UNIVERSITY OF CALIFORNIA
DEPARTMENT OF ECONOMICS

Economics 134
Spring 2018
Professor David Romer

LECTURE 21
ASSET PRICE BUBBLES
APRIL 11, 2018

I. BUBBLES: BASICS
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- B. "Bubbles" and "fundamental values"
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  2. A quick refresher on present discounted value
  3. The definition revisited
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II. ARE THERE BUBBLES?
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- A. The short answer: We don't know
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IV. A LITTLE ABOUT THE EFFECTS OF BUBBLES
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Asset Price Bubbles

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Announcement

- Your essays are due next time.
- Mechanics of turning it in:
  - Bring a hard copy to class.
  - Upload a pdf version on the class bCourses website (not the main course website). The file name should be Firstname_Lastname_Topic#.pdf (for example, Carol_Christ_Topic2.pdf).

I. Bubbles: Basics

Galbraith's Thesis

- The stock price boom of the 1920s was a speculative bubble—the result of irrational exuberance.

Case, Shiller, and Thompson's Thesis

- Homebuyers' expectations played a key role in the housing boom and bust.
- Their long-term expectations appear to have been irrationally overoptimistic during the boom.

Definition of a “Bubble”

- An excess of asset prices over their fundamental values.

A Refresher on Present Value

a. A one-time certain payment

Consider a payment of $\$X$ t years in the future, and suppose the nominal interest rate is i.

Then the present value of that payment is

$$V = \frac{X}{(1+i)^t}.$$

The appropriate interest rate to use is the safe t-year nominal interest rate.

b. A stream of certain payments

Consider a bond that will pay $\$X_1$ 1 year from now, $\$X_2$ 2 years from now, …, $\$X_T$ T years from now. Suppose the nominal interest rate is constant and equal to *i.* Then the present value of the payments is

$$V = \frac{X_1}{1+i} + \frac{X_2}{(1+i)^2} + \ldots + \frac{X_T}{(1+i)^T}$$

$$= \sum_{t=1}^{T} \frac{X_t}{(1+i)^t}.$$

c. The case of uncertainty

Suppose the payments are uncertain. Then the expected present value of the payments is

$$V = \sum_{t=1}^{T} \frac{E[X_t]}{(1+i)^{t'}},$$

where E[ ] denotes the "rational" expectation of X_t given the information available.

c. The case of uncertainty (continued)

$$V = \sum_{t=1}^{T} \frac{E[X_t]}{(1+i)^{t'}},$$

- In the case of a stock, the X's are the dividends. In the case of a house, they are the rents or the value the homeowner attaches to the housing services.
- A complication that we will largely ignore is that the appropriate *i* to use will be different for different *t*'s, and will depend on the risks of the *X*'s.

The definition of a “bubble” revisited

- Recall: An excess of asset prices over their fundamental values.
- Let V be the expected present value of the asset’s payments.
- Then a bubble occurs when P > V.

Digression: A Little about How Macroeconomists Think about the Appropriate Interest Rate to Use to Discount Risky Future Payoffs

- Think of a consumer devoting their marginal dollar to either: (1) consumption today; or (2) buying a risky asset, holding it for a year, and using the proceeds to raise consumption then.
- Utility gain from (1): MU_1, where "MU" denotes the marginal utility of consumption, and "1" refers to the current period.
- Expected utility gain from (2): $E[R \bullet MU_2]$, where "E" denotes expectations, "R" is the real payoff to the asset (1 + the rate of return), and "2" refers to next year.

Digression: A Little about How Macroeconomists Think about the Appropriate Interest Rate to Use to Discount Risky Future Payoffs (continued)

- The condition for expected utility maximization: $MU_1 = E[R \bullet MU_2]$.
- Note that
  $E[R \bullet MU_2] = E[R] \bullet E[MU_2] + \text{Covariance}(R, MU_2)$.
- Solving $MU_1 = E[R] \bullet E[MU_2] + \text{Covariance}(R, MU_2)$ for $E[R]$:

$$E[R] = \frac{MU_1}{E[MU_2]} - \frac{\text{Covariance}(R, MU_2)}{E[MU_2]}.$$

II. Are There Bubbles?

Does Theory Tell Us that Market Forces Will Prevent Mispricings?

- Arbitrage: A riskless opportunity for immediate profit.

Mispricings of Risky Assets Do Not Create Arbitrage Opportunities

- Fundamental risk: The actual payouts could differ from the rational expectation based on the information available when I make the initial transactions.
- Noise trader risk: The mispricing could become even worse by the time I choose to unwind my position.
- Agency risk: The mispricing could become even worse, forcing me to unwind my position.

Mispricings: A Microeconomic Example

"On March 2, 2000, 3Com sold a fraction of its stake in Palm … via an initial public offering. … 3Com announced that, pending an expected approval by the Internal Revenue Service (IRS), it would eventually spin off its remaining shares of Palm to 3Com's shareholders ….

"This event put in play two ways in which an investor could buy Palm. The investor could buy … shares of Palm directly or … buy … shares of 3Com, thereby acquiring a claim to … shares of Palm plus a portion of 3Com's other assets."

Lamont and Thaler, Can the Market Add and Subtract? Mispricing in Tech Carve Outs," *Journal of Political Economy* 2003.

Mispricings: A Microeconomic Example (cont.)

Implied value of non-Palm part of 3COM

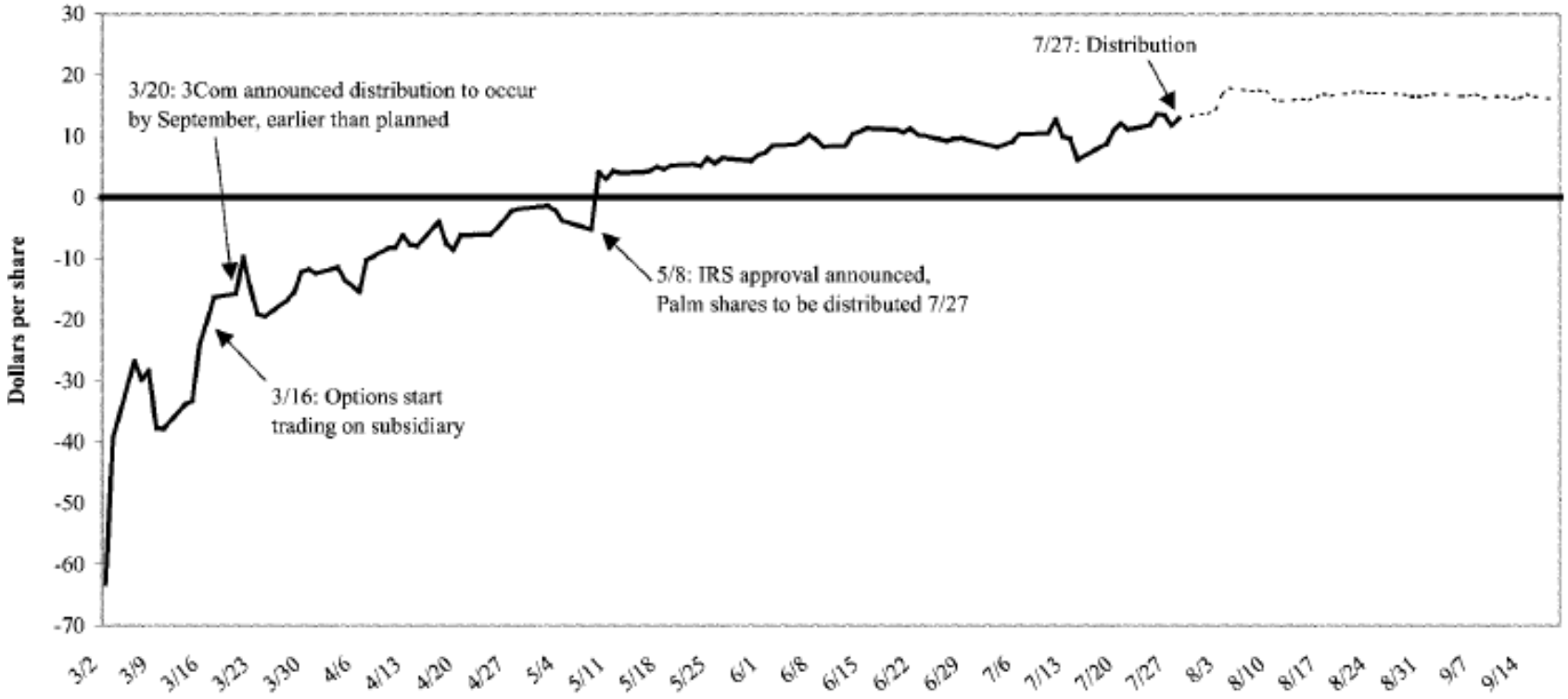


FIG. 3.—3Com/Palm stub, March 2, 2000–September 18, 2000

Source: Lamont and Thaler.

Galbraith's Evidence of a Stock Price Bubble

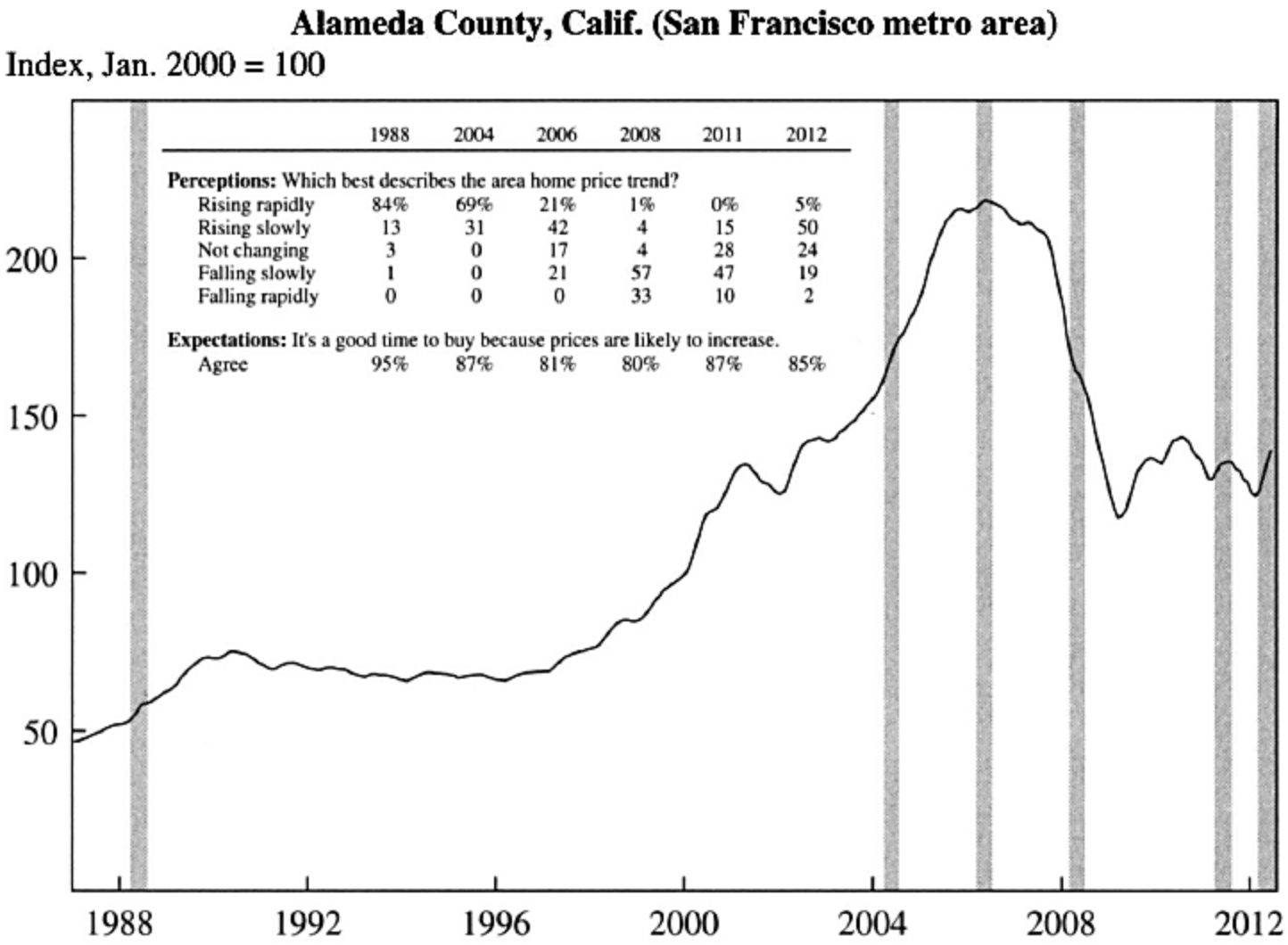
- Informal psychology.
- The Florida land boom and crash.
- "There were many indications by 1928 that this phase of the market [the true speculative orgy] had come. Most obvious was the behavior of the market [prices]."
- Prominent individuals making favorable statements about stocks.
- High volume.
- Large-scale buying on margin.
- Prices later collapsed.

Discussion

Case, Shiller, and Thompson's Evidence of Homebuyers' Irrational Long-Term Expectations

- Especially: Expected long-term housing appreciation was implausibly high.
- Also: Evidence from short-term expectations; evidence from open-ended questions and popular culture.

Figure 1. S&P/Case-Shiller Home Price Indexes for the Four Survey Locations, 1987–2012[a]

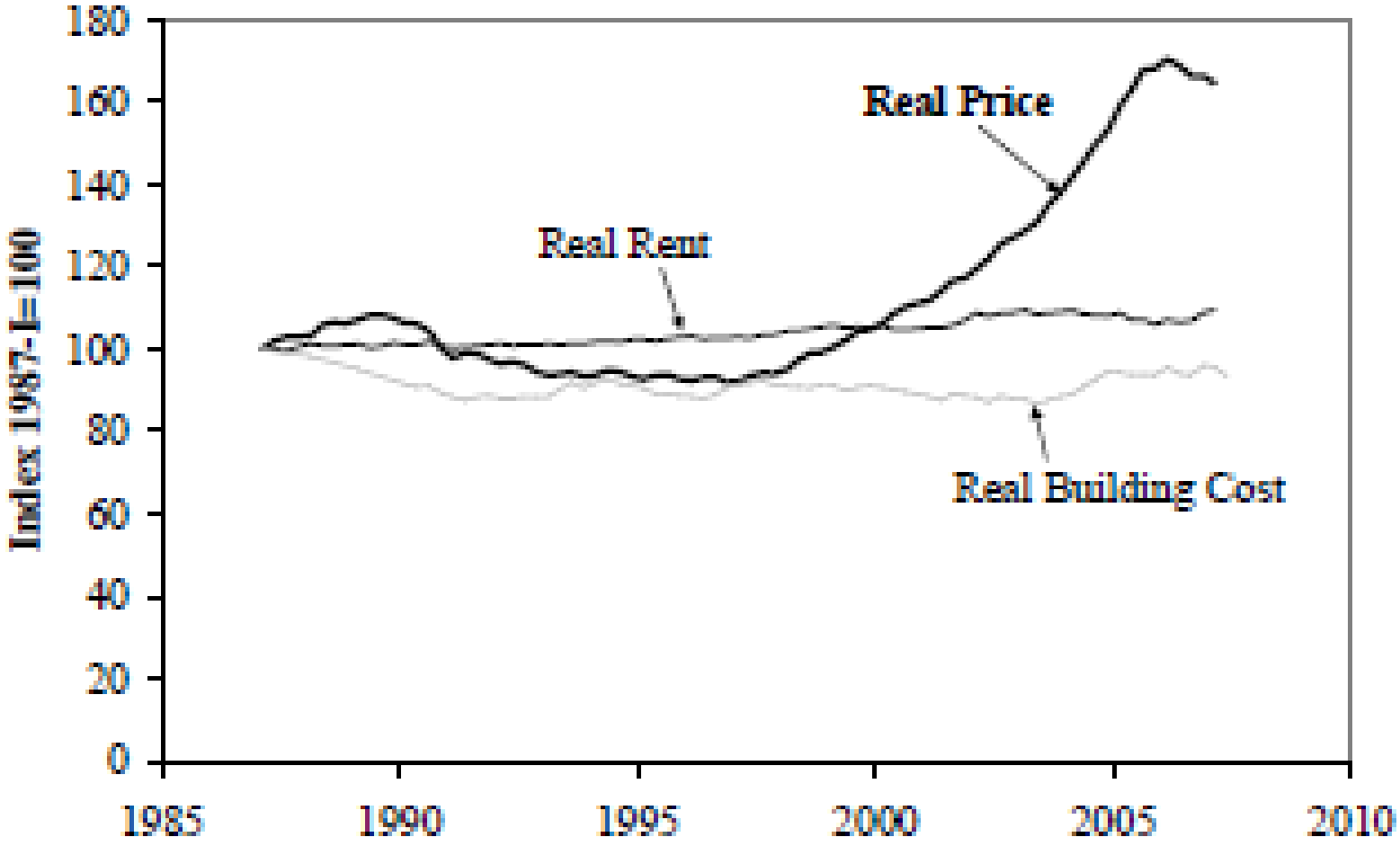


Mean response (percent)[a]

Survey year	*Survey location*			
	Alameda County	*Middlesex County*	*Milwaukee County*	*Orange County*
	"On average over the next ten years how much do you expect the value of your property to change each year?"[c]			
2003	12.3	8.9	7.1	11.5
2004	14.1	10.6	10.4	17.4
2005	11.5	8.3	11.9	15.2
2006	9.4	7.5	9.9	9.5
2007	10.7	5.3	8.1	12.2
2008	7.9	6.4	7.2	9.4
2009	8.5	6.2	8.2	6.9
2010	9.8	5.0	7.3	5.7
2011	7.6	4.1	4.7	7.1
2012	5.4	3.1	3.1	5.0

Discussion

House Prices and Indicators of Fundamentals, 1987-2007



III. What Causes Bubbles?

The Short Answer

We don’t know.

One Factor: Momentum

- There's some evidence that people's expectations of future returns are higher when past returns are higher.
- So, price increases can be self-reinforcing.
- But: Prices can't keep rising relative to fundamentals indefinitely.

Momentum (cont.)

But:

- Why do some price increases lead to bubbles while most don’t?
- What determines when—and how dramatically—the bubble bursts?

Other Possible Sources of Bubbles

- Expansions of credit supply?
- Loose monetary policy?

Monetary Policy and Bubbles (I)

- A common view: If the Fed injects money into the economy, it will find its way into the stock market.
- But: If the Fed increases the amount of high-powered money, the money doesn't end up in any market – it's held by households, firms, and banks.
- Asset prices can rise with little buying and selling.

Monetary Policy and Bubbles (II): Other Views of How Loose Monetary Policy Could Cause Bubbles

- 1. Recall:

$$V = \sum_{t=1}^{T} \frac{E[X_t]}{(1+i)^t},$$

where i is the interest rate.

Thus, reductions in interest rates will tend to raise fundamental values. This could cause bubbles via momentum.

- 2. Suppose investors have target rates of return. When safe interest rates are low, they might take greater risks in order to try to achieve their targets. This could bid up the prices of risky assets.

Monetary Policy and Bubbles (III)

- What does Galbraith think of the view that loose monetary policy caused the 1920s bubble?

IV. A Little about the Effects of Bubbles

The Effects of Asset Price Bubbles

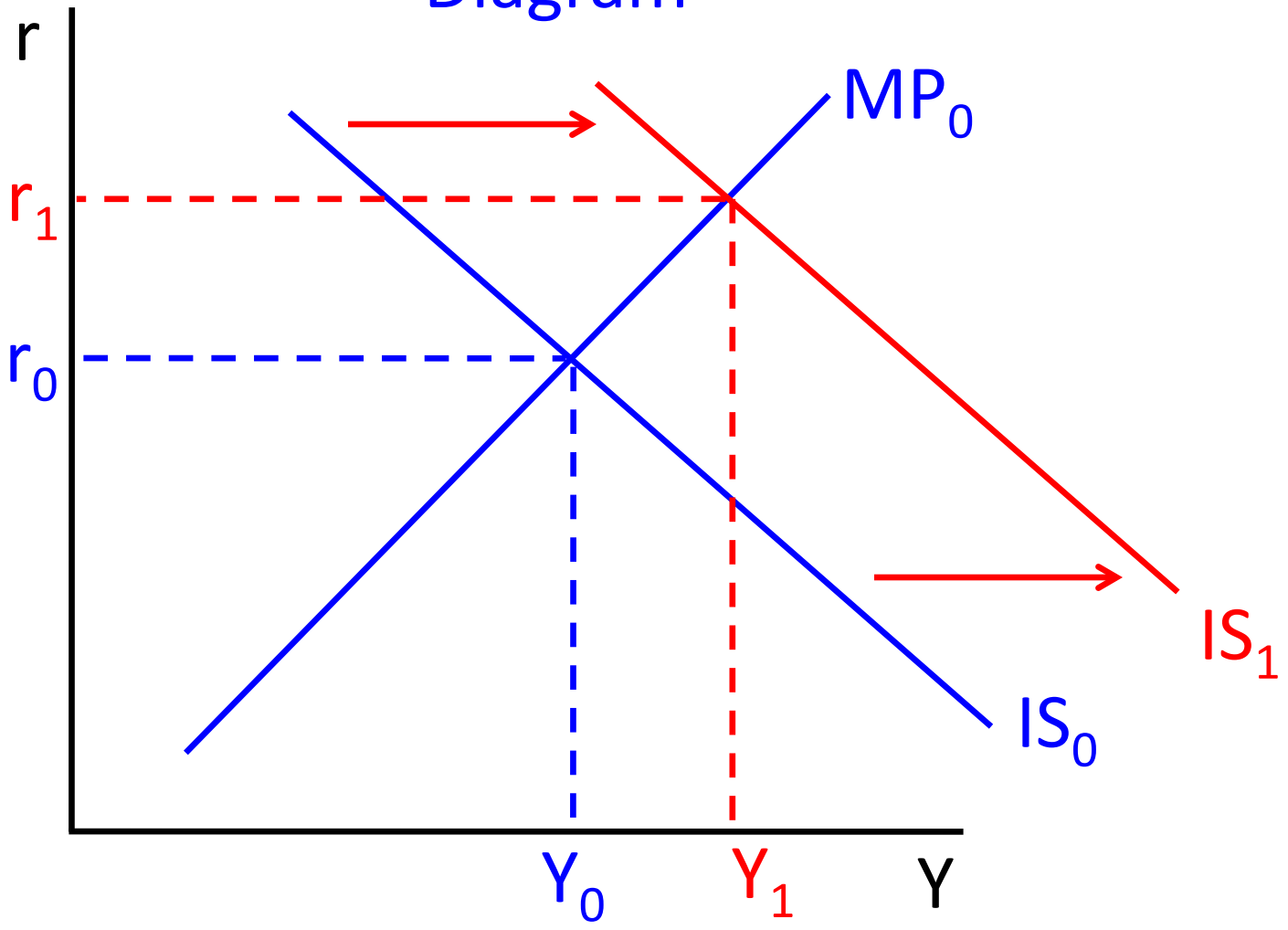
Consider an economy in long-run equilibrium (Y is equal to $\overline{Y}$, and inflation is steady), and suppose there is then a bubble in the prices of some type of asset (such as houses). How will this show up in the model?

The Effects of Asset Price Bubbles

Consider an economy in long-run equilibrium (Y is equal to $\overline{Y}$, and inflation is steady), and suppose there is then a bubble in the prices of some type of asset (such as houses). How will this show up in the model?

- I will be higher at a given r.
- C will be higher at a given Y – T.

The Effects of an Asset Price Bubble in the IS-MP Diagram



The Effects of Asset Price Bubbles on the Composition of Investment

- Suppose there are two kinds of investment: $I = I^A(r) + I^B(r)$.
- Suppose there is a bubble only in the prices of assets of type A, so only the $I^A(r)$ function shifts.
- What will be the effect on the quantity of investment of type B?
- r is higher and the $I^B(r)$ function has not shifted, so I^B falls.
- That is, the bubble affects the <u>composition</u> of investment.