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Title

What you don't see can't hurt you? Panel data analysis and the dynamics of unobservable factors

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Abstract

Standard models used to analyse panel data include fixed- and random-effects regression, conditional logit and random-effects ordered logit and probit, in static and dynamic forms. This wide range of statistical methods share a common feature: they assume the existence of individual-specific factors which are unobserved and time-invariant. The time-invariance assumption is important, since it allows these methods to capture the impact of important unobservable characteristics in any period t, by using observations on the same individual from other periods s. But what happens if the assumption of perfect persistence is incorrect?

This question is particularly important for studies of young people, for whom there is considerable evidence that the developmental process by which personal characteristics are formed continues well into the period in which the individual is at risk of initiation into drug use or criminality. We explore the possible consequences of mistakenly assuming that unobservable characteristics are perfectly persistent, using data from the 2003-6 UK Offending Crime and Justice Survey. We first develop and estimate by simulated maximum likelihood a dynamic latent factor model. We then use it to assess the biases that would be encountered in estimating spuriously causal models of the soft drug-hard drug "gateway", using misspecified models that assume fully persistent individual effects.

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