Predicting Recessions with Bivariate Dynamic Probit Model: The Czech and German Case

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Abstract : Recession of an economy has a profound negative effect on all involved stakeholders. It follows that timely prediction of recessions has been of utmost interest both in the theoretical research and in practical macroeconomic modelling. Current mainstream of recession prediction is based on standard OLS models of continuous GDP using macroeconomic data. This approach is not suitable for two reasons: the standard continuous models are proving to be obsolete and the macroeconomic data are unreliable, often revised many years retroactively. The aim of the paper is to explore a different branch of recession forecasting research theory and verify the findings on real data of the Czech Republic and Germany. In the paper, the authors present a family of discrete choice probit models with parameters estimated by the method of maximum likelihood. In the basic form, the probits model a univariate series of recessions and expansions in the economic cycle for a given country. The majority of the paper deals with more complex model structures, namely dynamic and bivariate extensions. The dynamic structure models the autoregressive nature of recessions, taking into consideration previous economic activity to predict the development in subsequent periods. Bivariate extensions utilize information from a foreign economy by incorporating correlation of error terms and thus modelling the dependencies of the two countries. Bivariate models predict a bivariate time series of economic states in both economies and thus enhance the predictive performance. A vital enabler of timely and successful recession forecasting are reliable and readily available data. Leading indicators, namely the yield curve and the stock market indices, represent an ideal data base, as the pieces of information is available in advance and do not undergo any retroactive revisions. As importantly, the combination of yield curve and stock market indices reflect a range of macroeconomic and financial market investors' trends which influence the economic cycle. These theoretical approaches are applied on real data of Czech Republic and Germany. Two models for each country were identified – each for in-sample and out-of-sample predictive purposes. All four followed a bivariate structure, while three contained a dynamic component.

Keywords : bivariate probit, leading indicators, recession forecasting, Czech Republic, Germany