconomic model of educational choice with unobserved heterogeneity in risk aversion and estimate the model parameters using panel survey data. We assess the credibility of the model by linking the estimated structural parameters of risk aversion to the self-reported willingness to take risks, which is directly elicited in the survey. The risk aversion parameters revealed from educational choices decrease with the willingness to take risks stated by the survey respondents. This indicates consistency between stated and revealed risk preferences. We suggest that this method could be applied more generally to support or reject the joint validity of structural models and survey measures of preferences.

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1. Introduction

Traditionally, economists estimate preference parameters such as risk attitudes and time discount factors from the observed choices of economic agents using structural utility based models. The choice data used for estimation may be collected from the observation of naturally occurring activity, or may be extracted from controlled and incentive-compatible experiments. The latter method, especially if applied in a lab, often gives rise to discussions about external validity,¹ in no small part because incentives are typically small in comparison to the stakes involved in major economic decisions that occur naturally. Another approach, which has become popular among economists more recently, is to directly ask respondents for their preferences and attitudes in a survey. Such preference questions can easily be included in large and representative surveys at a relatively low cost, and the response data can flexibly be combined with any other information elicited in the survey, enabling a broad spectrum of possible analyses. However, the relationship between respondents' answers to a non-incentivised survey question and their actual behaviour in the real world, especially when it comes to important decisions with high stakes involved, is an issue of lively debate and an important research topic.

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¹ In the context of social preferences, cf. [Levitt and List \(2007\)](#) and [Voors et al. \(2012\)](#).

An emerging literature in this context compares survey measures of preferences to preferences revealed in incentivized experiments. [Dohmen et al. \(2011\)](#) consider survey measures of risk attitude used in the German Socio-economic Panel (SOEP), a large, representative household survey. In the “general risk question”, respondents are asked to self-report their willingness to take risks in general on a scale from 0 to 10. In a field experiment with 450 individuals, the authors contrast the answers to this question with paid lottery choices. They conclude that the self-reported willingness to take risks is a good predictor of actual risk taking behaviour in the experiment.² In a similar vein, and also based on the SOEP, [Vischer et al. \(2013\)](#) compare a simple survey measure of self-reported patience with experimentally elicited inter-temporal choices and find that both approaches give consistent results. While these studies increase confidence in the survey measures, it remains a largely open question how stated preferences relate to revealed structural preference parameters governing naturally occurring economic choices in real large stake situations.³

To shed more light on this question, in this paper we study one of the most important and far-reaching decisions taken by young persons: the choice to start university education. This decision involves forecasting and comparing future income streams that would occur with and without a university education. The decision context is risky because future income is clearly uncertain, and income risk may differ between university graduates and less educated workers. Therefore, the decision to begin tertiary education involves risk preferences. At the same time, the decision to enrol in university implies a trade-off between foregone labour income during the study period and higher labour income later in life, and thus also depends upon time preferences. Based on the SOEP data mentioned above, we estimate a structural microeconomic model of the probability of university enrolment conditional on the expected value and the variance of individually forecasted future after-tax income streams in both career path alternatives. These moments of future income are estimated based on individual information available at the time of the enrolment decision and not on ex-post income realizations, which would bias results ([Cunha et al., 2005](#); [Cunha and Heckman, 2007](#)); furthermore, we account for multiple non-random selection.⁴ Estimation of the model based on the observed educational choices reveals two core structural preference parameters: The Arrow–Pratt coefficient of constant relative risk aversion (CRRA) and a utility discount factor as a time preference parameter. [Andersen et al. \(2008\)](#) stress the importance of eliciting risk and time preferences jointly to avoid biased estimates.

For the first time in a structural empirical model of university enrolment with taxation, and going beyond prior work by [Fossen and Glocker \(2011\)](#), we allow for unobserved heterogeneity in the risk aversion coefficient. [Harrison et al. \(2007\)](#) conclude from their field experiments that one should not assume the same attitudes to risk for all individuals in contexts with uncertainty, and [Harrison et al. \(2007\)](#) as well as [Dohmen et al. \(2011\)](#) also stress heterogeneity in risk aversion. We identify two latent classes of potential university entrants, one pertaining to a more risk-averse and one to a less risk-averse type. We specify the individual probability of belonging to one of the two latent classes as a function of the stated general willingness to take risks. This approach is similar to that of [French and Jones \(2011\)](#), who allow for latent classes with heterogeneous parameters of consumption and time preferences in a structural model of retirement behaviour and specify the probability of belonging to these classes in terms of an index built from three survey questions on a person’s stated willingness to work. The results from estimating our university enrolment model indicate that those young persons who self-report a low willingness to take risks in the survey are more likely to belong to the latent class with a higher revealed risk aversion. This indicates consistency between the risk preferences revealed from educational choices and the stated risk preferences in the survey.

The main contributions of our paper to the literature are thus the following: First, we introduce a new method for cross-checking utility parameters in structural models, which are revealed from major naturally occurring choices, with stated preference measures from surveys. The high correspondence between revealed and stated preferences that we find increases confidence in both the interpretation of the structural parameter (which is estimated from educational choices, not from an experiment) as revealed risk aversion (and not as reflecting some other features of the data) and the behavioural relevance of the survey measure of risk preferences. More generally, we demonstrate how the plausibility of heterogeneous preference parameters in structural models describing real-world behaviour can be assessed by employing stated preference data. Conversely, our method allows us to probe the relevance of survey measures of preferences for major economic choices that occur naturally, as a complement to existing experimental techniques. A finding of inconsistency between revealed and stated preferences would reject the joint validity of the structural model and the survey measure of preferences.

Second, in the context of education and tax policy, our contribution is to provide an estimated structural model of university enrolment that has been cross-checked in the way described and that can be used to simulate the effects of policy scenarios on university enrolment rates, taking into account the important heterogeneity in risk aversion of potential students. We illustrate this by simulating elasticities of university enrolment with respect to the expected value and the variance of after-tax income in the alternative career paths with and without a university education.

This paper speaks to several strands of literature. A growing literature links stated or experimentally elicited risk preference measures to naturally occurring real outcomes. After having established the predictive power of the self-reported

² A qualification is that different instruments are used in the survey question and in the experiment, and the latter may reflect the underlying latent risk aversion in a non-linear way.

³ In this paper we refer to stated risk preferences as the willingness to take risks directly stated by survey respondents, and to revealed risk preferences as the Arrow–Pratt coefficient of relative risk aversion, which is econometrically estimated from choice data. Thus preferences in this sense do not refer to the option chosen or indicated as preferred, but to underlying risk attitude.

⁴ Our approach differs from eliciting subjective beliefs on future income from students. We discuss this in [Section 3.2](#).

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