

**”Asset price bubbles and monetary
policy:
A multivariate extension”
Paper by Andrew Filardo, BIS**

Discussion by Øyvind Eitrheim

Norges Bank Monetary Policy

Workshop on ”Fundamental and Non-Fundamental Asset Price Dynamics: Where do we stand?”, Venastul, 14-15 February 2008

Disclaimer: The views expressed here are those of the discussant and do not necessarily reflect those of my colleagues or the official views of Norges Bank.

Author's research agenda

- Important policy debate: Three views on policy implications of asset price movements
 - i) The "benign neglect view". Effects of asset prices are sufficiently incorporated in a flexible inflation targeting regime, Bernanke and Gertler (2001, AER), Bean (2003, BIS WP), Mishkin (2007, Jackson hole) .
 - ii) The "activist view". Macroeconomic performance can be improved by responding proactively to asset prices, Cecchetti et.al (2000, ICMBS/CEPR)
 - iii) The "discretionary judgment view". Some discretion should be entertained, acknowledging that abrupt changes in asset prices, followed by sharp unwinding of financial imbalances, may inflict substantial costs, Borio and Lowe (2002, BIS WP), Bordo and Jeanne (2002, IF, NBER).

Author's research agenda (cont'd)

- In two previous papers, Filardo (2001, in Kaufman(ed),Elsevier) and Filardo (2004,BIS WP), a broad framework is outlined in which these policy questions are addressed
- The present paper extends this framework in two new dimensions:
 - Endogenous propagation of (fundamental and non-fundamental) asset price movements with feedback from key state variables (output, interest rates)
 - Multivariate extension with (weak and strong) interaction between equity and housing markets and their spillovers into the real economy (macro economy block)

Modelling approach

- Extension of the Rudebusch and Svensson (1999) model (RS)

$$(IS) \quad y_t = -\gamma r_{t-1} + \theta y_{t-1} + \phi(\pi_{AP,t-1} - \pi_{t-1}) + \varepsilon_{y,t}$$

$$(PC) \quad \pi_t = \pi_{t-1} + \alpha y_{t-1} + \beta \pi_{NF,t-1} + \varepsilon_{\pi,t}$$

$$\pi_{AP,t} = (\pi_{e,t}, \pi_{h,t})'$$

$$(AP) \quad \pi_{AP,t} = \pi_{F,t} + \pi_{NF,t}$$

$$(F) \quad \pi_{F,t} = i\pi_{t-1} + \lambda y_{t-1} + v_t$$

$$(NF) \quad \pi_{NF,t} = \zeta_t(y_{t-1}, r_{t-1})$$

$$(MP) \quad r_t = a_y y_t + a_\pi \pi_t + a_F \pi_{F,t} + a_{NF} \pi_{NF,t}$$

$$L = V[y] + \mu_\pi V[\pi] + \mu_r V[\Delta r]$$

The strategy of the paper

- Formulate two-sided bubble process driven by (Markov) transition probabilities (univariate & bivariate APs)
- Three alternative assumption wrt the NF components of APs:
 - Fixed transition probabilities (FTPs)
 - Weak interaction time-varying transition probabilities (Weak TVTPs)
 - Strong interaction time-varying transition probabilities (Strong TVTPs)
- Focus on optimized (simple) interest rate rules:
 - No AP-response (benchmark) $\alpha_F = \alpha_{NF} = 0$
 - Non-differentiated response to F and NF components of APs
 $\alpha_F = \alpha_{NF}$
 - Differentiated response to F and NF components of APs
 $\alpha_F \neq \alpha_{NF}$

The strategy of the paper (cont'd)

- .. and the conditional probability distribution of the duration D of AP bubbles
 - Simulation based estimates of the conditional expectation of D following a persistent output shock using calibrated (time-varying) transition probabilities
 - Scenarios based on alternative policy assumptions
- .. and robust monetary policy strategies under model uncertainty
 - using a Bayesian approach
 - Costs of not pricking a bubble are weighted against costs of pricking a non-bubble

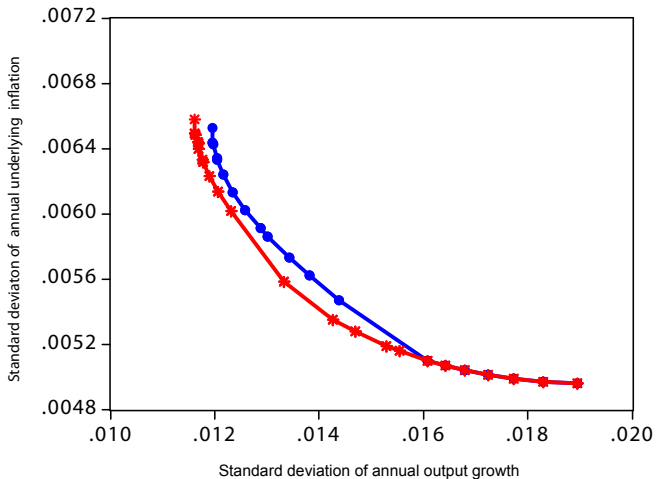
Main findings

- Optimized (simple) interest rate rules
 - Reaction to output α_y not sensitive to specification of π_{NF}
 - More aggressive reaction to inflation α_π in the benchmark (no AP-reaction) case than when reacting to APs
- Stronger reaction to F than NF component when possible to differentiate (in most cases)
- Bayesian approach: Should prick a bubble if Prob(bubbles matter) $> 10\%$
- Bivariate AP extension \Rightarrow time to reconsider the arguments for "benign neglect" of APs?
- Future research should focus on a better understanding of the drivers behind the size, duration and interaction of non-fundamental AP components

C1: RS is a stylized model, how strong effects through ϕ and β ?

- .. and how is γ affected?
- Asset price transmission channels: Expectations, wealth effects/balance sheet effects, credit/banking channel effects
- Interaction between asset markets and credit markets through collateral effects, nicely represented in e.g. Kyiotaki and More (1997, JPE)
- \Rightarrow Main effects on output? Cf. empirical example in Akram et. al (2006, IJFE) and Akram and Eitrheim (2008, JBF) with $\phi \neq 0$, $\beta \approx 0$ (estimated model where interaction between asset prices and credit affects IS curve)
- \Rightarrow Factor financial stability through a larger weight on $V[y]$?

Some gain from responding to π_h



C2: Model uncertainty

- How sensitive are losses L to non-optimal policy responses under model uncertainty?
- Difficult to assess this from the paper
- Can be assessed by the models' *fault tolerance*, cf. Levin and Williams(2003, JME)

Fault tolerance (example)

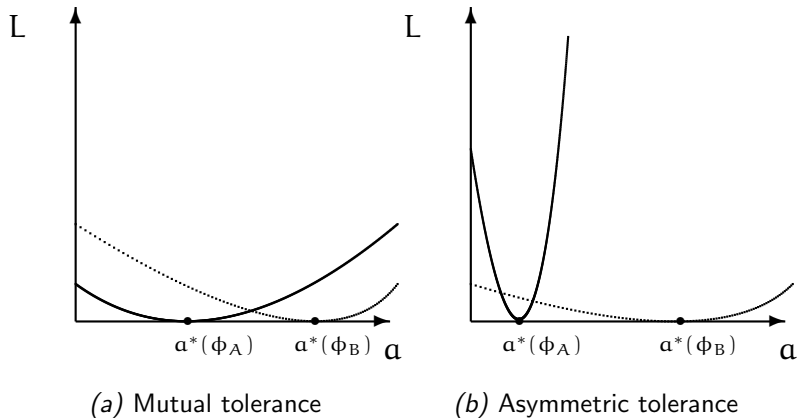


Figure: Fault tolerance. Variations in L as the policy parameter α is varied in model A (solid line) and model B (dotted line).

C2: Model uncertainty (cont'd)

- Bayesian average tend to insure against the least tolerant models
- Uncertainty about bubbles and robust policy strategies \Rightarrow Important topic!
- Calibrated version of the Rudebusch and Svensson (1997) model without APs
- Potentially misspecified model \Rightarrow unknown shock persistence in the IS and PC equations (alt: bubble representation)
- Standard Taylor type rule (allowing for interest rate smoothing)

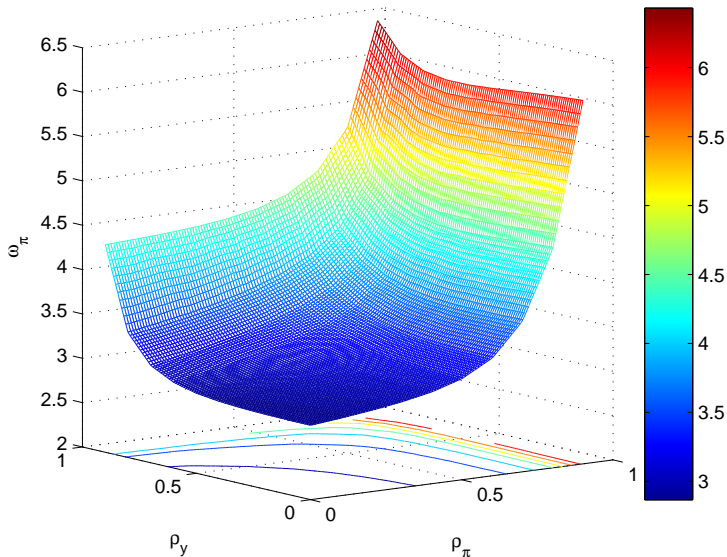
$$e_{y,t} = \rho_y e_{y,t-1} + \varepsilon_{y,t}$$

$$e_{\pi,t} = \rho_{\pi} e_{\pi,t-1} + \varepsilon_{\pi,t}$$

C2: Model uncertainty (cont'd)

- Two common approaches to deal with uncertainty
 - Bayesian: assign equal probabilities and min average loss
 - Robust control (min-max) and robust-satisficing strategies, cf. e.g. Ben-Haim et.al(2007, NB WP) and Akram et.al (2007, NB WP)
- Results: Overestimate tasks and underestimate abilities ⇒ Aggressive response
- Normative and descriptive issues:
 - Conflicts with Brainard attenuation
 - Aggressiveness does not match estimated policy rules
 - Robustness is achieved at a cost
 - Too costly (in particular at the margin)?
 - Robust-satisficing strategies often less aggressive than min-max strategies

Optimal response to output and inflation



Questions and comments

- I like the extension to bivariate APs!
- Main argument for bivariate AP specification is that it allows for (temporary) co-movements which propagate the NF components through different parts of the transmission channel
 - However, over-investment cycles and credit fueled consumption booms may require different medicine?
 - If shocks to equity prices and house prices propagate through different channels, their degree of co-movement may be of concern when evaluating the overall policy implications

Questions and comments (final)

- Thought experiment: Central banks who have built credibility by adhering to monetary policy rules in normal times may have a better chance of exercising some discretion when facing non-normal AP co-movements which potentially threaten monetary and financial stability
- This may require a more forward-looking type of model which allows for an explicit tradeoff between commitment to anchoring expectations and taking advantage of some discretion when facing NF AP-(co)movements

Thank you for your attention