

## Practical fixed-effects estimation methods for the three-way error-components model

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**Abstract.** Methods for fixed-effects estimation of the three-way error-components model are not yet standard. Where possible, we make the fixed-effects methods originally developed by Abowd, Kramarz, and Margolis (*Econometrica* 67: 251–333) for linked worker–firm data more accessible. We also show how these methods can be implemented in Stata. There is a caveat, however. If the researcher wants to recover estimates of the error components themselves, and the number of units at the higher level of aggregation is large, memory or matrix constraints may make using Stata to estimate the components themselves infeasible.

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