Why IPO Auctions Are Not Popular: Interpreting International Experience

Ravi Jagannathan
Northwestern University & NBER

Why Study IPOs?

- IPOs bring new firms to the public
  - An important economic activity

- Market value of firms (other than banks and utilities) that went public during 1997-2006
  - $1.52 Trillion, at the offering price
  - VC backed accounted for $0.41 Trillion
Methods Available for IPOs

- Bookbuilding and its’ variants
- Auctions
  - Uniform price
  - Discriminatory
- Fixed Price Issues
- Hybrids that combine the above methods
Global Patterns in IPO Methods

- Traditional IPO method in most countries was Fixed Price Public Offer
  - Set the price, and let investors place orders
  - Inexpensive, easy on retail investors
- Large Privatizations
  - Margaret Thatcher started the wave of privatizations
    - Other countries followed
  - First tried auctions, and then bookbuilding
  - Early 1990s: Hardly any bookbuilding outside North America
  - Late 1990s: Bookbuilding became dominant
Global Patterns in IPO Methods...

- Just as bookbuilding gained grounds around the world
  - US began having doubts...
The Bookbuilding Method for IPOs

- Common U.S. IPO Method
  - A select group of investors submits bids

- The issue manager:
  - Uses bids to approximate the demand curve
  - Sets Offering Price below what will equate supply and demand
    - Discretion (in consultation with issuer) over level of Underpricing
  - Allocate shares by rationing
    - Discretion over who gets how many shares
Why offer shares at a discount?

- Those with valuation relevant information
  - Have to be compensated to share their information and facilitate price discovery
  - Even those without any “information” have to be induced to participate

- Otherwise they can wait and buy after trading starts
  - If everyone waits, the issue will fail

- How much underpricing is reasonable?
  - Debatable!
Magnitude of Underpricing

- 6,995 U.S IPOs, 1980-2006
  - Average Offer Price:
    - $12.39 ($12.54 for VC backed)
  - Average Net Proceeds:
    - $69.33 million ($47.20 for VC backed)
  - First day return
    - Average: 18.64% (26.93% for VC backed)
    - Median: 6.67% (9.82% for VC backed)
What happened during 1998-2000

- Severe Underpricing
  - Average first day return: 48.8%
- Money left on the table
  - $71 billion
  - $163 Billion Raised through IPOs
- Why so much money was left on the table?
  - Why issuers did not complain?
Popular View in US

- Underpricing + Discretion over share allocation in bookbuilding
  - Potential for abuse
    - Especially with first day returns as large as 50%
  - Some abuse happened
    - Well publicized scandals
- Need for a more transparent process with less discretion
Popular View in the US...

- Auctions are eminently suitable for IPOs
- Transparency
  - Little underwriter discretion
- Widely used for a variety of goods and securities
  - Especially for Government bonds
  - Also for
    - Corporate Bonds and Preferred Shares
    - New Equity Issues in Privatizations
- Why not for new equity issues in general?
  - What do we learn from other countries’ experience?
Popular View in the US...

- Auctions not popular only because
  - Underwriters’ incentive to promote bookbuilding
  - Issuers’ disincentive to try a new method
  - Investors’ unfamiliarity with auctions
Global Experience with Auctions

- Auctions have been tried in over 20 countries
  - Most have abandoned them

- Choice
  - Made by issuers and not regulators
  - Not due to lack of familiarity
  - Does not appear to be due to underwriters’ efforts to higher fees or to allocate shares to “friends”

- No evidence that issuers prefer method with least underpricing
Global Experience, ...

- Country, Introduced, (Abandoned)
  - France, 1960s, (1999?)
  - Italy, 1980s, (1986)
  - Sweden, 1980s, (1980s)
  - Switzerland, 1980s, (1980s)
Global Experience, ...

- Country, Introduced, (Abandoned)
  - Malaysia, 1992, (1994?)
Auctions were tried and abandoned

Dotted line (right axis): # of total IPOs per year;
Solid line (left axis): % of IPO auctions out of all IPOs.
Three Problems with IPO Auctions

- **Winner’s Curse**
  - Accentuated by Uncertainty about the number of bidders and what they know, ...

- **Free Riders**
  - Inadequate incentive for information gathering and price discovery, ...

- **Return Chasers**
  - Destabilizing effect, ...
Winner’s Curse

□ Bidding in auctions requires sophistication

■ Even risk neutral bidders will have to adjust bids down to be below their own estimate of value

■ Adjustment depends on

□ Number of bidders, and their bidding strategies

□ Their information
Winner’s Curse ...

- Learning from the past experience is difficult
  - Example: K shares, N bidders. Everyone gets a signal about the value and has a private estimate.
  - How should one bid?
Winner’s Curse: Example with Naïve Bidders

- K = 100 shares being offered
  - True value = $20
  - i’th bidder’s estimate of value, IV$_i$
    - IV$_i$ = $20 + e_i$
    - e$_i$ ~ Normal (0, $6$)
  - 101$^{\text{st}}$ highest bid is the auction clearing price.
- N = 200 Naïve bidders, i = 1,2...200
  - Each bidder bids his estimate
  - Almost No Winner’s Curse
Winner’s Curse: Example, cont..

- 200 bidders as expected, N = 200, # of auctions = 100

B. 200 Bidders  Average Bid = $19.23
Clearing Price = $19.08
Winner’s Curse: Example, cont..

- Suppose a risk neutral participant observed 100 past auctions where exactly 200 bidders participated

- Finds,
  - Average bid price is about $20
  - Winning bid is also about $20
  - Range, $18.32 to $21.27
  - True value is about $20
  - Maximum Winner’s Curse
    - $1.27 (Loss)
  - Minimum Winner’s Curse
    - -$1.68 (Gain)

- Naïve bidding strategy seems acceptable
Winner’s Curse: An Example, cont..

- Suppose the investor bids his private estimate of intrinsic value
  - Unexpectedly 1000 investors decide participate
  - 10 times expected
    - Not unusual

- Winner’s Curse
  - Average loss: $8.20
    - 41% of the value of the stock being auctioned
    - 6.5 times $1.27 (worst case observed in the past!)
Winner’s Curse: An Example, cont..

- Too many bidders, $N = 1,000$, # of auctions = 100

**D. 1,000 Bidders**  
Average Bid = $19.90  
Clearing Price = $28.20
Sophisticated Bidders

- What if all investors correctly analyze the auction structure?
  - Equilibrium optimal bidding strategy is given in Milgrom (1981)
Winner’s Curse & Sophisticated Bidders

- Adjusting for Winner’s Curse
  - Shave your bid, depending on how many others will be bidding and how they will bid
  - But, how many are bidding?
  - What do they know and what strategy do they follow?
Sophisticated Bidders: Equilibrium

☐ To follow:
☐ Properties of the equilibrium
A numerical exercise

- $K=5$
- **Number of bidders = N, Each bidder can bid for one unit or zero unit**
- Initial capital of $30$
- $V$ lognormal, $E(V) = $10, $\sigma(V) = 0.3$
- $\{S_i\}$ lognormal, $E(S_i) = V$, $\sigma(S_i|V) = 0.3$
- After the auction, all the information is revealed and the issue is traded at a price equal to the average of the signals
- Bidders are Risk Neutral
Equilibrium Bid Function

Equilibrium bid shaving increases with the number of participants:

![Equilibrium Bid Function Graph](image-url)
Little reward to participation in the auction!

- Discount = \( E(V|\text{All Signals}) - \) Auction Price
Allowing for Randomness in N...

- As long as the number of bidders is known, there is little risk for any $N$
- What if $N$ is random?
- Suppose $N=10$ with probability 0.80, but there is a 0.20 chance that $N=5000$
- Bidders’ Coefficient of Relative Risk Aversion is 15
Allowing for Randomness in N...

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- Bidders’ Coefficient of Relative Risk Aversion is 15.

- The discount that bidders require, and the riskiness of the auction payoff, increase substantially:
  - Average discount = 20%
The Free Rider Problem

- Unlike Treasury Bills and Preferred Shares of Utilities
- Coming up with a reasonable value for IPO shares requires effort, even for sophisticated investors
- With large number of investors
  - If everyone gathers information through effort, auction clearing price will reflect that information
  - Why not free ride, and bid high without effort?
- One possible equilibrium
  - “Free ride” with probability, p, and gather information with probability, 1-p
- Limiting the number of bidders & knowing their identity/information quality may help design a better mechanism
The Free Rider Problem...

- Another possibility
  - Adaptive learning strategy
  - Bidders assume others may behave in one way
    - Respond optimally
  - No one free rides
    - Followed by free riding
      - Followed by no free riding
  - May not converge, ...unstable, volatile auction prices, ...investors and issuers may shy away from auctions
Free Riders: Singapore Evidence

Free Riders Placing Excessive Bids

<table>
<thead>
<tr>
<th>Company</th>
<th>Reservation Price</th>
<th>Clearing Price</th>
<th>Highest Bid</th>
<th>Premium over Reservation Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>STIC</td>
<td>$0.85</td>
<td>$1.20</td>
<td>$9.80</td>
<td>1,053%</td>
</tr>
<tr>
<td>Eng Wah</td>
<td>$0.65</td>
<td>$0.66</td>
<td>$7.80</td>
<td>1,100%</td>
</tr>
<tr>
<td>Hwa Tat Lee</td>
<td>$0.60</td>
<td>$1.02</td>
<td>$10.20</td>
<td>1,600%</td>
</tr>
<tr>
<td>SingTel</td>
<td>$2.00</td>
<td>$3.60</td>
<td>$100.00</td>
<td>4,900%</td>
</tr>
</tbody>
</table>

Singapore Telecom: A mature, established company scheduled to lose its current monopoly in a few years.
- At the $2.00 reservation price, the PE was 27 times.
- At the highest bid, the PE was 1,350 times.
Return Chasers

- Suppose some investors do not know how to bid in an auction and go by the results of preceding auction
  - Unexpectedly low auction participation
    - Low auction clearing price
    - High return to auction participation
  - Induces more participation in subsequent auction
  - Unexpectedly large participation
    - High auction clearing price
    - Low return to auction participation
  - Discourages participation in subsequent auction
    - Induces volatile auction prices and participation levels,...,
An Anecdote from Argentina

- Argentina began a massive privatization program with the IPO auction of Telefonica de Argentina in December, 1991.

- The clearing price was 45% above the already-high reservation price.

- But the price rose another 20% on the first day of trading, and kept climbing from there.

- A “smashing success”.
An Anecdote from Argentina...

- Four months later, they auctioned off Argentina Telecom.

- People thought “if I had only bid in the Telefonica auction, I’d be rich now”, so they piled into Telecom.

- Telecom was later described as “viciously overpriced”.
Evidence from Singapore

- 20 uniform price auctions from 1993-1994
- (as well as 31 fixed price public offers)

- Simultaneous hybrids – investors could also place fixed price orders at the reservation price, but the fixed price tranche was usually heavily oversubscribed and had to be rationed.

- We find evidence of
  - Free riders placing excessively high bids
  - Deteriorating and eventually negative returns to bidders
- Fewer bidders over time, eventually leading to two undersubscribed offerings.
Learning, Winners Curse: Past Auction Return affects Future Participation

Regression Equation: $y = 14.112x + 2.9134; R^2 = 0.4611$

$x = $One month return following (i-2)\text{'th auction}$

$y = \frac{\text{#Shares Bid}}{\text{#Shares Auctioned}}$ in $i$\text{'th auction}$
Singapore, 1993-94, cont...
Subscription Rate Affects Auction Price (Stronger Winner’s Curse?)

Auction Price Vs Auction Subscription

Regression Equation: \( y = 0.1225x + 0.0278, \quad R^2 = 0.3842 \)

\[ y = \frac{\text{Auction Price} - \text{Reservation Price}}{\text{Reservation Price}} \]

\[ x = \frac{\text{(#shares bid in auction)}}{\text{(#shares auctioned)}} \]
Singapore, 1993-94, cont...
Winner’s Curse? Continued...

\[ r_i = \alpha_0 + \alpha_1 \left( \frac{P_A - P_F}{P_F} \right)_i + \alpha_2 s F_i + u_i \]

- Higher auction price from Winner’s Curse =>
  - Controlling for participation rate in fixed price tranche
    - Lower one month return following auction
    - First slope coefficient negative (significant, 10%, one tail)
- Larger participation rate in fixed price tranche =>
  - Controlling for auction price / fixed price, stronger demand once trading starts
    - Higher prices after trading starts
    - Second slope coefficient significant (significant, 2%, one tail)
- Adjusted R-Square: 14.3%
Evidence from Singapore...

Deteriorating Returns Over Time

- Initial returns –
  - Mean: 4.6%; Median: 2.8%; Standard deviation: 8.7%
  - Half of the auctions had negative market-adjusted initial returns.

- One month returns –
  - Mean: -0.5%; Median: -2%; Standard deviation: 12.4%
  - 13 out of 20 had negative market-adjusted initial returns.

- One month returns over time –
  - First 7 auctions: 11.7% average return (5 of 7 positive)
  - Last 13 auctions: -6.2% average return (11 of 13 negative)
  - Singapore’s auctions were known as tenders;
  - People joked that the stocks must be catching a new disease, ‘tenderitis’
Evidence from Singapore...

Deteriorating Returns Over Time...

Figure 3.A. One Month Raw Returns on Singapore Auctions Over Time

- IPC International
- STIC
- Keppel Bank
- Intern'l Factor
- Rotary Engineering
- Hwa Tat Lee
- Singapore Telecom
- Vickers Balleas
- Pan United Co.
- Hup Seng Hat
- Datapulse Tech.
- Aztech Systems
- Nippecraft Ltd.
- Berger International
- Comfort Group
- Liang Hiat
- Eng Wah Org.
- Superbowl
- Pokka Corp.
- Sunright Ltd.

- 4-offering moving average raw 1-month returns
- One month raw returns
Evidence from Singapore...

- **Fewer Bidders Over Time**
  - Average number of bidders, first 9 auctions: 45,517
  - Average number of bidders, 4 of last 5 auctions: 1,422 (a 97% reduction)
  - The 5th-to-last auction, Liang Huat, was 38% undersubscribed.
  - The last auction, Sunright, was 82% undersubscribed.
  - But there were still a few placing high bids – the highest bids for Liang Huat and Eng Wah were 250% and 1,000% over the reservation prices.

- **Summary** –
  - All of this is consistent with the idea that return-chasing free riders made auctions less attractive over time
  - less attractive to sophisticated investors;
  - and ultimately less attractive to issuers.
Singapore, 1993-94

- Dotted Line: #IPOs; Solid Line: % IPOs Using Auctions

A. Singapore
Improving on standard auctions

- Consider Nonstandard Auctions & Allocations

  - Allocations to depend on price as well as "quality" and "timing" of bid
  - Reward long-term investors, early firm bids, reward information that helps price the issue, favor limit bids to market bids, ...
  - Pre-qualify and limit number of bidders to minimize risk to bidders
  - Encourage small retail participation without discouraging sophisticated institutional investors
    - Fixed price tranche for qualified small retail investors immediately following issue price is set with predetermined allocation rules
  - Make decision rules public and discretion subject to oversight
Conclusion

- IPO auctions have been tried repeatedly in various countries, but have been abandoned by issuers.

We argue that there are three problems:
- the winner’s curse
- the free rider problem
- return chasers

- The problems are all related to the fact that entry is not controlled, making auction outcomes uncertain for both investors and issuers.

- We find evidence of these problems for IPO auctions in Singapore and elsewhere.

- Need to address these issues for IPO auctions to become popular