Research activities and output by Gianni Amisano, January 2007 to February 2010

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My research activity at the ECB in the last 3 years has focussed on 4 different directions:

1. forecasting evaluation and optimal model combination in macro and finance;
2. modelling breaks and time varying mechanisms, Markov Switching and smooth transition models
3. Estimation of nonlinear DSGE models to model risky assets; effects of time varying volatilities on risk premia;
4. estimation of nonlinear panel data models with unobserved heterogeneity.

1 Forecasting evaluation and optimal model combination

I have worked mainly on the evaluation/combination of models under the viewpoint of their predictive density. I have produced 4 papers in this line of research.

In paper ([4]), joint with Giacomini, we develop a simple test of equal density forecasting ability of competing models and apply that to the comparison between a linear and a Markov Switching Phillips curve for the US.

Paper ([16]), joint with Geweke, shows how to compare competing financial time series models using various predictive density metrics.

In paper ([17]), joint with Geweke, we construct optimal prediction pools that mimic the behaviour of unknown DGPs. In the pool of models being considered, we do not assume to have necessarily the "true" one. The application is on predictive models of daily financial returns.

In the paper ([3]), we construct optimal prediction pools of US macro variables using a model span consisting of DSGE, VAR and dynamic factor models.

2 Models with time discontinuities, Markov Switching and smooth transition models

I have worked on different projects involving models with time variation in the parameters.

In particular, my paper ([15]), joint with Geweke, generalises the concept of Markov Switching model to define mixtures of non-Gaussian distributions. This seems to be particularly useful for modelling financial time series data with low serial correlation but substantial skewness.

In paper ([14]), joint with Tronzano, I have worked on producing time varying measures of ECB reputation, using recursively estimated Baysian autoregressions to capture variations in the perceived real interest rate.

In paper ([2]), joint with Fagan, we produce probabilistic early warning signals on the risk of leaving the low inflation state by using Markov Switching models with transition probabilities which depend on monetary growth variables. At the moment we are working on a multivariate extension which can be used to give signals of risks in several contexts (foreign exchange, stock market, fiscal crises).

In the paper ([1]), joint with Casarin, we have a bivariate stochastic volatility model with drifting volatilities and potential discrete shifts in the correlation. We use the model to compose optimal bivariate portfolios and optimal hedging ratios.

In the paper ([10]), joint with Savona, we use a CAPM approach to describe time variation of excess returns on several US assets. The betas are stochastic function of predictive state variables which model how exposure to market risk varies. There are leverage effects connecting unpredictable variation in betas and the asset specific measures of risk.

In the paper ([5]), joint with Giammarioli and Stracca, we run a counterfactual experiment asking whether Italy would have been better off not to join the monetary union. We use a smooth transition VAR model and we conclude that had Italy stayed out, it would have achieved marginally higher growth but it would have been exposed to substantially higher inflation and exchange rate risks.

I am also getting back to an old research topic of mine, Bayesian time varying parameter (TVP) models.

In paper ([6]), joint with Giannone and Lenza, we use alternative restrictions on the covariance matrix of the shocks hitting the coefficients to obtain more efficient forecasts.

In paper ([9]), joint with Justiniano and Primiceri, we estimate a Bayesian TVP model in which coefficients shocks have a factor structure. This is also shown to improve quality of forecasts

3 Estimation of nonlinear DSGE models for financial asset variables

We use nonlinear DSGE models to obtain microfounded pricing kernels to price risky assets. In order to produce non zero and time varying risk premia, we found that a satisfactory specification has the following elements

1. the solution approximated to include nonlinear terms (to get nonzero risk premia);
2. structural shocks have Markov switching movements in their variances;
3. agents are characterised by a flexible Epstein and Zin utility function which separates risk aversion and intertemporal elasticity of substitution and allows for habit formation.ristani, which shows how to do

Estimation is carried out by a Bayesian approach that requires use of simulation based filtering. We describe this approach and its shortcomings in a simple model in the paper ([11]), joint with Tristani.

In paper ([12]), joint with Tristani, we show how the complications of simulation based filtering can be avoided in situations in which the number of shocks in the model equals the number of observable variables.

Paper ([13]), joint with Tristani, uses a nonlinear DSGE model with regime shifts in the variance to price nominal bonds for the US. We find significant risk premia which vary principally driven by changes in the volatilities of underlying structural shocks.

4 Estimation of nonlinear panel data models with unobserved heterogeneity

Joint with Giorgetti, we have produced paper ([7]) in which we estimate a Bayesian panel probit model to model entry decisions of firms in the pharmaceutical market. The approach allows for unobserved heterogeneity potentially correlated with observed firm characteristics.

In the paper ([8]), with Giorgetti, we use the same dataset and the same methodology to assess the relevance of market concentration in order to determine entry decisions.

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