Discussion on

Dynamics or diversity? An empirical appraisal of distinct means to measure inflation uncertainty

by Matthias Hartmann and Helmut Herwartz

Discussant: Christian Conrad

Heidelberg University

Uncertainty and Forecasting in Macroeconomics
June 02, 2012

Motivation

- comparison of alternative times series based uncertainty measures
- dynamics (benchmark AR model) vs. diversity (AR-X models and **not survey expectations**)
- ‘new’ approach to evaluating alternative inflation uncertainty measures

Baseline model: (recursive) AR(1)

$$\pi_{t+l} = \alpha_0 + \alpha_1 t + \alpha_2 \pi_t + \epsilon_{t+l}$$

and $\hat{\pi}_{t+l|t}$ for $l = 1, 2, 3, 4$ and 18 countries
Extensions: output gap, money growth, oil price, inflation gap

Uncertainty

Uncertainty measures

- dynamics
  - predictive standard deviation ($\hat{\sigma}_{\tau+l|\tau}$)
  - exponential smoothing
  - unanticipated volatility (ex-post)
- diversity
  - disagreement
  - average uncertainty ($\bar{\sigma}_{\tau+l|\tau} = 1/J \sum_{j=1}^{J} \hat{\sigma}_{\tau+l|\tau}$)
  - combinations of disagreement and average uncertainty/exponential smoothing

Benchmark uncertainty measures

- GARCH(1,1)
- ZEW survey expectations

Empirical Results

Descriptive analysis

- stronger correlation between dispersion than between dynamic measures
- average uncertainty most strongly correlated with GARCH measure
- reduction in uncertainty in 1990s and early 2000s (Great Moderation)
- after 2008: dynamic measures signal uprise in uncertainty, dispersion measures do not

Forecast evaluation

$$R_{\tau+l} = \gamma_{10} + \gamma_{11}\tau + \gamma_{12}(L)\pi_\tau + \gamma_{13}(L)R_\tau + \gamma_{14}(L)IU_{\tau+l|\tau} + e_{\tau+l}$$

- combined predictor $\widehat{R}^{\bullet}_{i,\tau+l|\tau}$ (BMA), comparison based on $TOP3^{\bullet}$
- average uncertainty is most informative predictor (longer forecast horizons, turbulent times, high inflation rates)
- $\widehat{\gamma}_{14}(1) > 0 \Rightarrow$ inflation risk premium

Specific Comments I

Data

- real-time instead of revised data (Chua et al., 2011)

Benchmark uncertainty measures

- ZEW (qualitative) survey data might be 'bad' benchmark
  $\Rightarrow$ Consensus Economics (point forecasts), ECB SPF (density forecasts), financial market indicators (e.g. inflation-linked swaps)
- GARCH(1,1):
  - Friedman hypothesis: inflation uncertainty increases with the level of inflation (level effect in GARCH models)
  - asymmetry, i.e. positive inflation shock (higher than expected inflation) increases uncertainty more than negative inflation shock of the same size

Baseline models

- inflation uncertainty may affect the level of inflation
- multivariate specifications (Chua et al., 2011)

Specific Comments II

Forecast Evaluation

- 'arbitrary' choice of Fisher relation for selection of uncertainty measure
  - investment (Byrne and Davis, 2004)
  - output growth (Grier and Perry, 1998, 2000, 2004)
  - asymmetric loss function (Capistran and Timmermann, 2009)
  - ...
- current sovereign debt crisis as motivation for looking at the effect of inflation uncertainty on government bond yields $\Rightarrow$ proxy for macro uncertainty in general/default risk
- include output gap

Combining disagreement and GARCH (Lahiri and Sheng, 2010)

- overall forecast uncertainty = common shocks + idiosyncratic shocks
  imprecision in idiosyncratic information = disagreement
  imprecision in common information (aggregate shocks) = GARCH

  Relation of $\hat{s}_{\tau+l|\tau}$, $\bar{\sigma}_{\tau+l|\tau}$ and $h^{(\lambda)}_{\tau+1|\tau}$ to idiosyncratic/common information?
  - compare with survey measures

General Comments

- **previous literature:** times series (dynamics, mainly GARCH) vs. survey (dispersion, mainly disagreement) based uncertainty measures
  here: dispersion of time series based uncertainty measures (in addition: nested models)
  What do/can we learn about dispersion measures for survey data?
- uncertainty measures based on backward-looking information (lagged inflation rates, output gap, . . .) vs. forward-looking content of survey expectations

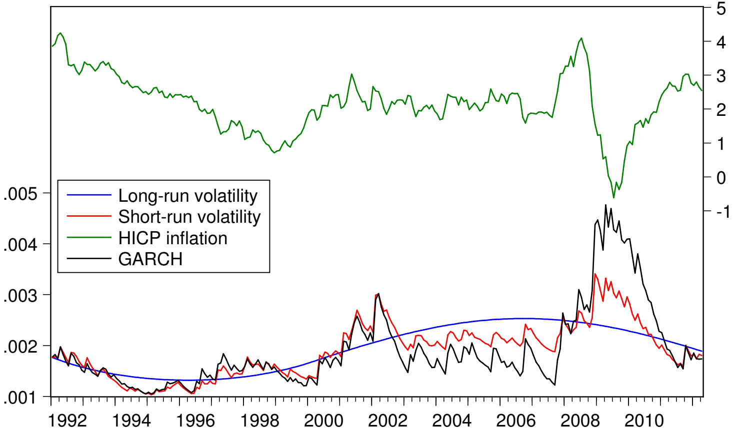
  for central banks medium to long-term inflation expectations/uncertainties are most important

$$\mathbf{Var}_A[\pi] = \mathbf{E}[\sigma_i^2] + \mathbf{Var}[\mu_i]$$

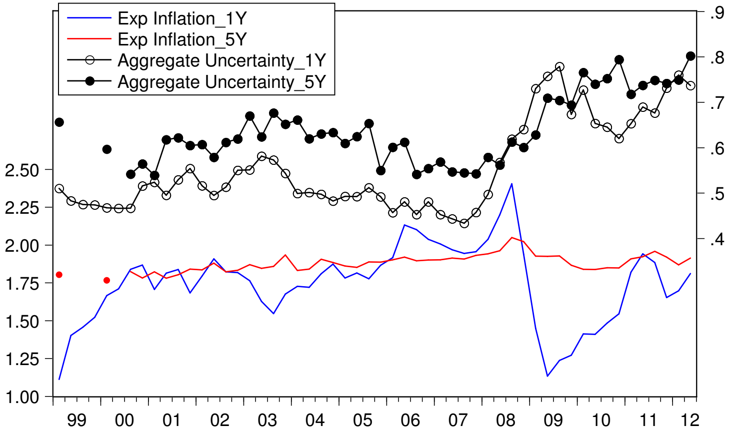
  inflation might be easy to predict, but inflation uncertainty can be high

  Lahiri and Liu (2005): differences between GARCH and survey uncertainty (disagreement responds) during turbulent times

GARCH and Spline-GARCH

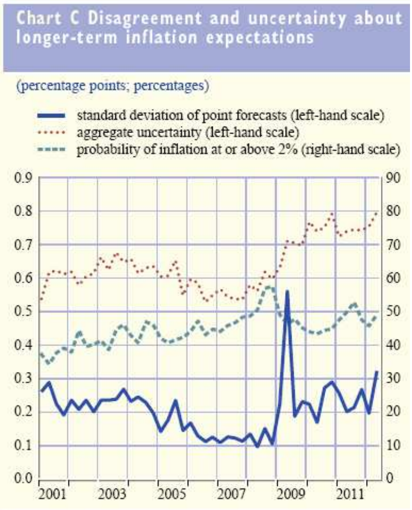


ECB SPF



Exp Inflation_1Y
Exp Inflation_5Y
Aggregate Uncertainty_1Y
Aggregate Uncertainty_5Y
2.50
2.25
2.00
1.75
1.50
1.25
1.00
.9
.8
.7
.6
.5
.4
99
00
01
02
03
04
05
06
07
08
09
10
11
12

ECB SPF



Source: ECB.
Note: Aggregate uncertainty is defined as the standard deviation of the aggregate probability distribution (assuming discrete probability density function with probability mass concentrated in the middle of the interval).

Long-Run Uncertainty

- component models: short- vs. long term uncertainty

$$h_t = g_t \tau_t(\mathbf{z}_t)$$

  (Engle et al., 2012)
- beyond second moments: 'tails of inflation'
  Ghysels et al. "inflation-at-risk"