

FIN 540 Initial Public Offerings (IPOs)

Why Issue Public Equity?

Cost & Benefits of IPOs

Why Is There Underpricing?

Hot Issues Markets

Why Issue Public Equity?

- 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.)

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

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, β^* , 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 β_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

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

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

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.)

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.)

- 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.)

- 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.)

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 2 years after IPO -- Rule 144

Costs of Initial Public Equity Offering (IPO)

- 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.)

4. Costs of corporate control

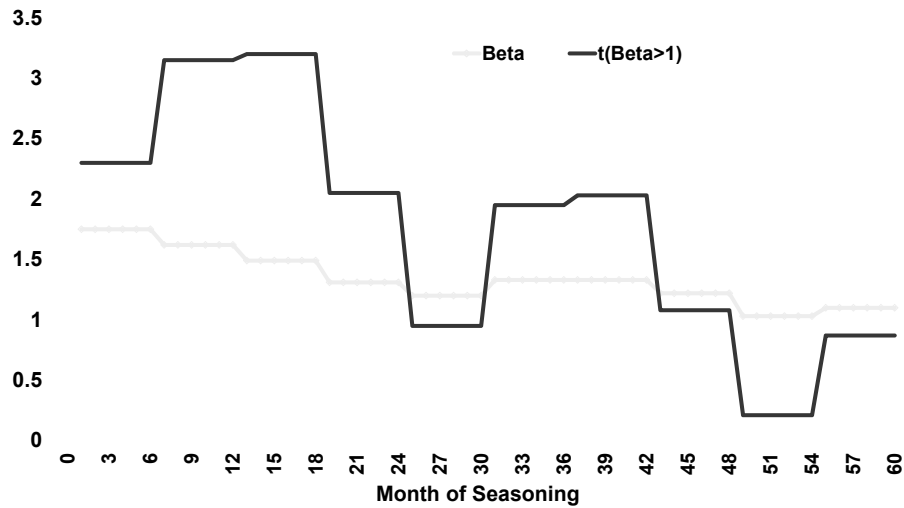
- outside stockholders can impose costs on managers if they feel that the firm isn't being managed in the stockholders' interests, even if they only represent a minority position
 - e.g., Hugh Hefner, the majority stockholder of Playboy, was sued for having too many perquisites by outside minority shareholders

Costs of an IPO (cont.)

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.)

- (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?

- 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

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.)

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.)

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

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.)

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.)

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

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

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.)

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.)

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.)

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.)

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.)

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

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.)

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

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

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?

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

Underpricing was greater if:

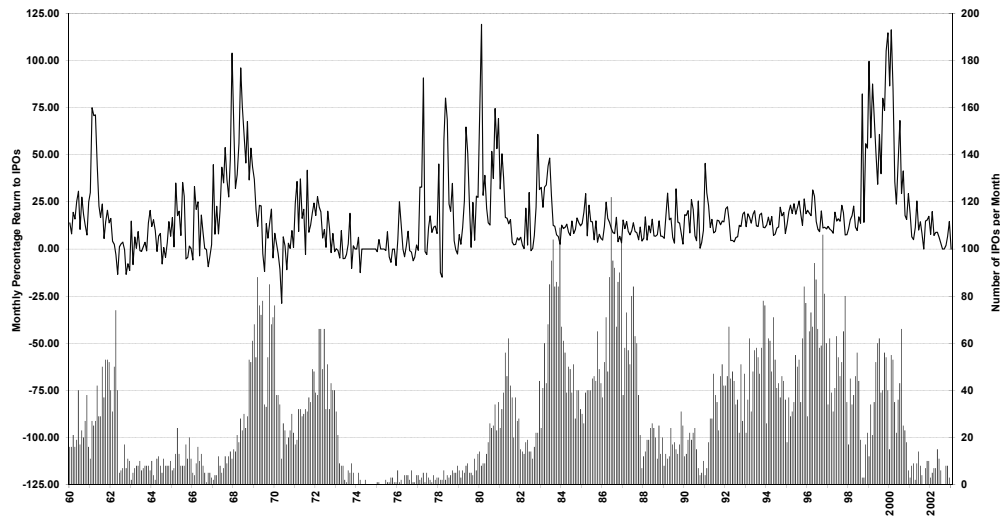
- (a) it is a startup company vs. one with past operating results (e.g., Indian Bingo)**
- (b) the after-market standard deviation is higher**
- (c) there was lots of underpricing in "penny stocks" in Denver in 1980**
 - inexperienced underwriters were underpricing**

Hot Issues Markets (cont.)

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

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?

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

**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

- (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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