Stability and Monetary Policy in Economies with Speculative Stock Markets

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Introduction

During crises, expansionary monetary policy might, instead of fueling output and inflation, flood financial markets with the freshly created money. Overheated asset markets in turn might then crash and further destabilize the economy. To counteract one proposal is to let the CB conduct **asset price targeting (APT)** and increase the interest rate in proportion to asset prices.
This implies three assumptions:

1. A linkage between asset prices and real activity
2. Asset price expectations do not only reflect the fundamental value but take speculation profits into account
3. The speculative process is fragile

This work derives policy implications when incorporating these assumptions and furthermore shows that such a model is able to match empirical moments of output and stock prices quite well.

Model

I use a micro-founded New Keynesian model where stock prices s_t have impact on real activity through the credit chanel:

$$\pi_t = \beta E_t \pi_{t+1} + \kappa x_t + v_t^{\pi}$$
$$y_t = E_t y_{t+1} - r_t + v_t^{y}$$
$$x_t = \eta y_t + i_t - \nu s_t$$
$$s_t = \beta E_t s_{t+1} - r_t$$
$$i_t = \phi_\pi \pi_t + \phi_s s_t$$

The connection between real and financial markets is based on the idea that in the long run, managers have to maintain equality of market and book value of equity. If we assume a (BGG-type) **external finance premium** and that **firms maximize shareholder value given competitor's stock prices**, then $\frac{S_{j,t}}{N_{j,t}}$ is equal among firms and

$$\underbrace{X_t^{-1} W_t^{-1}}_{\text{marginal profits}} = \underbrace{\frac{R_t S_{j,t}}{N_{j,t}}}_{\text{return on equity}} = \underbrace{z\left(\frac{N_{j,t}}{W_t H_{j,t}}\right) R_t}_{\text{external finance rate}}.$$

Speculation and the Positive Feedback Loop

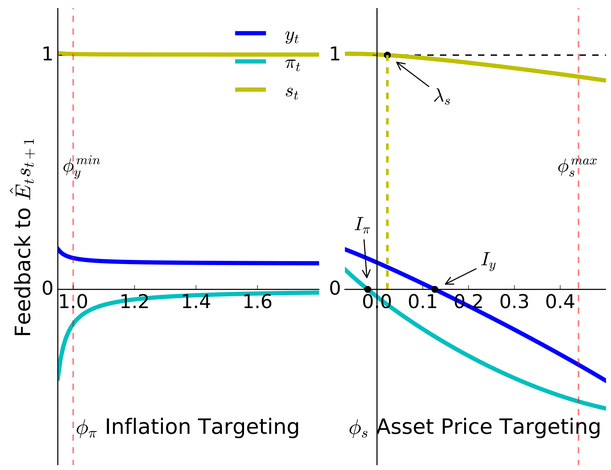

Figure 1: Responses of inflation, output and asset prices to a 1% change in asset price expectations for viable values of asset price targeting

Let us continue to assume that households and firms are perfectly rational. If traders are **speculative** and asset prices have real impact, the economy is affected by **expectations dynamics**. The CB choses ϕ_s, aiming to dampen potential **spillovers** and achieve stability of the financial system.

- At point I_y the impact on output is fully offset, but there is a strong deflationary effect
- At point I_π the impact on inflation is fully offset
- Without APT, the response of asset prices w.r.t. a deviation in price expectations is > 1 and implies an exploding feedback loop
  ▶ The CB wants to dampen this response in order to **stabilize the financial system**

Naturally, APT has (generally amplifying) impact on the transmission of non-financial disturbances.

Deterministic Cycles and Asset Price Targeting

To emulate speculative dynamics I use a nonlinear model of expectation formation (Brock and Hommes, 1997). Agents use different predictors (biased trend extrapolation and fundamentalists) and the fraction $n_{h,t}$ of agents using each predictor is updated based on past profits of the predictor:

$$U_{h,t} = (\beta s_t - s_{t-1})(\beta \hat{E}_{t-1,h} s_t - s_{t-1})$$

The type of dynamics depend crucially on the intensity of choice δ. Higher values indicate that agents switch predictors more resolutely when they were less profitable.

- At low values of δ the system endogenously produces **invariant cycles**
- At point I_π (I_y) the impact on inflation (output) is offset
- The bifurcation point $B(\lambda_s, \delta)$ depends on λ_s and δ and lies most probably outside the viable set of ϕ_s (i.e. $B(\lambda_s, \delta) > \phi_s^{max}$). This implies that the CB is **unable** to completely **shut down endogenous speculative financial market dynamics**

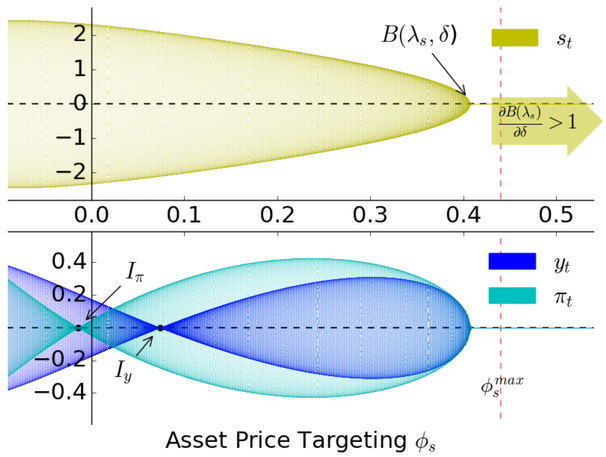

Figure 2: Bifurcation diagram w.r.t. policy parameter ϕ_s

For higher values of δ no deterministic steady state exists and the system diverges. When adding stochastic shocks however, the system is stationary and matches statistic moments of the data that are otherwise not replicable. **Asset prices** are now **strongly affected by fundamental shocks**.

Stochastic Simulations

The model with unstable deterministic steady state and stochastic shocks reproduces the data reasonably well:

	π	y	s
σ	1.21	1.32	11.57
π	1	-.149	-.338
y	-.149	1	.637
s	-.338	.637	1

Table 1: Cross-correlation matrix of simulation (10.000 runs)

	π	y	s
σ	1.21	1.04	13.47
π	1	-.197	-.355
y	-.197	1	.582
s	-.355	.582	1

Table 2: Cross-correlation matrix for data from 1977 to 2014

Even though the CB is able to considerably stabilize the stock market, this happens at the cost of high inflation and output volatility.

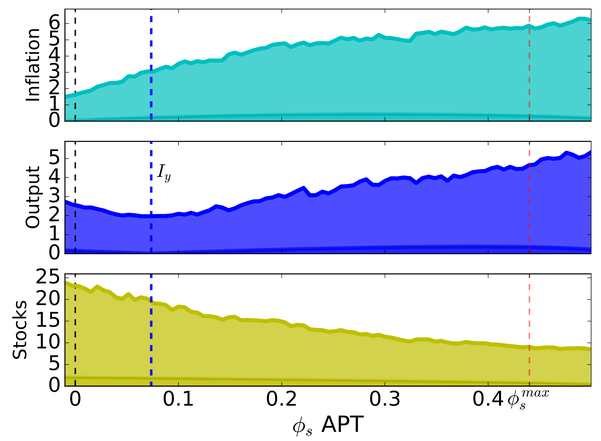

Figure 3: Standard deviations of stochastic simulations for varying policy parameter ϕ_s

Policy Recommendations

- Expectation formation in the financial market plays a crucial role in explaining the data
- It is unlikely that asset price targeting will be able to offset financial cycles
- CB has limited room for prevention policy (i.e. $\phi_s^* \in [0, I_y]$)
- CB should then chose whether to isolate output or inflation from financial shocks
- CB should be careful when creating another structural linkage by introducing APT