Do Macroeconomic Variables Help Predict International Migration?
Insights from Bayesian VAR 'General-to-Specific' Modelling

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The paper addresses the issue of forecasting international migration with the help of two important theory-based macroeconomic predictors: income differentials (a pull factor) and unemployment (a push factor). The analysis is performed within the Bayesian vector autoregression (BVAR) framework and follows Hendry's (1995) 'from general to specific' approach to model selection. In BVAR processes, predictive uncertainty stems not only from forecasting migration and its determinants, but also from the randomness of interactions between particular variables, embodied in the parameters of the forecasting model. The Bayesian paradigm additionally enables small-sample inference, while allowing to include prior information about the model structure.

The discussion is illustrated by forecasts of long-term migration flows between Germany and Poland, Italy, and Switzerland, prepared for 2005–2015 on the basis of macro-level data from the population registers. The macroeconomic variables used include two important determinants in the light of the empirical research of Jennissen (2004): differences in GDP per capita (PPP-adjusted), a proxy for income differentials, as a pull factor of migration, and unemployment in the sending country, as a push factor.

In the current study, BVAR processes of order 1 are considered, and the impact of additional variables on migration intensity is assessed both with a one-year time lag, as well as instantaneously, through the covariance matrix of the random component. In both cases, the Lindley's Bayesian test (Zellner, 1971: 298–302) is applied, in this case being a variant of traditional sampling-theory Wald's significance test for linear restrictions on parameters. If the null hypothesis on the lack of impact of additional determinants on migration cannot be

rejected, the initial (general) BVAR model can be reduced to a marginal AR(1) process for migration intensities, according to the 'from general to specific' modelling paradigm.

Results of Lindley's tests indicate a lack of significant impact of the two determinants on migration flows, neither lagged, nor instantaneous (conditional). However, this conclusion, which at first sight seems contrary to migration theory, as well as empirical observations especially for Polish-German migration needs to be treated with caution. Firstly, a general conclusion about the lack of impact of important macroeconomic variables on migration would be too far-going, given the limited information provided by the data samples. A more appropriate supposition would be that available migration statistics do not allow for empirical testing of particular theories concerning long-term relationships between particular variables, such as their cointegration. Nevertheless, additional socio-economic covariates can contribute to prediction-making, at least with respect to the construction of formal and probabilistically coherent what-if scenarios based on conditional forecasts.

Secondly, even if (hypothetically) the reductions of general VAR models to marginal AR processes proved to be illegitimate, which would suggest that forecasting can include variables recommended by the theories, the price to pay would likely be an extremely high predictive uncertainty, far exceeding any reasonable quantities. In contrast, unjustified reductions could potentially lead to errors and discrepancies both in the central tendencies, as well as in the ex-ante assessments of uncertainty spans. Summing up, the outcomes obtained in the empirical example seem to be primarily attributable to the weak statistical properties of samples, yet they also confirm the hardly predictable character of international migration.

References:

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