Employment trajectories in the presence of measurement error. An application using Mixed Hidden Markov Models

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Inspired by the work of Abbott (1983) social scientists attempt more and more often to describe and explain social phenomena using a processual approach. In more detail, researchers produce sequence typologies of employment status (Mattijssen & Pavlopoulos, 2019) or marital status (Elzinga & Liefbroer, 2007). This research has ignored so far the presence of measurement error in the data that is used. Even rich register data – that are highly suitable to analyse trajectories – contain measurement error due to administrative delays, reporting errors and failing software. Research has shown that this error can have severe consequences on the estimation of transition rates (Pavlopoulos & Vermunt, 2015) but can also bias typologies that result from processual approaches (Garnier-Villarreal & Pavlopoulos, 2022). In this paper, we propose a Mixed Hidden Markov Model that can simultaneously correct for random and systematic misclassification error in different (non)employment statuses and types of employment contract and classify (error-corrected) employment trajectories into different clusters. This model is applied on a unique register dataset with information on individuals living in the Netherlands from 2007 until 2015.

Our results confirm that measurement error can bias mobility measures: almost half of the observed transitions from employment with a fixed-term contract to a permanent contract and from employment with temporary work agencies or with an on-call contract to a permanent contract is due to misclassification error. Results show further the existence of 10 clusters (mixtures) that differ considerably both in the latent initial state probabilities and in the latent transition probabilities. 4 of these states can be rather seen as 'noise' states as they are extremely small and have erroneous transition probabilities. The other 6 clusters correspond to different segments of the labour market with different patterns of moving to or out of insecure employment and non-employment.

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