

Saving Speculative Markets from the Speculators

Vladimir A. Gatchev

Rama Seth (presenter)

Ajai Singh

Vishwanatha S. R.

NSE - NYU Stern Initiative on the Study of
Indian Capital Markets



December 10, 2020



Motivation

- A large and growing literature shows (some) investors have a preference for assets with lottery-like payoffs:
 - ... a small probability of unusually high returns
 - Originally, Friedman and Savage (1948) and Markowitz (1952)
- These preferences affect:
 - Investor engagement in financial markets
 - Investor trading behavior
 - Asset prices
 - Expected returns

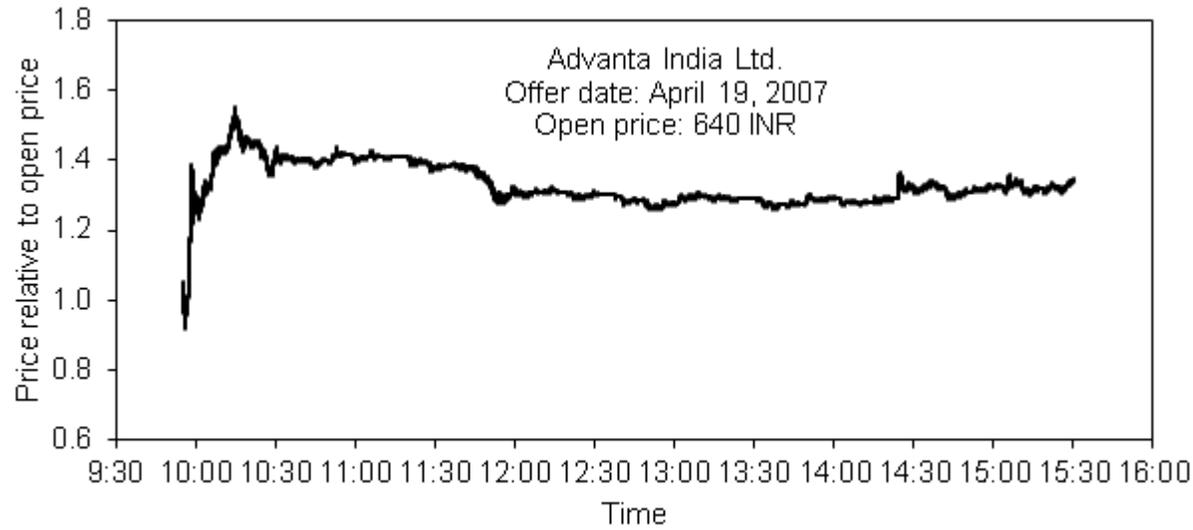
What if Price Moves are Restricted?

- Strict limits on the moves of asset prices will eliminate lottery-like payoffs
- Which in turn should:
 - *Reduce the demand* by investors with a preference for such payoffs
 - *Reduce asset prices*
 - *Increase expected returns*
- Moreover, lower asset prices may affect firm desire to sell equity to outside investors

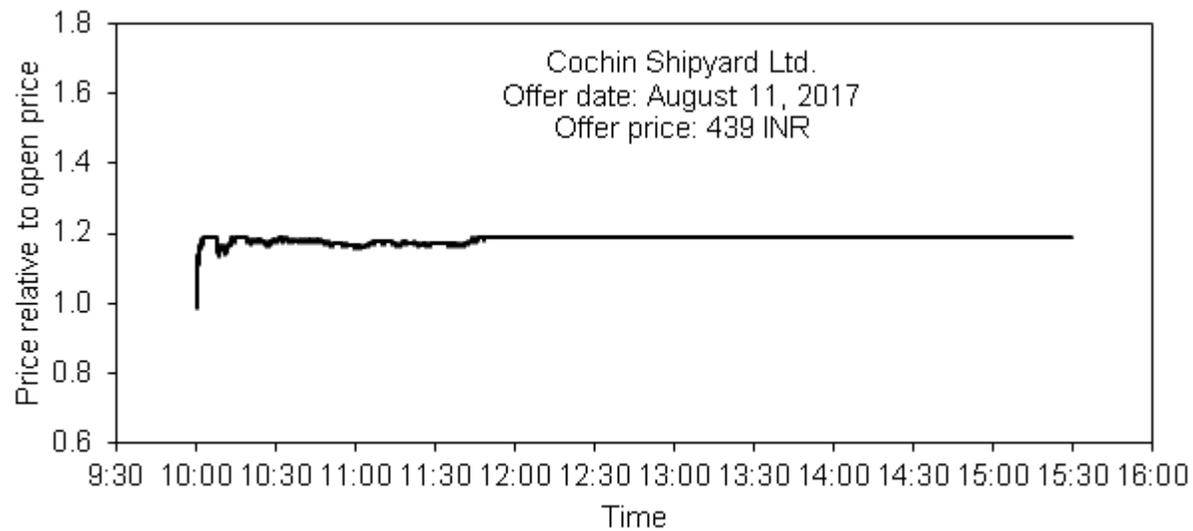
Our Study

- Uses a natural experiment to examine these questions
- In 2012, the Securities Exchange Board of India (SEBI) imposed price bands on IPO stocks for ten days after listing
 - Pre-regulation, daily returns are unbound
 - Post-regulation, daily returns are bound within:
 - $\pm 5\%$ for smaller IPOs (< INR 2.5 billion ~ USD 35 million)
 - $\pm 20\%$ for larger IPOs (> INR 2.5 billion ~ USD 35 million)
- Introduce a 45min pre-market auction on first day of trading
 - Investors can buy and sell IPO shares before the market opens

Example: Intraday Prices of Two IPOs



Before introduction of price bands



After introduction of price bands

Contributions

- Direct evidence of how changes in the distribution of stock returns affect investor demand and trading behavior
 - Friedman and Savage (1948); Markowitz (1952) and many others
- Effect of investor sentiment on the demand and pricing of IPOs
 - Derrien (2005) and Green and Hwang (2012)
- Sentiment and activity in primary equity markets
 - Lee, Shleifer, and Thaler (1991); Loughran, Ritter, and Rydqvist (1994); Ljungqvist, Nanda, and Singh (2006); Santos (2017)
- Ability of regulators to curb speculation by imposing price limits
 - Kim and Rhee (1997) and others

Preview of Main Findings (1)

Comparing pre-regulation to post-regulation IPOs:

- Decline in price variability of IPO stocks on first trading day
 - The decline is not temporary; persists over the first month
- Decline in upside potential on the first trading day
- Decline in retail and institutional pre-sale demand
- Decline in net buying by retail investors and an increase in net buying by institutional investors on first day of trading

Preview of Main Findings (2)

Comparing pre-regulation to post-regulation IPOs:

- No change in average underpricing
- Increase in expected returns
- Sharp decline the number of medium-sized IPOs
 - IPOs most affected by the new rules

Examining pre-market auction:

- Retail (institutional) investors use the auction to sell (buy) shares

Main Data

- 393 bookbuilt IPOs on the Bombay Stock Exchange (**BSE**) and the National Stock Exchange (**NSE**). 327 IPOs on the Small & Medium Enterprise (**SME**) exchange
- **Prime** provides information on:
 - Offer prices, shares offered, subscription and allocation by investor type, number of managers, underwriter reputation, VC backing, firm age
- **BSE** provides information on:
 - Pre-market auction trades by buyer and seller types
 - Intraday trading prices, quantities, buyer and seller types
 - Monthly returns for the 12 months following the IPO
- **Prowess** provides accounting data:
 - Assets, liabilities, profits
 - Daily returns data
- **Other** FF value factors, Bloomberg, RBI

Empirical Approach

- Propensity score matching to control for variables related to market, firm, and offer characteristics:
 - First stage, a probit regression of whether an IPO was conducted in the post-regulation period
 - Verify matched samples are similar across the set of relevant variables
- Return tests are based on estimates from a four-factor model
 - Market, size, value, and momentum

Matched Sample

Panel B: Matched sample comparisons

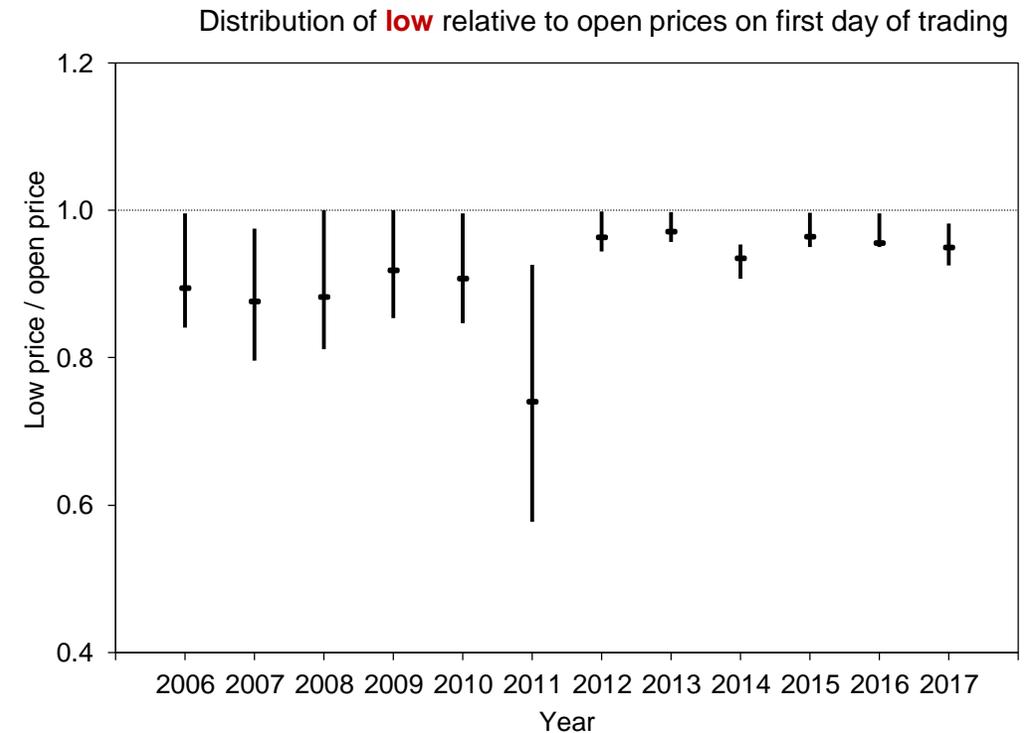
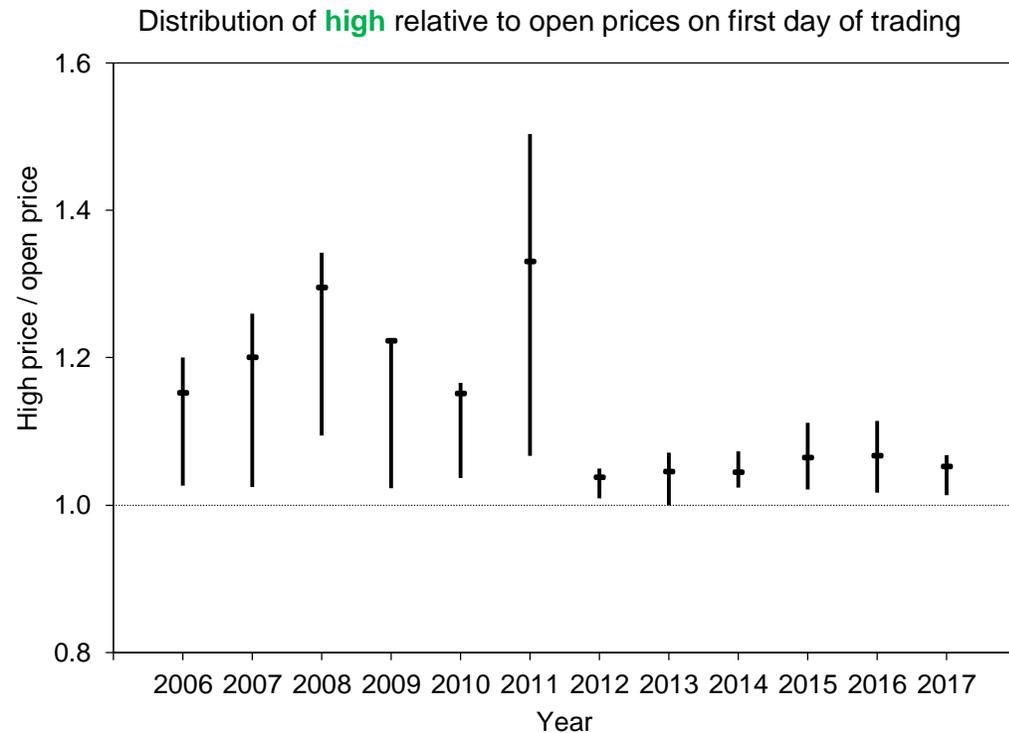
	Pre-regulation	Post-regulation	Difference	t-statistic	p-value	Δx
Market cap (bill 2017 INR)	142.52	83.07	-59.46	-1.86	(0.065)	-0.199
Fraction offered (%)	21.00	23.33	2.33	1.59	(0.114)	0.170
Offer price (INR)	386.08	358.05	-28.03	-0.73	(0.467)	-0.078
ROA (%)	7.80	7.78	-0.02	-0.02	(0.981)	-0.003
Debt-to-assets (%)	68.30	98.80	30.51	1.64	(0.102)	0.176
Market-to-book	3.20	3.04	-0.16	-0.43	(0.665)	-0.047
Firm age (years)	20.32	22.49	2.17	1.20	(0.232)	0.129
VC backed IPO dummy	24.14	20.69	-3.45	-0.54	(0.588)	-0.057
Reputable lead dummy	75.86	79.31	3.45	0.54	(0.588)	0.057
Number of managers	3.63	3.37	-0.26	-0.70	(0.486)	-0.075
S&P CNX Nifty three-month return (%)	1.34	2.63	1.29	0.97	(0.332)	0.104

Hypothesis 1

- On the first day of trading after an IPO, we expect a lower variability of IPO prices in periods when price bands are in effect, relative to periods when price bands are not in effect.
- As a corollary, we expect the upside return potential of IPO stocks on the first day of trading to be lower when price bands are in effect, compared to periods when price bands are not in effect.
- Findings: **Strong support for H1**

Hypothesis 1 (continued)

- Decline in variability of IPO prices on first day of trading



Hypothesis 1(Contd.)

	Pre-regulation	Post-regulation	Difference	t-statistic	p-value
Standard deviation of 5-minute returns	1.05	0.76	- 0.29	- 3.56	(<0.001)
High price / Open price	1.13	1.06	- 0.08	- 4.91	(<0.001)
Low price / Open price	0.88	0.96	0.07	4.83	(<0.001)
(High price - Low price) / Mid price (%)	25.39	9.78	- 15.61	- 8.49	(<0.001)
High / Open > 1.05 dummy (%)	72.41	43.68	- 28.74	- 3.99	(<0.001)
High / Open > 1.10 dummy (%)	40.23	17.24	- 22.99	- 3.44	(0.001)
High / Open > 1.15 dummy (%)	34.48	11.49	- 22.99	- 3.72	(<0.000)
High / Open > 1.20 dummy (%)	19.54	0.00	- 19.54	- 4.57	(<0.000)

Hypothesis 2

- We expect lower demand by retail investors for IPO stocks in periods when price bands are in effect, relative to periods when price bands are not in effect
- Findings: **Strong support for H2**
 - Subscription multiples of retail investors declined from 9x to 4.7x
 - Subscription multiples of institutions also declined from 36.1x to 12.6x
 - Subscription multiples of high-net-worth individuals increased from 49x to 75x

Hypothesis 2 (continued)

	Pre-regulation	Post-regulation	Difference	t-statistic	p-value
<i>Times subscribed:</i>					
Qualified institutional buyers	36.086 →	12.603	-23.483	-4.520	(<0.001)
Retail investors	9.042 →	4.678	-4.364	-3.060	(0.003)
High-net-worth individuals	48.643 →	75.437	26.794	1.830	(0.069)
Employees	0.384	0.208	-0.176	-2.270	(0.024)
Existing shareholders	0.038	0.171	0.133	0.920	(0.357)
All investors	28.613	18.970	-9.643	-2.080	(0.039)
All investors	100.000	100.000	0.000	0.000	(1.000)

Hypothesis 3

- In the IPO aftermarket on the first day of trading, we expect less net buying by retail investors in periods when price bands are in effect, relative to periods when price bands are not in effect.
- As a corollary, we expect more net buying by institutional investors in periods when price bands are in effect, relative to periods when price bands are not in effect.
- Findings: **Strong support for H3**

Hypothesis 3 (continued)

Panel B: Buy and sell volume, percent by investor type					
	Pre-regulation	Post-regulation	Difference	t-statistic	p-value
<i>Buy volume (% of total)</i>					
Institutional investors	8.502	24.194	15.692	5.520	(<0.001)
Individual investors	50.239	36.003	-14.236	-6.800	(<0.001)
Non-individual investors	40.841	34.499	-6.342	-2.330	(0.021)
Other	0.419	5.304	4.885	2.250	(0.025)
<i>Sell volume (% of total)</i>					
Institutional investors	16.156	14.911	-1.245	-0.430	(0.670)
Individual investors	49.059	52.056	2.997	1.370	(0.171)
Non-individual investors	34.298	28.152	-6.146	-2.260	(0.025)
Other	0.487	4.881	4.394	2.070	(0.040)
<i>Difference (% of total)</i>					
Institutional investors	7.655	-9.282	-16.937	-4.270	(<0.001)
Individual investors	-1.180	16.053	17.233	7.510	(<0.001)
Non-individual investors	-6.543	-6.347	0.196	0.060	(0.953)
Other	0.068	-0.423	-0.491	-1.210	(0.227)

Hypothesis 4A

- We expect lower first-day IPO returns in periods when price bands are in effect, relative to periods when price bands are not in effect
- Findings:
- We do not find significant differences in IPO underpricing between the two periods

Hypothesis 4B

- We expect lower market prices, and thus higher subsequent returns, of freshly listed IPO stocks in periods when price bands are in effect, relative to periods when price bands are not in effect
- Findings: **Strong support for H 4B**
 - Pre-regulation, IPO stocks deliver a monthly alpha of -1.2% over the first year after IPO
 - Post-regulation, IPO stocks deliver a monthly alpha of +1.5% over the first year after IPO
 - Consistent with an increase in expected return post regulation

Hypothesis 4B (continued)

$$R_{p,t} - R_{rf} = \alpha + \beta_{MKT} (R_{MKT,t} - R_{rf}) + \beta_{SMB} R_{SMB,t} + \beta_{HML} R_{HML,t} + \beta_{MOM} R_{MOM,t} + u_{i,t}$$

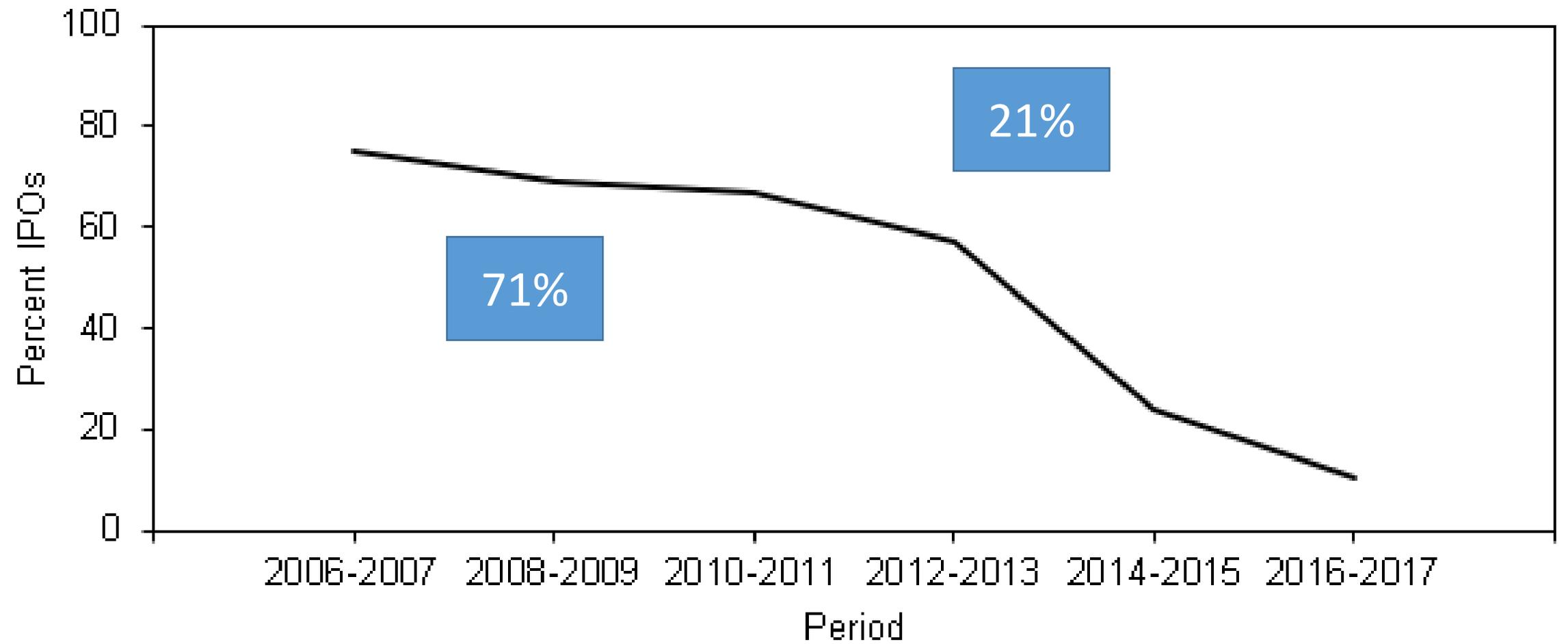
	Pre-regulation	Post-regulation	Difference
α	-0.012** (-2.577)	0.015* (1.736)	0.027*** (2.802)
β_{MKT}	1.033*** (15.926)	1.127*** (4.930)	0.094 (0.453)
β_{SMB}	0.842*** (6.890)	0.507** (2.243)	-0.335 (-1.329)
β_{HML}	0.296*** (3.324)	0.060 (0.360)	-0.236 (-1.269)
β_{MOM}	-0.194*** (-2.666)	-0.115 (-0.653)	0.079 (0.446)
Observations	82	80	
Adjusted R-squared (%)	86.88	30.33	

Hypothesis 5

- For IPOs most affected by the new price band rules, we expect fewer IPOs in periods when price bands are in effect, relative to periods when price bands are not in effect
- Findings:
 - Pre-Regulation IPO %age below INR 2.5 Billion = 71%
 - Post-Regulation IPO %age below INR 2.5 Billion = 21%
 - Not explained by the active IPO market of Small and Medium Enterprises

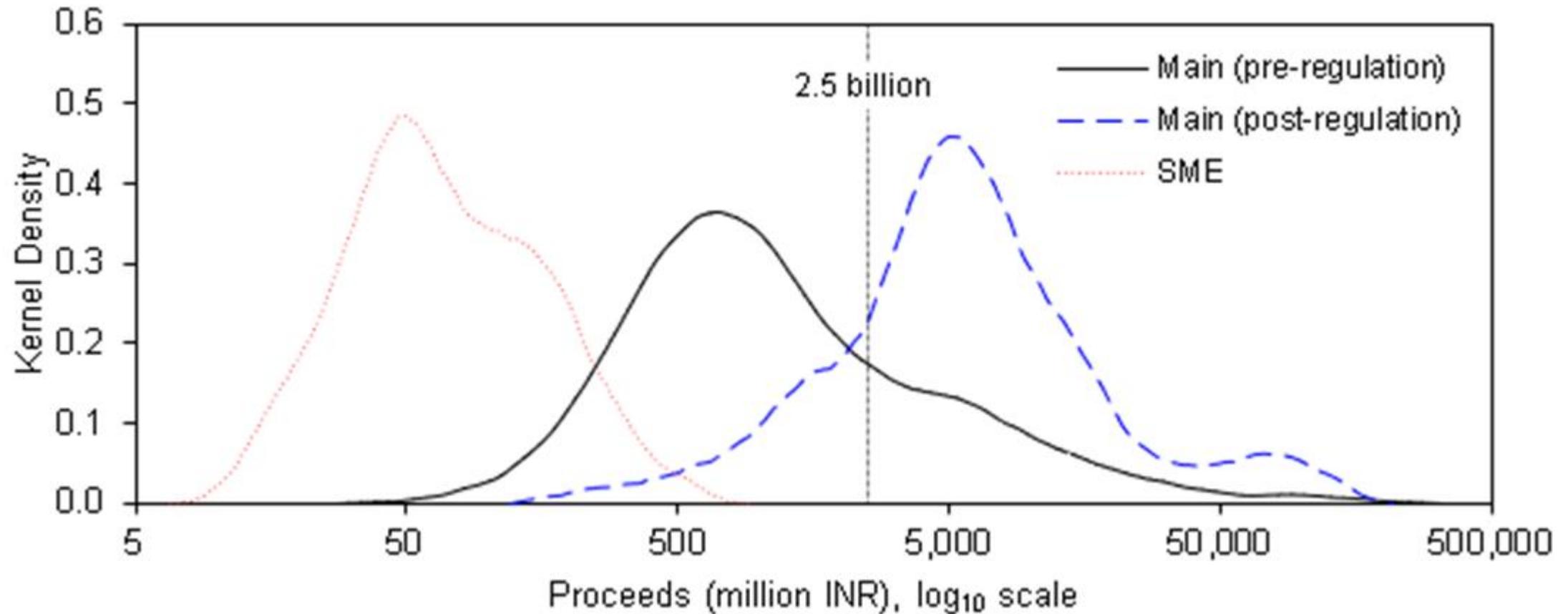
Hypothesis 5 (continued)

Percent IPOs with proceeds below 2.5 billion INR



Hypothesis 5 (continued)

Kernel density of IPO proceeds by exchange



Conclusion

- Price restrictions on IPO stocks *reduced price variability* and the short-term *upside potential* for investors, limiting their ability to gamble
- Leading to a significant decline in the subscription rate and the net buying by retail investors
- No significant change in IPO underpricing
- An increase in expected returns
- A disappearance of medium-sized IPOs in the Indian equity markets
 - IPOs most affected by the new rules on the main exchanges
 - Not picked up by SME

Reduced participation of speculative investors likely leads to a significant increase in the firm's cost of capital and a possible reduction in the incentives of firms to sell their equity to public investors

REFERENCE SLIDES

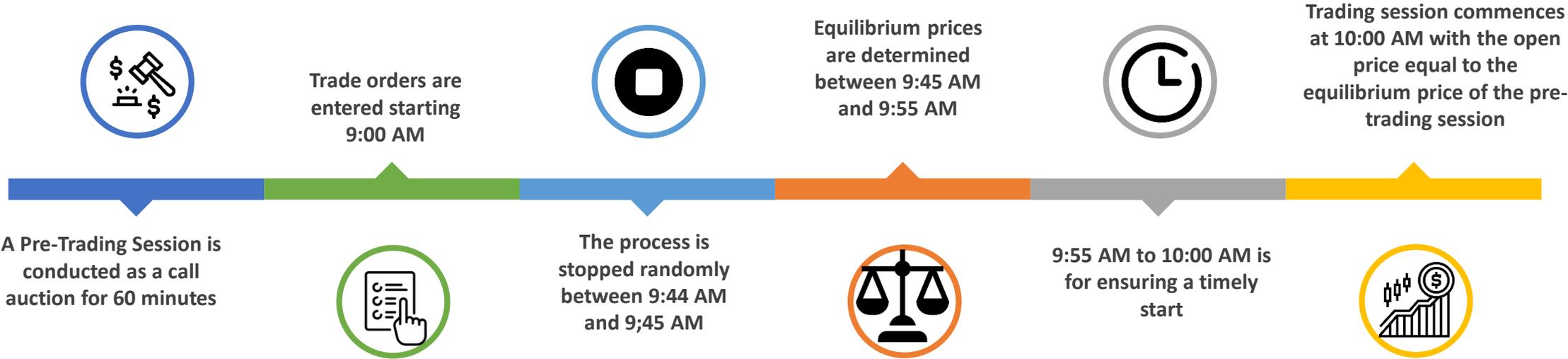
Why Initial Public Offerings?

- IPOs are particularly suited for our analysis
- IPO prices are highly volatile in the initial days of trading
 - Reilly (1987) and Asquith, Jones, and Kieschnick (1998)
 - Also noted by SEBI when introducing the price limits
 - ... and verified within our sample
- Green and Hwang (2012) point out that IPO stocks in the initial days of trading are attractive to investors with a preference for lottery-like payoffs

Selected Literature

- Limited availability of public information resulting in price variability of IPOs:
 - Miller and Reilly (1987) and Asquith, Jones and Kieschnick (1998)
- Investor Demand for assets delivering high payoffs but low profitability:
 - Green and Hwang (2012)
 - Kumar (2009)

Price Discovery under new regulations



Regulatory settings (SEBI Ruling)

- In response to high volatility and price movements on initial days of trading, SEBI passed a norm for predetermined IPO price-bands for ten trading days post listing.
- The daily returns are bound within $\pm 5\%$ for IPOs below INR 2.5 Billion and within $\pm 20\%$ for IPOs above INR 2.5 Billion.
- **In order to facilitate price discovery:**
 - **A Pre-Trading Session is conducted as a call auction for 60 minutes**
 - **Trade orders are entered starting 9:00 AM**
 - **The process is stopped randomly between 9:44 AM and 9:45 AM**
 - **Equilibrium prices are determined between 9:45 AM and 9:55 AM**
 - **9:55 AM to 10:00 AM is for ensuring a timely start**
 - **Trading session commences at 10:00 AM with the open price equal to the equilibrium price of the pre-trading session**

Variables Used

Firm Financials

Market Cap
Return On Assets
Debt to Assets
Market to Book



IPO

Offer Amount
Offer Price
Fraction Offered



Firm Details

Age
VC Backed
Reputable Lead
Number of Managers



Market Conditions

S&P CNX NIFTY 3-Month Return



Sources of Data

431 IPOs from
BSE and NSE



BSE: Time Stamp
Price
Quantity Traded
Type of investors
Daily Returns



Prowess: Total Assets
Total Liabilities
Net Income
Daily Returns



393 Book-building and 38 Fixed Priced



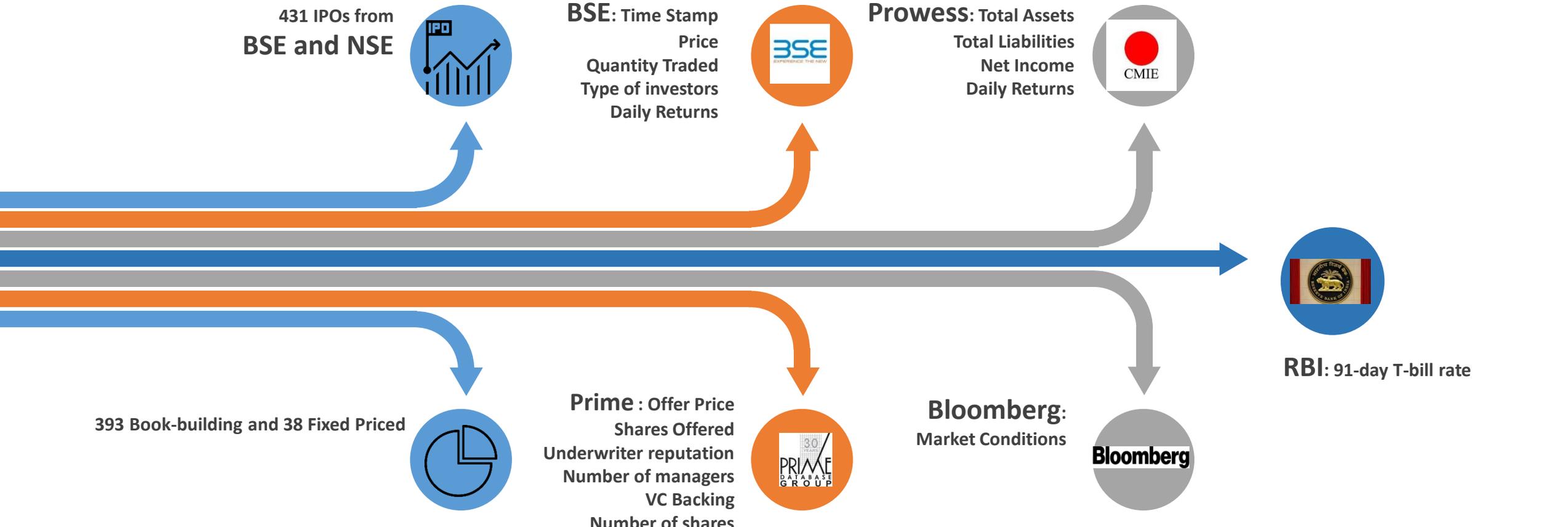
Prime : Offer Price
Shares Offered
Underwriter reputation
Number of managers
VC Backing
Number of shares



Bloomberg:
Market Conditions



RBI: 91-day T-bill rate



Hypotheses

Under the price band regulations (relative to periods when price bands are not in effect):

1. On the first day of trading after an IPO, a lower variation in IPO prices are expected
2. Lower demand of IPO stocks among retail investors is expected
3. Less net buying by retail investors is expected
- 4A. Lower first day IPO returns are expected
- 4B. Higher subsequent returns are expected for freshly listed IPO Stocks
5. Fewer IPOs are expected

Variables used and their characteristics

Variable	Mean	Std. dev.	1 st quartile	Median	3 rd quartile
Market cap (bill 2017 INR)	55.49	129.25	4.50	12.20	39.01
Fraction offered (%)	26.40	11.18	18.18	25.37	32.35
Offer amount (bill 2017 INR)	8.76	17.77	1.38	2.92	7.68
Offer price (INR)	249.35	228.94	91.00	170.00	320.00
ROA (%)	7.56	7.00	3.01	6.71	10.63
Debt-to-assets (%)	84.35	125.96	12.19	41.30	84.04
Market-to-book	2.38	2.05	1.19	1.69	2.77
Firm age (years)	24.75	13.75	17.00	23.00	28.00
VC backed IPO dummy	0.12	0.32	0.00	0.00	0.00
Reputable lead dummy	0.55	0.50	0.00	1.00	1.00
Number of managers	2.46	1.75	1.00	2.00	3.00
S&P CNX Nifty 3-month return (%)	4.30	10.50	- 3.40	4.00	12.30

Price Variability(steps)



New Rules have imposed significant restrictions on price variability of IPO Stocks

Steep Drop in daily high prices relative to open prices post 2012

Plotting Cross Sectional Kernel Density of returns from open to close on first day of trading

Examining the variability of IPO stock prices on first day of trading

Are new regulations restrictive enough to affect price movements?

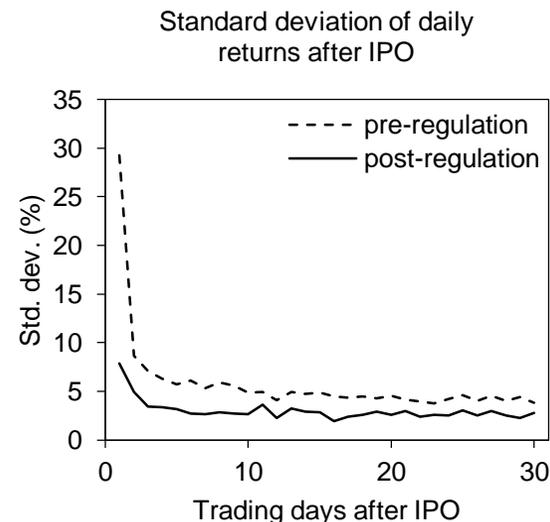
Plotting the ratio of daily prices to open prices on first day of trading

Probit Regression Results

Dependent variable is whether an IPO was conducted post-regulation	
Intercept	-0.433 (-0.158)
Market cap (2017 INR, log)	-0.143 (-1.200)
Fraction offered (%)	0.023* (1.927)
Offer price (INR, log)	0.575*** (4.671)
ROA (%)	-0.008 (-0.605)
Debt-to-assets (%)	0.000 (0.086)
Market-to-book	0.090 (1.503)
Firm age (years, log)	-0.538*** (-2.917)
VC backed IPO dummy	0.806*** (3.502)
Reputable lead dummy	0.485** (2.104)
Number of managers (log)	0.773*** (3.703)
S&P CNX Nifty three-month return (%)	-0.017** (-1.973)
Observations	393
Pseudo R-squared (%)	29.48

Testing the first hypothesis (additional)

- To examine this possibility of subsequent volatility spillover effects:
 - we calculate the cross-sectional standard deviations of daily returns over the first 30 trading days in the post-IPO period.
 - **Some increase in return volatility** on the 11th trading day is observed after the price bands are removed but the increase in volatility is relatively **small and short-lived** as volatility declines again
 - Uncertainty about the IPO firm has also declined and hence, opportunities for speculative trading have also decline



Hypothesis 3

Investor Trading Behavior

Trades per minute=502

Shares Traded/Shares Offered per Minute =0.438%

Shares Traded/Shares outstanding per minute=0.1%

Pre-Regulation

Trades per minute=247

Shares Traded/Shares Offered per Minute=0.05%

Shares Traded/Shares outstanding per minute=0.01%

Post-Regulation

Testing the third hypothesis

Panel A: Overall trading activity					
	Pre-regulation	Post-regulation	Difference	t-statistic	p-value
Number of trades per minute	502.540	246.850	– 255.690	– 5.530	(<0.001)
Shares traded / shares offered per minute (%)	0.438	0.051	– 0.387	– 9.350	(<0.001)
Shares traded / shares outstanding per minute (%)	0.107	0.011	– 0.096	– 7.080	(<0.001)

Testing the Third Hypothesis

Investor Trading Behavior

Institutional Investors post-regulation

Buying volume has increased from 8.5% to 24.2%
Selling volume is stable at 15%
Net Selling 7.7% to Net Buying 9.3%



Individual Investors post-regulation

Buying volume has declined from 50.2% to 36%
Selling volume has increased from 47.1% to 52.1%
Stable net position to Net Selling 16.3%



Individual investors increased their propensity to sell their IPO allocations immediately after the IPO

Non-Individual Investors post-regulation

Buying volume has declined from 41% to 34.5%
Selling Volume has declined from 34.2% to 28.1%
Net Selling stable around 6.4%



Other Investors post-regulation

Buying volume increased from 0.4% to 5.3%
Selling volume increased from 0.5% to 4.9%
Net Buying 0.07% to Net Selling 0.42%



Testing the third hypothesis (Contd.)

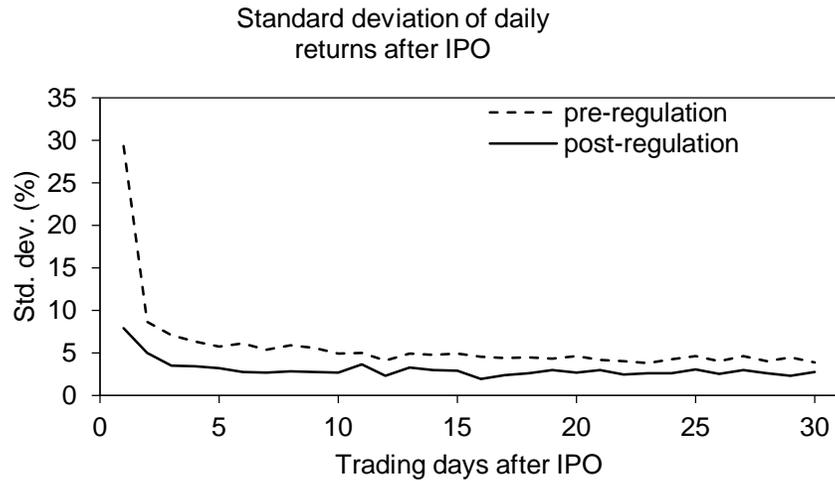
- **Institutional Investors post-regulation:**
 - Buying volume has increased from 8.5% to 24.2%
 - Selling volume is stable at 15%
 - Net Selling 7.7% to Net Buying 9.3%
- **Individual Investors post-regulation:**
 - Buying volume has declined from 50.2% to 36%
 - Selling volume has increased from 47.1% to 52.1%
 - Stable net position to Net Selling 16.3%
- **Non-Individual Investors post-regulation:**
 - Buying volume has declined from 41% to 34.5%
 - Selling Volume has declined from 34.2% to 28.1%
 - Net Selling stable around 6.4%
- **Other Investors post-regulation:**
 - Buying volume increased from 0.4% to 5.3%
 - Selling volume increased from 0.5% to 4.9%
 - Net Buying 0.07% to Net Selling 0.42%

Testing the fourth hypothesis

	Pre-regulation	Post-regulation	Difference	t-statistic	p-value
Unmatched samples					
Open price / Offer price – 1 (%)	15.041	11.528	– 3.513	– 1.358	(0.175)
Close price / Offer price – 1 (%)	19.511	12.483	– 7.028	– 1.522	(0.129)
Matched samples					
Open price / Offer price – 1 (%)	14.205	10.900	– 3.305	– 1.080	(0.282)
Close price / Offer price – 1 (%)	12.714	11.956	– 0.758	– 0.190	(0.852)

Hypothesis 4

First Day IPO Returns



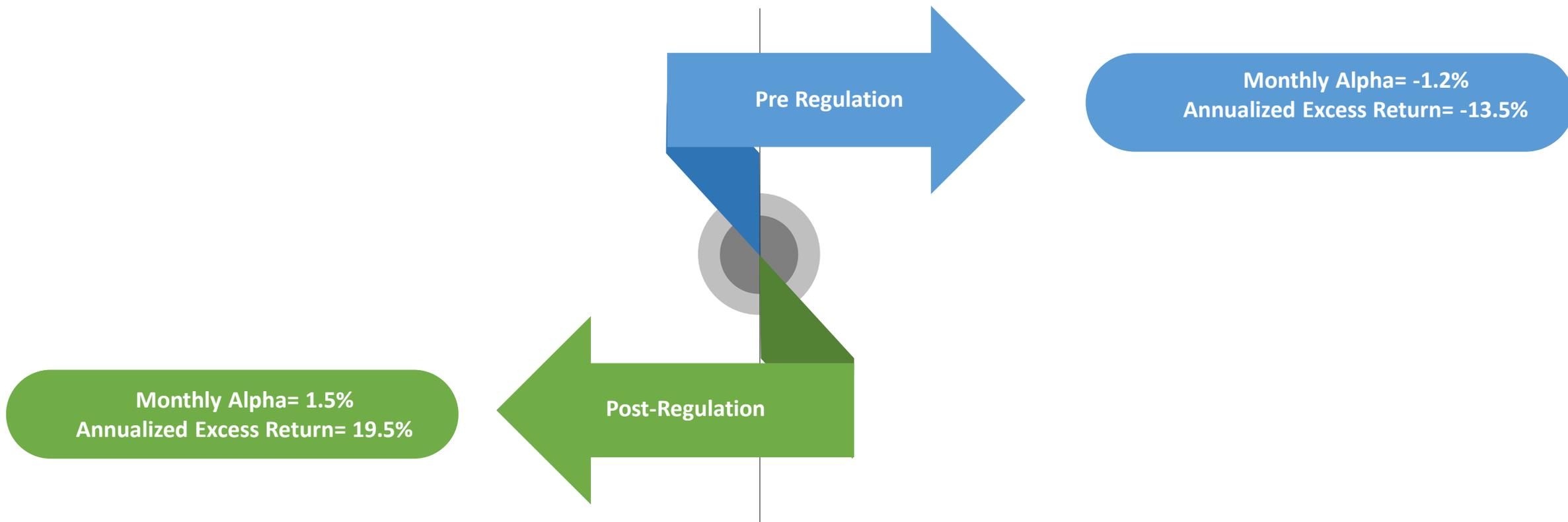
Pre Regulation

Offer-to-Open Returns=15%
Offer-to-Close Returns=19.5%

Offer-to-Open Returns=11.5%
Offer-to-Close returns=12.5%

Post-Regulation

One-Year Returns



Impact on size of IPOs

SME Exchange was highly active
327 IPOs over the period of 2012-2017.



Firms face reduced valuations post-IPO
Hence, they choose to remain private



Significant Drop in Medium-Sized IPOs

Pre-Regulation IPO %age below INR 2.5 Billion= 71%
Post-Regulation IPO %age below INR 2.5 Billion= 21%



Hypothesis 5(Contd.)

Period	All IPOs	IPOs (proceeds < INR 2.5bill)	IPOs (proceeds ≥ INR 2.5bill)	Percent IPOs (proceeds < INR 2.5bill)
2006- 2007	143	107	36	75%
2008- 2009	52	36	16	69%
2010- 2011	102	68	34	67%
2012- 2013	14	8	6	57%
2014- 2015	25	6	19	24%
2016- 2017	57	6	51	11%

- Post regulation, there is a sharp decline in IPOs raising below INR 2.5 billion and listing on the main exchanges.
- A sample of IPOs that listed on the SME exchange over the 2012-2017 period. With 327 IPOs, the SME exchange was highly active over that period. All these IPOs raised proceeds lower than INR 2.5 billion. Thus, there is no shortage of relatively smaller firms willing to go public in more

Results

Sharp decline in
medium-sized IPOs

Significantly higher
Expected Returns

Significant drop in
net buying by retail
investors

Retail Demand of IPO
Stocks has decreased
significantly

Significant decline in price
variability of IPO Stocks on
first trading day