

# **FIN 514**

## **Initial Public Offerings (IPOs)**

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**Why Issue Public Equity?**

**Cost & Benefits of IPOs**

**Why Is There Underpricing?**

**Hot Issues Markets**

# Why Issue Public Equity?

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- 1. lower the cost of capital for the firm**
- 2. a "wealth constraint" prevents current owner-managers from financing the project**
- 3. provide liquidity for current stockholders**
- 4. shift monitoring costs from private lenders to the S.E.C.**
- 5. firm can learn from the information contained in stock price movements**

# Why Issue Public Equity? (cont.)

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## 1. Lower the cost of capital for the firm

- one of the main lessons from portfolio theory is that risk reduction due to diversification lowers the risk (and required return) for stocks
  - this won't work if owner-manager has a large undiversified stake in the firm
- Amihud-Mendelson argument about lowering the cost of capital for the firm by reducing trading costs (increasing liquidity)

# Cost of Capital for Private Firm: Risk Reduction

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## Assume:

- Equity is held by entrepreneur
- Entrepreneur's portfolio is not diversified
- Assume no debt in the capital structure (for simplicity)
- Then the risk of returns to private equity is the variance of returns, not the beta, because the “residual risk”  $\sigma^2(e_i)$  can't be diversified away

$$\sigma^2(R_i) = \beta_i^2 \sigma^2(R_m) + \sigma^2(e_i)$$

# Cost of Capital for Private Firm: Risk Reduction

## Suppose:

$$\beta_i = 1$$

$$\sigma^2(R_m) = 0.0018$$

[monthly standard deviation of return to market portfolio = 4.24%]

Coefficient of determination from market model = 25% =  
 $\beta_i^2 \sigma^2(R_m) / \sigma^2(R_i)$

Then  $\sigma^2(R_i) = 0.0072$  and  $\sigma^2(e_i) = 0.0054$

# Cost of Capital for Private Firm: Risk Reduction

What level of beta,  $\beta^*$ , would be implied by systematic or non-diversifiable risk equal to 0.0072?

$$\beta_i^{*2} \sigma^2(R_m) = \beta_i^{*2} \times 0.0018 = 0.0072$$

$$\Rightarrow \beta_i^{*2} = 4 \Rightarrow \beta_i^* = 2$$

So, the risk (as measured by  $\beta_i^*$ ) of the private firm in this example is twice as high as if this stock were held by the “marginal investor” as part of a well-diversified portfolio

# Cost of Capital for Private Firm: Risk Reduction

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If you use the CAPM and assume:

$$R_f = .03 \text{ and } E(R_m) = .09$$

Then the cost of capital for this private firm would be:

$$\begin{aligned} E(R_i) &= R_f + \beta_i^* [E(R_m) - R_f] \\ &= .03 + 2 [.09 - .03] = .15 \end{aligned}$$

But after it is publicly traded and the marginal investor can diversify the firm-specific risk, the cost of capital falls to:

$$E(R_i) = .03 + \beta_i [.09 - .03] = .09, \text{ since } \beta_i = 1$$

# **Cost of Capital for Private Firm: Value Increase**

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**Using a crude perpetuity analogy, if expected cash flows are not affected, reducing the cost of capital from 15% to 9% increases value by the ratio of  $.15/.09 = 67\%$**

**So if the firm was worth \$100 million before the IPO, it would be worth \$167 million afterwards**

**Obviously, this is a very crude example, but it does illustrate the importance of access to public capital markets**

# Cost of Capital for Private Firm: Increased Liquidity

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Amihud-Mendelson (*JFE*, 1986) show that transaction costs (illiquidity) raise the cost of capital

Basic idea: investors look at the net returns, so that given risk, a stock with higher transactions costs must have a higher gross return to compensate for the higher transactions costs

=> To get a higher expected gross return you must have a lower price

# Why Issue Public Equity? (cont.)

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2. Firm has  $NPV > 0$  project, but a "wealth constraint" (or lack of diversification) prevents current owner-managers from financing the project

# Why Issue Public Equity? (cont.)

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- 3. To provide liquidity for current stockholders (for consumption or diversification)**
  - but if this were the only reason, the firm could register the securities and allow stockholders to sell some stock through a secondary offering with a primary offering, more cash comes into the company
- 4. Shift monitoring costs from private lenders to the S.E.C.**
  - if the costs of registration, filing, etc. are below the benefits

# Why Issue Public Equity? (cont.)

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5. **By creating a public market for the stock, the firm can learn from the information contained in stock price movements (useful for incentive compensation for employees, feedback on management decisions, etc.)**
  - also, subsequent (seasoned) equity offerings will be easier in the future because there will be a reliable secondary market price for the stock that potential buyers can observe

# Why Issue Public Equity? (cont.)

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5. **By creating a public market for the stock, the firm can learn from the information contained in stock price movements (useful for incentive compensation for employees, feedback on management decisions, etc.)**
  - creating a secondary trading market in the stock allows owner-managers to sell their stock in the future if they want consumption, liquidity, or diversification
    - usually have to wait 90 to 180 days after IPO – lockup provision

# Costs of Initial Public Equity Offering (IPO)

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- 1. Disclosure of proprietary information**
  - may be helpful to competitors, other contracting parties
- 2. Jensen-Meckling agency costs of outside equity (shirking/incentive effects)**
  - plush carpets in the CEO's office
- 3. Costs of reporting/filing with the S.E.C.**
  - largely fixed

# Costs of an IPO (cont.)

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## 4. Costs of corporate control

- outside stockholders can impose costs on managers if they feel that the firm isn't being managed in the stockholders' interests, even if they only represent a minority position
  - e.g., Hugh Hefner, the majority stockholder of Playboy, was sued for having too many perquisites by outside minority shareholders

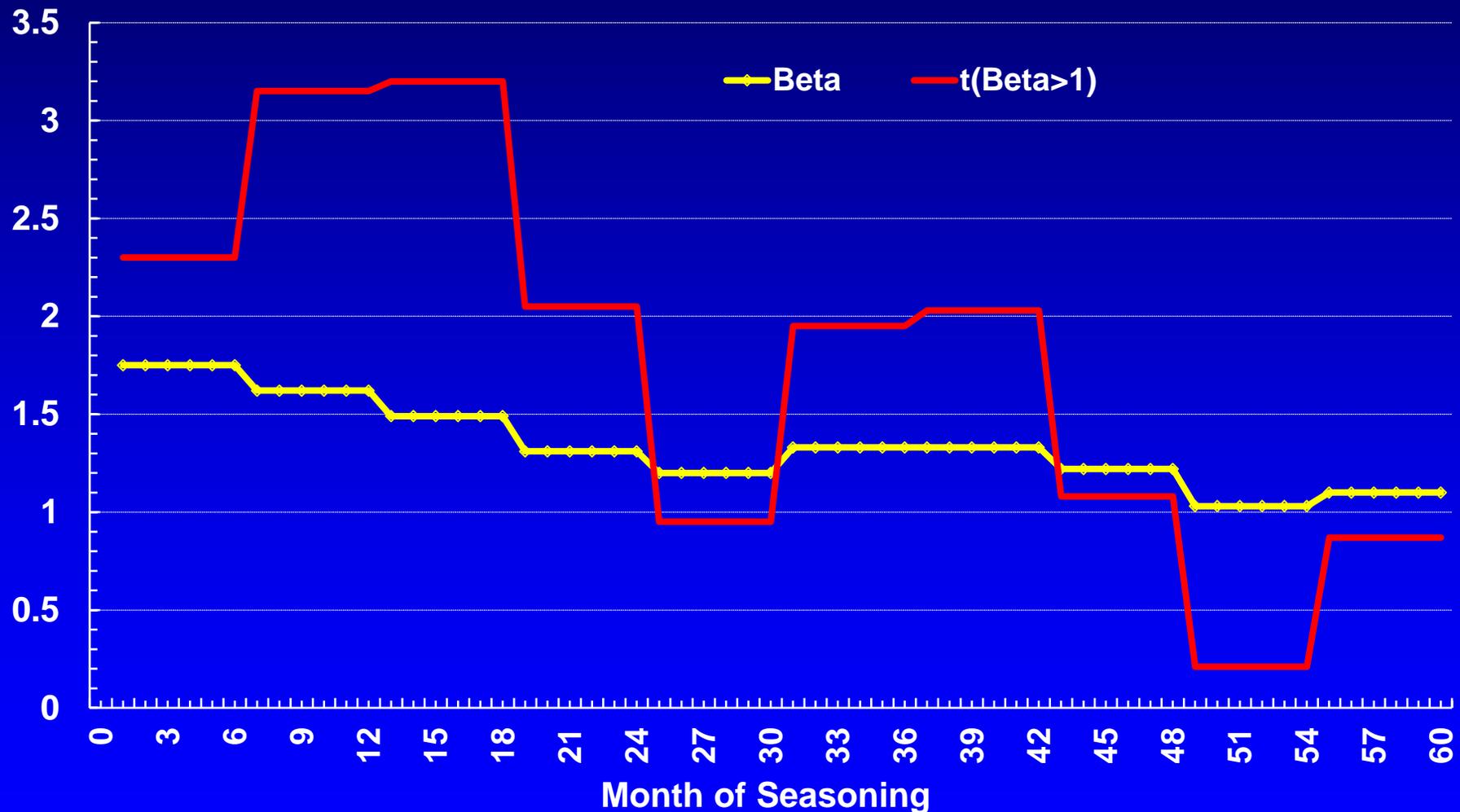
# Costs of an IPO (cont.)

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## 5. Underpricing

- Ibbotson (1975, JFE) found average abnormal returns in the first month after the IPO (starting at the IPO price) of 11.4 %
- he also found that the beta for IPO stocks falls from about 2.0 in the first month after the IPO to a little over 1.0 five years after the IPO
- Ritter (1984, JBus) found average underpricing of 18.8% in first month after issue (5000 offerings 1960-82)

# Ibbotson (JFE, 1975): Risk of IPO's as They Season



# Ibbotson (JFE, 1975): Abnormal Returns to IPO's (cont.)

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- (1) Risk is high for early months of seasoning**
  - falls to average levels after 4-5 years
  
- (2) Abnormal returns are large in first month**
  - much smaller (maybe negative?) after that

# Why Is There Underpricing?

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- 1. Compensation for underwriters**
- 2. Compensation for investors**
- 3. Selection bias**
- 4. Litigation Insurance**
- 5. Marketing Expense**
  - for products and/or stock
- 6. Hot Issues Markets**

# Why Is There Underpricing?

## 1. Compensation for underwriters

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### Underwriters with 'firm commitment' contracts:

- guarantee a minimum price and number of shares sold to the issuing firm
  - underwriter bears risk that the IPO will not sell out at the offering price

### Underwriters feel an obligation to act as a market-maker for the stock after the IPO

- don't want to be in the position of holding inventory of the stock if the prices falls after the IPO

# Compensation for underwriters (cont.)

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## Frequently told story:

- underwriters provide some unmeasurable service to IPO firm (e.g., cheap consulting)
- get underpricing in return
- give IPO profits to retail customers (institutional investors who are included in restricted allocations of underpriced stock)
- then receive different unmeasurable favors in return from these investors (e.g., they agree to participate in offerings that are not underpriced)

# Compensation for underwriters (cont.)

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**Muscarella and Vetsuypens, "A Simple Test of Baron's Model of IPO Underpricing," (JFE, 1989)**

- **initial returns to stocks when major underwriters went public**
  - **e.g., DLJ, Merrill Lynch, Goldman Sachs, etc.**
- **small sample, but no evidence that there is less underpricing when the issuing firm should be as smart as the underwriter setting the price**

# Why Is There Underpricing?

## 2. Compensation for investors

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**Underwriters claim it is important to cultivate investors so that subsequent securities offerings will be successful**

- **i.e., 'leave something on the table' so that buyers of the IPO will have an incentive to gamble on this unknown prospect**
- **Is there some model of marketing that predicts a higher long-run price as a function of "investor interest"?**

# Compensation for investors (cont.)

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How big would the beta of an average IPO have to be to explain a 10% one month abnormal return?

- Assume expected monthly market risk premium  $E(R_m - R_f) = .7\%$
- the monthly riskfree rate is .3%
- then to get  $E(R_i) = 10\%$  requires  $\beta = 10$

# Compensation for investors (cont.)

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How big would the beta of an average IPO have to be to explain a 10% one day abnormal return?

- Assume expected daily market risk premium  $E(R_m - R_f) = .03\%$
- the daily riskfree rate is .01%
- then to get  $E(R_i) = 10\%$  requires  $\beta > 200$

# Why Is There Underpricing?

## 3. Selection bias

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### Excess returns are mismeasured

- in oversubscribed deals, the underwriter gets to allocate stock to whomever he wishes (not proportional to request by investors)
- 'favored' customers get more of the best deals

# Why Is There Underpricing?

## 3. Selection bias -- the Rock Model

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### Assume:

- (1) it is necessary to have some uninformed investors in the IPO market to raise enough capital to meet the supply needs of corporations;
- (2) the uninformed investors can't tell which deals are hot, so they subscribe equally to all deals;
- (3) investment bankers prorate oversubscribed deals
  - or worse, leave uninformed investors out of hot deals completely

### **3. the Rock Model (cont.)**

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**For uninformed investors to earn a normal rate of return on their IPO investments (risk-adjusted), the informed investors must earn an abnormally high return**

- so the average return across all investors looks abnormally high**
- but uninformed investors can't realize these abnormal returns because of rationing**

### **3. the Rock Model (cont.)**

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**This raises the question of why underwriters give away the profits from underpricing to their 'informed' customers?**

**Or why the 'informed' customers can recognize the hot deals better than the underwriters?**

### **3. the Rock Model (cont.)**

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**It also raises the question of why the capital available to the 'informed' customers is not sufficient to supply the capital wants of corporations?**

- Why don't they raise investment pools to invest in IPOs and compete away the profits?**

### **3. the Rock Model (cont.)**

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**Finally, it takes the underpricing as given**

- **Is the underwriter making mistakes, and the informed investor can recognize the mistakes?**
  - **Why don't they become underwriters?**
- **Do underwriters cross-subsidize corporate customers?**
  - **Underprice some issues to attract investors into other issues that would be hard to sell**

### **3. the Rock Model (cont.)**

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**Why would Microsoft, etc. agree to cross-subsidize some other firm's stock?**

**It's hard to imagine that Goldman Sachs could provide enough cheap (unmeasured) services to Microsoft to make up for large amounts of underpricing**

# Why Is There Underpricing?

## 4. Litigation Insurance

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**Both the underwriter and the firm face liability if the stock price drops after the IPO**

- entrepreneurial law firms representing the class of IPO purchasers are highly likely to file suit claiming a failure to disclose some type of bad news in the IPO prospectus
- in essence, the IPO also contains a put option given to the purchasers of the stock
  - the firm has to buy back the shares if they fall too much
- underpricing reduces the cost of the put option

## 4. Litigation Insurance (cont.)

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**Tinic (J Fin, 1988) studies underpricing before and after the 1933 Securities Act**

- 33 Act created federal filing requirements
- standardized the liability of underwriters and the issuing firms
- lowered the costs of subsequent litigation
- finds that underpricing is lower pre-1933
  - consistent with the litigation insurance argument

**Lowry & Shu [*JFE*(2002)] find that firms more likely to be sued underprice more**

# Why Is There Underpricing?

## 5. Marketing Expense

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**If an IPO is “hot” (big initial return & lots of after-market trading), it tends to get a lot of attention in the popular press**

- **It creates “awareness” advertising**
  - **Front page “ads” on the WSJ are very expensive (they don’t sell them at any price)**
- **Bob Merton says that the long-term demand for the company’s stock increases as more potential investors become aware of the stock**
  - **This lowers their cost of learning**
  - **Leads to a long-term higher price for the stock**
- **But, it’s hard to imagine that this effect is permanent**
  - **i.e., is price permanently lower without underpricing at IPO?**

# 5. Marketing Expense

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**Demers and Lewellen (JFE, 2003) argue that after-market publicity also affects demand for the firm's products/services**

- They measure “hits” to web pages of Internet stocks before and after IPOs
- Find that there is a significant increase in web traffic following a “successful” IPO
  - i.e., when the initial return is high (underpricing)

# Hot Issues Markets -- Underpricing Is a Bubble?

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Jay Ritter looked at the "hot issue" market of 1980:

Underpricing was greater if:

- (a) it is a startup company vs. one with past operating results (e.g., Indian Bingo)
- (b) the after-market standard deviation is higher
- (c) there was lots of underpricing in "penny stocks" in Denver in 1980
  - inexperienced underwriters were underpricing

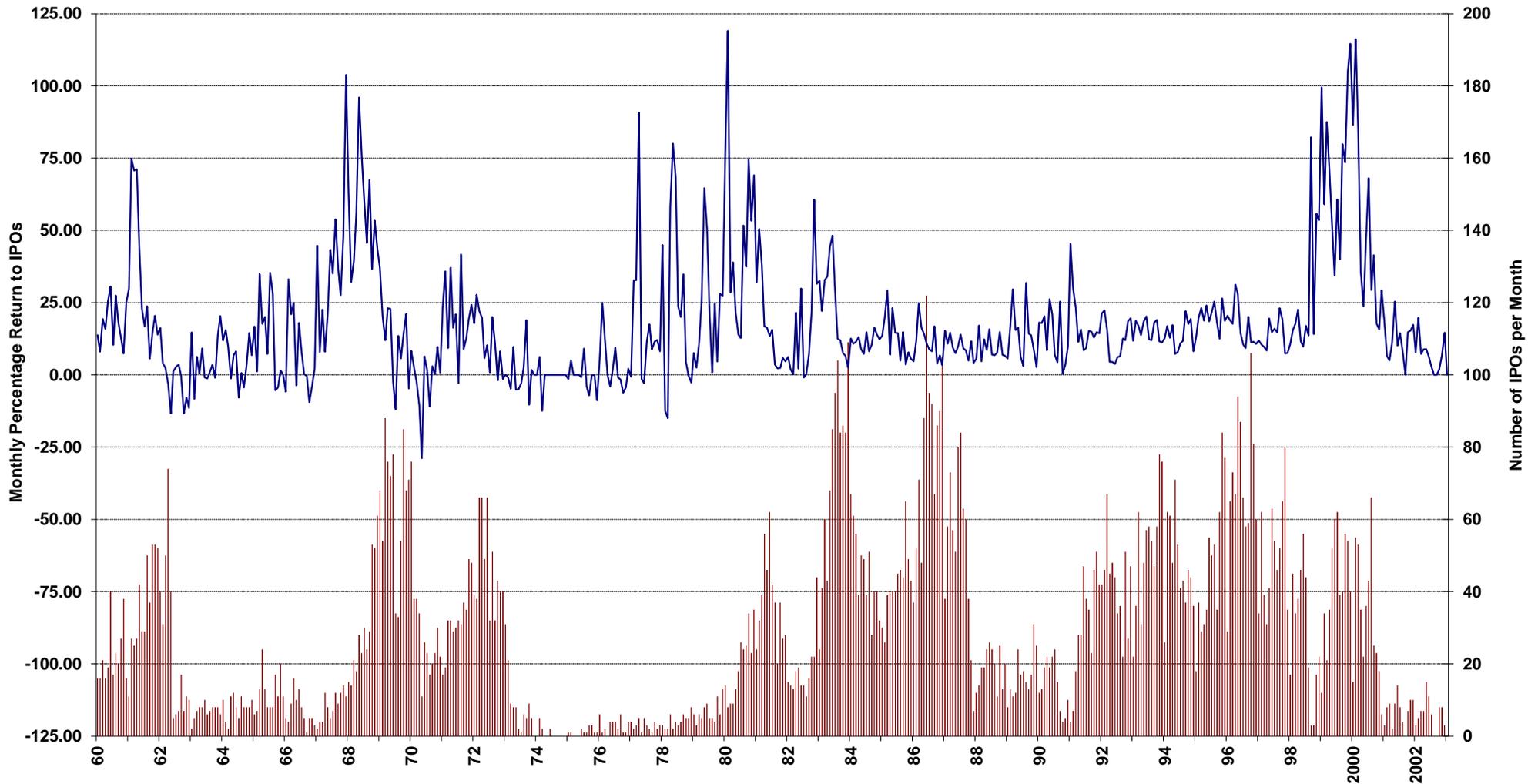
# Hot Issues Markets (cont.)

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**Ritter also found lots of variation in underpricing over time ('hot issues' markets)**

- **see his figs. 1 & 2 showing percent average initial returns and number of offerings per month**
- **it looks like underpricing leads issues, then when underpricing disappears, after a few months the new issues markets dry up (no more new issues)**

# Ibbotson, Sindelar & Ritter (JACF, 1994) -- Hot Issues Markets



# **Lowry & Schwert (*JFin*, 2002)**

## **Hot Issues Markets**

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**IPO cycles are due to cross-correlated information and slowness of the IPO process**

- **No opportunity to time your IPO to minimize (or maximize) underpricing**
- **Underwriters learn from book-building process, which usually takes 2 or more months**
- **Contemporaneous, related deals also adjust in price from information gleaned from book-building**

# **Lowry & Schwert (*JFE*, 2004)**

## **Is the IPO Market Efficient?**

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**Price updates between initial filing and IPO price are predictable**

- **Prominent underwriters low-ball the initial filing range**
- **Price updates are correlated with market returns that occur before the initial registration statement is filed**

# IPO Pricing: Summary

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**Average IPO is underpriced**  
risky investments (beta or std dev)

**Extent of underpricing varies through time**  
serial dependence -- "hot issues" markets

**Puzzle: Why are underwriters not better at**  
**eliminating underpricing?**  
insurance against litigation?

**After-market performance of IPO's is not great**  
**[Ritter(JF, 1991)]**

# IPO Pricing: Questions

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- (1) If you were a CFO of a private company, how would you choose an investment banker?**
- (2) How would you negotiate with your investment banker to try to minimize the mispricing problem with your IPO?**
- (3) As an investor, how might you take advantage of IPO underpricing?**

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