What Do Professional Forecasters Actually Predict?

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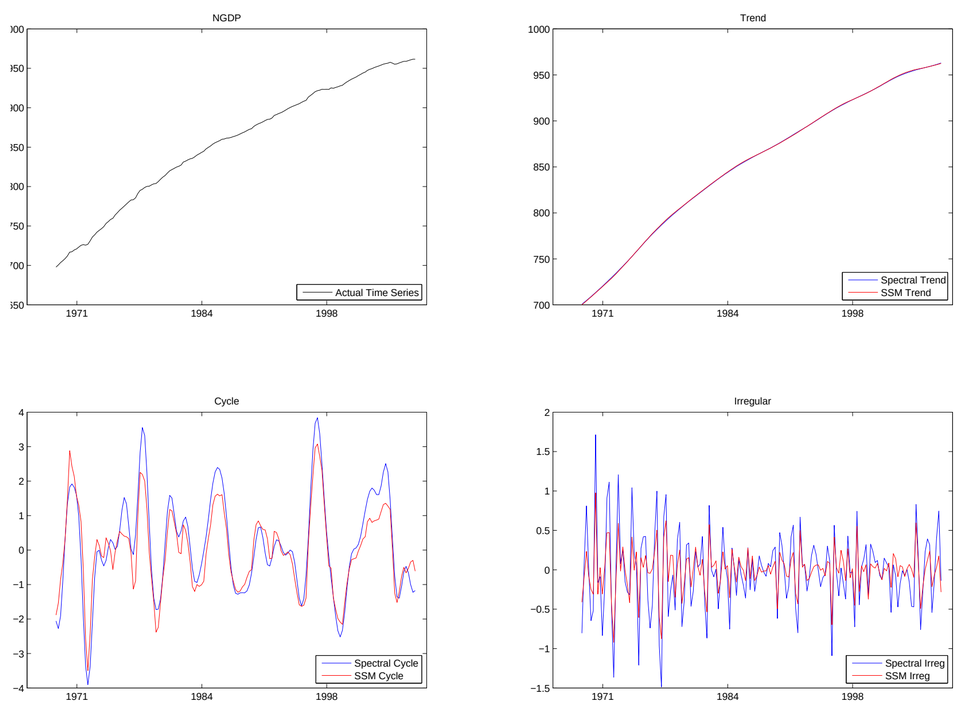
9th ECB Workshop on Forecasting Techniques, June 2016

Introduction

- We examine what professional forecasters predict. Broad movements like trend or business cycle, or also an irregular component that is hard to predict by models and non-experts?
- Method: Use spectral analysis and state space modelling to decompose real-time economic time series into a trend, a business-cycle, and an irregular component. To examine which components are captured by forecasts of the Survey of Professional Forecasters (SPF), we regress the forecasts on the estimated components.
- Key finding: Forecasters can predict almost all variation due to the trend and the business-cycle, but forecasts contain little information about the irregular component.

Time Series Decomposition



Methods

Spectral Analysis

We consider the model $y_t = \mu_t + c_t + \varepsilon_t$, where y_t is the observed time series, μ_t represents the trend, c_t the business cycle, and ε_t the irregular component. In other words, we have a slow-moving component, an intermediate component, and a high-frequency component. We isolate these different frequency bands by a low-pass filter derived by Baxter and King (1999).

State Space Model

The trend-cycle model of Harvey (1990):

$$y_t = \mu_t + c_t + \varepsilon_t, \qquad \varepsilon_t \sim N(0, \sigma_\varepsilon^2).$$

The smooth trend component is specified as

$$\mu_{t+1} = \mu_t + \nu_t, \quad \nu_{t+1} = \nu_t + \zeta_t, \quad \zeta_t \sim N(0, \sigma_\zeta^2),$$

The business cycle component is represented by

$$c_{t+1} = \rho c_t \cos\lambda + \rho c_t^* \sin\lambda + \kappa_t, \qquad \kappa_t \sim N(0, \sigma_\kappa^2),$$
$$c_{t+1}^* = -\rho c_t \sin\lambda + \rho c_t^* \cos\lambda + \kappa_t^*, \quad \kappa_t^* \sim N(0, \sigma_\kappa^2),$$

where the unknown coefficients $\rho, \lambda,$ and, σ_κ^2 represent the damping factor, the cyclical frequency, and the cycle error term variance, respectively.

Forecast Regression

The professional forecasts are related to the components of the historical time series by

$$f_t = \beta_0 + \beta_1 \hat{\mu}_t + \beta_2 \hat{c}_t + \beta_3 \hat{\varepsilon}_t + v_t,$$

where f_t is the professional forecast for time period t. When the Survey of Professional Forecasters perfectly predicts the actual values, we have $\hat{\beta} = (0, 1, 1, 1)$.

Forecast Regressions

	Based On Spectral Analysis					Based On State Space Model				
	Estimate				Wald	Estimate				Wald
	Intercept	Trend	Cycle	Irreg.	Stat[a]	Intercept	Trend	Cycle	Irreg.	Stat[a]
Perfect fcst	0	1	1	1		0	1	1	1	
NGDP	−1.178* (0.620)	1.001 (0.001)	0.954 (0.037)	0.249* (0.149)	34.897 {0.000}	−1.242* (0.589)	1.001 (0.001)	1.063 (0.045)	−0.596* (0.301)	42.717 {0.000}
PGDP	−0.197 (0.505)	1.000 (0.001)	0.990 (0.037)	−0.132* (0.173)	43.620 {0.000}	−0.316 (0.485)	1.001 (0.001)	1.096* (0.048)	−0.804* (0.219)	70.909 {0.000}
CPROF	−1.552 (2.548)	1.001 (0.005)	0.849* (0.041)	0.102* (0.155)	50.164 {0.000}	−1.743 (2.538)	1.002 (0.004)	0.956 (0.034)	−0.621* (0.283)	52.912 {0.000}
UNEMP	1.318 (1.960)	0.997 (0.011)	0.949* (0.016)	0.581* (0.104)	44.220 {0.000}	0.015* (1.919)	1.004 (0.011)	0.980* (0.010)	−0.024* (0.210)	53.677 {0.000}
INDPROD	−3.491 (1.936)	1.006 (0.003)	0.938* (0.030)	0.441* (0.168)	18.540 {0.000}	−3.708* (1.874)	1.006 (0.003)			
HOUSING	2.555* (0.880)	0.919* (0.022)	0.888* (0.038)	0.239* (0.119)	83.413 {0.000}	4.520* (1.331)	0.866* (0.037)			

*: 5% level signif difference from perfect forecast; (..)=Std. error

[a]: Tests for *joint* difference from perfect forecast; {..}=p-value

- More results in paper! Including: Sensitivity analysis state space model identification; Comparison to model-based forecast; Decomposition of forecasts
- In progress: Additional decompositions and link between them; Robustness to timing of releases; Sensitivity to Real-Time data

Conclusions

- Trend and cycle receive weights close to one: SPF can predict most of the variation caused by trend and cycle.
- Weights irregular components do not significantly differ from zero: SPF does poorly predicting irregular movements.
- Compared to model-based forecasts, SPF contains no new information