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# Should Central Bankers Respond to Asset Price Movements: Theory & Evidence

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# Overview

- Can central bankers improve economic performance by paying attention to asset prices (in addition to inflation and output)?
- If so, how should they do it?
  - Using interest rates
  - Alternative “unconventional policies”
- What have policymakers actually done?

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# Main conclusions

- Can central bankers improve economic performance by paying attention to asset price (in addition to inflation and output)?

Yes, reacting to asset prices can reduce the variability of both inflation and output (about their target levels).

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## Main conclusions

- Is it possible to identify asset price misalignments (and bubbles)?

Bubbles exit and yes they are hard to measure. But central banks have no choice but to forecast asset prices, and measuring misalignments is no harder than estimating the output gap or the equilibrium real interest rate.

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## Main conclusions

- Are there regulatory policies that can be used to address perceived asset price misalignments?

There is some evidence that changes in margin requirements and other regulatory tools will dampen asset price volatility.

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# Main conclusions

- What have policymakers done?

It appears that they react to measures related to bubbles and financial system stress.

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# Why Central Banks Care

- ***Stabilization improves welfare.***
- Elimination of system-wide risks
- Scope of asset ownership is increasing
  - Increased importance of retirement saving
  - Widening impact of booms & crashes
  - Creates a risk is very difficult to hedge

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# The Road Map

## 1. Bubbles

- a. Arguments for why they exist
- b. Impact on the Economy

## 2. Models Examining the Efficacy of Reacting

- a. Background: What Central Bankers Do
- b. Conventional/interest rate response
- c. Non-conventional responses

## 3. Estimating Reactions

## 4. The State of the Debate





The US Postal Service will honor the 24 cent value of this stamp.  
Today, collectors value this stamp at approximately \$150,000.

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# Bubbles

- Do Bubbles Exist?
  - Easy to argue that prices of collectables reflect deviations from fundamental value
  - Printing errors in stamps are worth more
  - Perfect forgery's are worth less
- There should be a presumption in favor of bubbles existing.

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# What About Financial Assets?

- Argument against bubbles is based on arbitrage.
  - Assume that we know there is a bubble
  - Someone will short the asset
  - Increased desire to sell drives the price down
  - The bubble is eliminated

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# When Arbitrage Fails

- Holding short positions can be difficult or impossible.
  - Requires constantly posting additional margin as prices rise
  - Risk of being squeezed
  - How do you short residential housing?
- Information asymmetries
  - Too many open-ended funds
  - Managers have short horizons
  - Benchmark to average return means that managers can't hold a position until a bubble bursts

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# Bubbles Distort Economic Decisions

- **Investment:**

- Financing is too cheap, especially in sectors where the bubble is biggest.

- **Consumption:**

- False impression of wealth

- Housing price increases temporarily alleviate liquidity constraints, making borrowing possible. But with the collapse, there is debt is unsustainable.

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# Bubbles Distort Economic Decisions

- **Fiscal Policy:**  
Increase in revenue leads to tax cuts and expenditure increases
- **Pension Funds:**  
Book high returns, become over funded, so company sponsors can make withdrawals
- **Insurance Companies:**  
High returns make reserves look big

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# Bubbles Distort Economic Decisions

- **Potential GDP:**

Over investment in high productivity growth sectors makes both real growth and productivity look higher than it actually is.

- **Balance Sheet of Financial Institutions:**

Deterioration of the quality of assets, placing banks at risk.

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# Consequences of Bubbles

- Output rises and then falls
  - Depending on the exact mechanism, potential output can rise and fall as well.
- Financial Intermediaries can be impaired



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# Considerations

- Theoretical Models
- Logical Arguments
- Evidence of Response

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# Theoretical Models

- Bernanke and Gertler
- Dupor
- Gruen, Plumb, and Stone

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# The Bernanke-Gertler model

## Firm finance:

1. Combination of internal funds and external borrowing.
2. Credit market frictions make external finance more costly.
3. External borrowing premium depends on firm's balance sheet position.

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# The Bernanke-Gertler model

Consider an increase in a firm's share price:

- ❑ Raises net worth of the firm's owners
- ❑ Improves firm's creditworthiness
- ❑ Reduces external finance premium
- ❑ Increases borrowing and investment

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# The Bernanke-Gertler model

## Consequences of Financial Accelerator:

- ❑ Monetary policy, through its impact on the real interest rate, can move asset prices affecting borrowing costs.
- ❑ Asset Price Misalignments cause investment boom-bust cycles.

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# The Bernanke-Gertler model

## Conclusions:

- ❑ Focus on inflation is important
- ❑ Reacting to asset prices can improve performance

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# Dupor:

## Nominal versus Asset Price Stabilization

- The model is necessarily complex
- The intuition is straightforward
- Two marginal conditions
  - Atemporal Consumption – Leisure Tradeoff: distorted by nominal price rigidity
  - Intertemporal Consumption-Saving Tradeoff: distorted by asset price bubble
- Policymaker has one instrument
- Asset price bubbles are a market distortion to which
- Policymakers should react to temper overaccumulation of capital, but the cost is destabilizing nominal prices

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# Gruen, Plumb, and Stone

- Activist raising interest rates initially to combat the bubbles initial effects.
- But then lowers interest rates quickly in anticipation of the bubble bursting.
- As the bubble grows, the potential negative impact of its eventual bursting will increase.
- Case for tightening in response:
  - Probability of bubble bursting soon is small
  - Probability of bursting is interest rate sensitive
  - Bubble's demise is likely to occur slowly rather than suddenly
- Since it is hard to identify a bubble until it gets big, there is a weak case for reacting.



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# Arguments Against Activism

- Difficult to identify imbalances
- Risk that responsive policy is destabilizing
- Difficult to provide public justification

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## Identifying Misalignments

- Central bankers have no extra information:  
If you're so smart, why aren't you rich?
- Market expectations are unobservable

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# Estimating asset price misalignments: Too hard to be practical?

- Estimating potential output also requires estimates of trend productivity growth and equity risk premium
- But forecasts for inflation and real growth require forecasts of
  - Equity Prices → Investment
  - Exchange Rates → Current Account
  - Property Prices → Consumption

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# Risk of Destabilizing the Economy

- Qualitative knowledge is great
- Quantitative knowledge is not.
- Imprecision argues for caution, not paralysis

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# Communication

- Responding to bubbles stabilize growth and inflation
- Clarity of goals should make explanation possible.

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# Regulation vs. Monetary Policy

- Why not adjust regulations instead?
- Possibilities
  - Cyclically sensitive capital requirements
    - Difficult to implement
    - Interest rates can respond to banking system stress
  - Vary Margin requirements
    - Argument against this is that it is ineffective
    - Why not try?
  - Vary Mortgage Lending Requirements
    - Make loan-to-value ratio dependent on rent/price

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# What Central Banks Do

- 1997-98 Greenbook:
  - Forecast a 10 to 20 percent drop in the stock market

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# Alan Greenspan's Speech at the American Enterprise Institute

"[H]ow do we know when **irrational exuberance** has unduly escalated asset values, which then become subject to unexpected and prolonged contractions as they have in Japan over the past decade? And how do we factor that assessment into monetary policy? We as central bankers need not be concerned if a collapsing financial asset bubble does not threaten to impair the real economy, its production, jobs, and price stability."

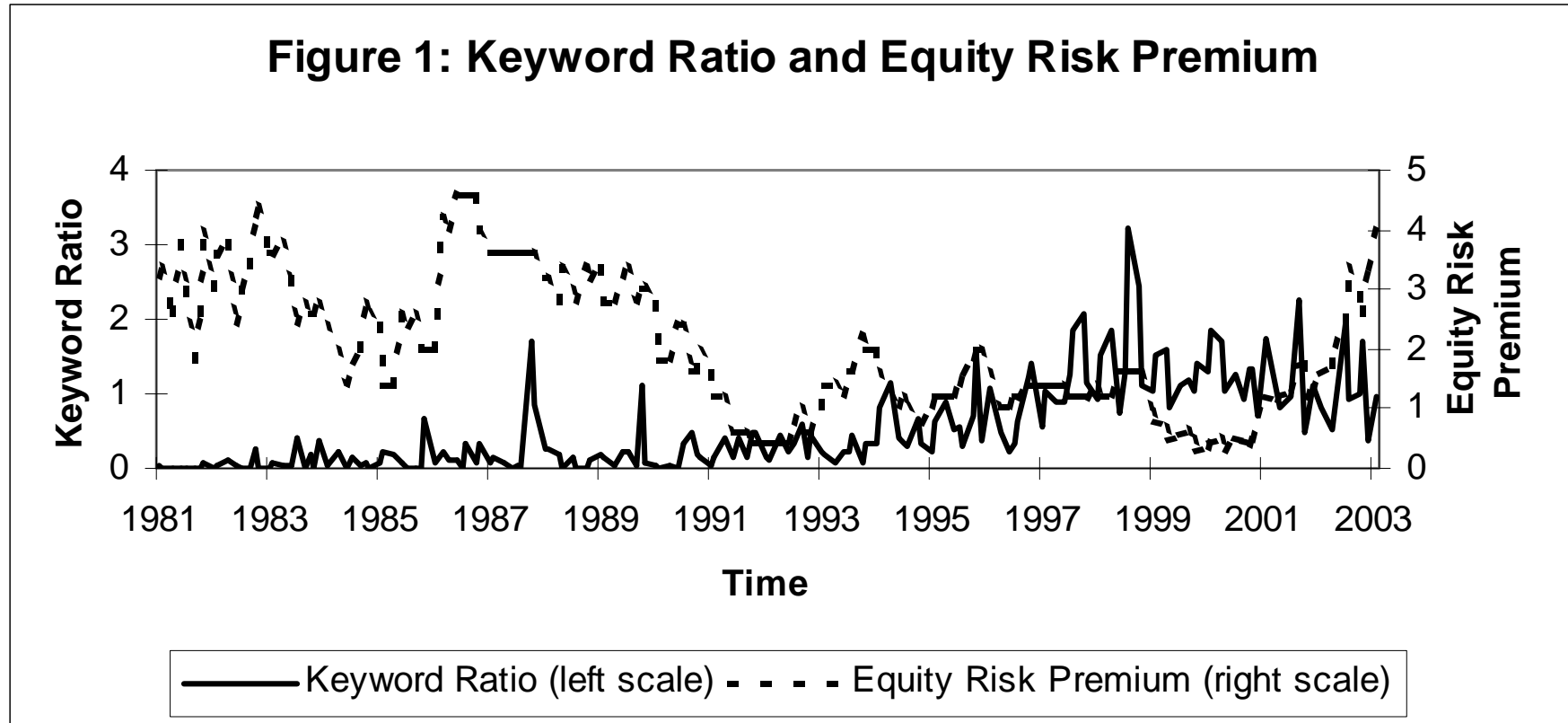


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# “Irrational Exuberance”

- Did public silence imply private indifference?
- Were officials discussing and reacting to asset price movements & banking system conditions?
- What was the FOMC saying and doing?

# What Was the FOMC Saying?



**Correlation = -0.42 (s.e.=0.07)**

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# What Was the FOMC Doing?

- Examine a forward-looking Taylor Rule

$$r_t^* = r^* + \beta_\pi [E(\pi_{t,k} | \Omega_t) - \pi^*] + \beta_y [E(y_{t,q} | \Omega_t)]$$

$$r_t = \rho(L)r_{t-1} + (1-\rho) + u_t$$

Policymakers respond smoothly to a combination of expected deviation of inflation from its target and the output gap.

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# Augmented-Taylor Rule

- Add
  - Stock market bubble
  - Banking System stress

$$r_t^* = r^* + \beta_\pi [E(\pi_{t,k} | \Omega_t) - \pi^*] + \beta_y [E(y_{t,q} | \Omega_t)] + \beta_b b_t + \beta_s s_t$$

**Table 1: Augmented-Taylor Rule for the U.S.**

(1990 Q1 to 2003 Q1)

Inflation Index	Inflation Gap $\beta_\pi$	Output Gap $\beta_y$	Equity Market Bubble	Banking System Stress	Sum of adjustment lags, $\rho$	Test of Over-identifying Restrictions	Goodness of Fit ( $R^2$ )
<b>Consumer Price Index</b>	0.34 (0.30)	<b>0.57</b> (0.00)			<b>0.23</b> (0.00)	0.51	0.80
	0.20 (0.24)	<b>0.57</b> (0.00)	0.09 (0.47)		<b>0.25</b> (0.00)	0.80	0.81
	<b>0.46</b> (0.03)	<b>0.41</b> (0.00)		<b>-0.17</b> (0.02)	<b>0.41</b> (0.00)	0.94	0.86
	<b>0.67</b> (0.00)	<b>0.50</b> (0.00)	<b>-0.65</b> (0.00)	<b>-0.23</b> (0.00)	<b>0.40</b> (0.00)	0.88	0.88

Source: GMM estimates of text equation (4) substituted into equation (2). Numbers in parentheses are p-values for the test that the coefficient estimate is equal to zero. When p-values are 5 percent or lower, the coefficient is printed in bold face. Data sources are reported in the appendix.

Note: Fuhrer and Tootell note that this result could be a consequence of using a different information set from the one that the FOMC actually used when making their decisions.

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# Chairman Greenspan:

“It seems reasonable to generalize from our recent experience that no low-risk, low-cost, incremental monetary tightening exists that can reliably deflate bubble. But is there some policy that can at least limit the size of the bubble and, hence, its destructive fallout? From the evidence to date, the answer appears to be no.”  
(Greenspan 2002, pg. 5).

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# Reactions

- Immediately harsh.  
“Given the problems of the intervening years how can he say that the FOMC shouldn’t even have tried?”
- More Charitable reaction:  
“They tried and failed. Maybe they should have done more.”

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# State of the Debate

- Property vs. Equity Price Bubbles
  - Property price collapses are more serious
  - Does the structure of the financial system matter?



# Comparing Equity and Property Bubbles

## Impact on Growth

	Equity	Property
Boom	+0.38	+0.73
Bust	-1.77	-2.36

Definitions:

Equity Booms +40%, Busts -30%

Property Booms +15%, Busts -15%

Data are from 23 countries

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# Financial Structure

- Preliminary Results Suggest:
  - During housing booms, GDP growth is higher in economies where financial markets are more important.
  - During housing busts, GDP declines by more in economies where banks are more important.

# The Picture of a Cautious Central Banker

The  
Suspenders



The Belt

(Then) ECB President  
Wim Duisenberg, wears  
both a belt  
and suspenders.  
There's no chance  
his pants will  
fall down!