Comment on "Predicting Inflation: Professional Experts Versus No-Change Forecasts"

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Deutsche Bundesbank workshop on "Uncertainty and Forecasting in Macroeconomics",
Eltville am Rhein, 1-2 June 2012

Some background

- The starting point is Ang, Bekaert, and Wei (2007) “Do macro variables, asset markets, or surveys forecast inflation better?”. The answer was “Surveys do!”.
- Do more complex/expensive forecasting techniques provide value added compared to simplistic forecasts? Atkeson and Ohanian (2001) for 1984–99: Phillips curve-based forecasts were no better than a naïve no-change forecast (the rate of inflation over the last year).
- Federal Reserve Bank of Philadelphia technical documents released regularly (authored by Tom Stark) compare SPF predictions with predictions from some simple time-series model (no-change, AR)

Description of the paper

- The simplistic forecast of choice is probabilistic no-change (PNC) forecast: sample distribution of the observations for the last 20 quarters.
- Data: The U.S. CPI data "vintages" and the Survey of Professional Forecasters (SPF) CPI forecasts. Inflation is predicted at $h = 1, \ldots, 5$ quarters horizon (or should it be $h = 0, \ldots, 4$ quarters?).
- The raw SPF forecasts vs. no-change forecasts (Section 2). The comparison is based on MAE and CRPS (a scoring rule for forecasts in a form of complete distribution).
- Survey postprocessing. Postprocessed and combined forecasts vs. no-change forecasts (Section 3)
- Robustness check (Section 4)

Description of the paper

The main conclusion of the paper

For $h > 1$ the PNC forecasts are competitive to the raw SPF forecasts and postprocessed SPF forecasts. In terms of CRPS the PNC forecasts are significantly better than the raw SPF forecasts (the raw SPF ensembles are too concentrated).

The conclusion is interesting and important. Somewhat similar to Atkeson and Ohanian (2001). The paper tells us that it is important to compare any new shiny sophisticated forecasting technique with simple (~~stupid~~) forecasting techniques.

Discussion

- Currently the paper is unfocused. The main message is about the good performance of the PNC forecast. However, it also underlines forecast postprocessing and forecast combination.
- The section on robustness (sub-periods exercise) is somewhat too technical and thus somewhat boring. (However, it is important. Beware the huge 2008Q4 negative outlier).
- The period considered is too short (1995Q3–2010Q1).
  The conclusion of the good performance of the PNC forecast can break in other periods. The persistence of the U.S. inflation gradually changes!
  Suggestions: In addition to the SPF utilize other surveys: GNP/GDP deflator predictions from SPF, Livingston survey.

A remark on the SPF design

It is more useful to predict price level after several quarters rather than inflation in some future quarter.
What would be more important to know: average inflation over the next 10 years or inflation rate in a single quarter 10 years later?
Can we change this with the available SPF data? Is it meaningful to cumulate survey forecasts for successive quarters to predict overall price change over these quarters?

A suggestion: AO no-change forecast

An analogue of Atkeson and Ohanian (2001) no-change (“random walk”) forecast is the average of the last available inflation rates for 4 quarters. Less noisy than the “traditional no-change” forecast used here (following T. Stark of the Philadelphia FRB) which takes a single quarter.

A suggestion: Exponential smoothing

In the realm of forecasting there exists a prominent simplistic technique known since 1950s, exponential smoothing (or EWMA)

$$m_{t+1} = (1-\alpha)m_t + \alpha y_t.$$

A conjecture by Adrian Pagan: "...It is not surprising that it [EWMA] produces a good forecast for inflation" (Pagan (2009)). The method can also be used to track volatility movements (e.g. RiskMetrics (1996)).

A suggestion: Exponential smoothing

The exponential smoothing equations for the mean and the variance can be readily combined

$$
\begin{aligned}
e_t &= y_t - m_t, \\
m_{t+1} &= m_t + \alpha_m e_t, \\
v_{t+1} &= (1-\alpha) v_t + \alpha_v e_t^2.
\end{aligned}
$$

The corresponding density forecast: $F_{t+h|t} = \mathcal{N}(m_{t+1}, v_{t+1})$.
This technique is a natural baseline for forecast evaluation. For simplicity use just the first available vintage. Choose some alphas: $\alpha_m = 0.94$, $\alpha_v = 0.94$.

AO no-change, exponential smoothing, comparison

The U.S. CPI, 1995Q3–2010Q1

		$h=1$	$h=2$	$h=3$	$h=4$	$h=5$
MAE	SPF	0.89	1.44	1.51	1.49	1.49
	Probabilistic no-change	1.45	1.46	1.45	1.48	1.48
	ExpSm	***1.43***	***1.46***	***1.47***	***1.47***	***1.50***
	AO no-change	***1.50***	***1.63***	***1.63***	***1.58***	***1.62***
	Traditional no-change	1.81	2.06	2.00	2.06	2.03
CPRS	SPF	0.69	1.16	1.25	1.26	1.27
	Probabilistic no-change	1.08	1.10	1.10	1.11	1.11
	ExpSm	***1.08***	***1.10***	***1.10***	***1.09***	***1.08***

A suggestion: Postprocessing by exponential smoothing

Postprocessing (recalibration) of (survey) forecasts using exponential smoothing.
Suppose there is a series of forecasts $\mathcal{N}(\bar{m}_t, \bar{v}_t)$ for y_t which is mis-calibrated.
Use exponential smoothing to recalibrate:

$$
\begin{aligned}
e_t &= y_t - \bar{m}_t - m_t, \\
m_{t+1} &= m_t + \alpha_m e_t, \\
v_{t+1} &= (1-\alpha) v_t + \alpha_v e_t^2 / \bar{v}_t.
\end{aligned}
$$

The post-processed forecast: $F_{t+h|t} = \mathcal{N}(\bar{m}_{t+h} + m_{t+1}, \bar{v}_{t+h} v_{t+1})$.
For surveys: $\bar{m}_t$ is the survey mean (or median), $\bar{v}_t$ is the survey variance.
$\longrightarrow$ SPF–ExpSm

SPF–ExpSm, comparison

The U.S. CPI, 1995Q3–2010Q1, CPRS

	$h = 1$	$h = 2$	$h = 3$	$h = 4$	$h = 5$
SPF	0.69	1.16	1.25	1.26	1.27
Probabilistic no-change	1.08	1.10	1.10	1.11	1.11
ExpSm, $\alpha_m = 0.94$, $\alpha_v = 0.94$	***1.08***	***1.10***	***1.10***	***1.09***	***1.08***
SPF–ExpSm, $\alpha_m = 1$, $\alpha_v = 0.94$	***0.69***	***1.05***	***1.12***	***1.12***	***1.12***
SPF–ExpSm, $\alpha_m = 0.94$, $\alpha_v = 0.94$	***0.68***	***1.05***	***1.14***	***1.14***	***1.14***
GM with variance adjustment	0.68	1.10	1.11	1.12	1.10

Summary of suggestions

- Replace the “traditional no-change forecast” by the AO no-change forecast.
- Exponential smoothing is even simpler than the PNC forecast and it is advisable to add it to the comparison.
- Keep the message of the paper simple. Less attention to complex postprocessing. More attention to simplistic techniques. (Use one of them as a baseline for Diebold—Mariano comparison.)
- Robustness, subperiods: make it compact.
- Robustness: wider period (using other surveys). Possibly, switch to average inflation rate (price level) forecasting.

References I

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