

Gate Fees: Shell Values and Regulatory Risk in Chinese Equity Markets

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2018 Reforms and liberalization of China's Capital Market Conference
September 22, 2018

Background

- Second largest equity market, fast-growing economy, and high demand for listing.
- IPO regulations strikingly different from a registration-and-disclosure system. IPOs are strictly rationed
 - China Securities Regulatory Commission (CSRC), a functional ministry of the central government, decides which, and how many, companies can obtain public funding through an IPO listing
 - Bright-line requirements on: Revenue and Earnings etc.
 - As of the end of October 2016, 806 companies meeting China's pre-specified listing standards are awaiting processing by the CSRC
- The alternative way to go public: Reverse mergers.

Key Research Questions and Findings

1. How do China's IPO policies impact the "functional efficiency" of its equity market?

- Use the "shell value" that unlisted firms pay in reverse mergers as a "shadow price" for the cost of accessing China's public market
- Realized shell value is 3~4 billion RMB, about 2/3 of the median market capitalization.

2. How are the prices and returns of listed firms affected?

- Compute an Expected Shell Value to Market (ESV) measure for each firm-year
- High ESV leads to high return, and risk-adjusted shell premium is about 6% per year.
- The shell premium significantly responds to the regulatory shocks of CSRC.
- The shell premium eliminates the large size premium in China.

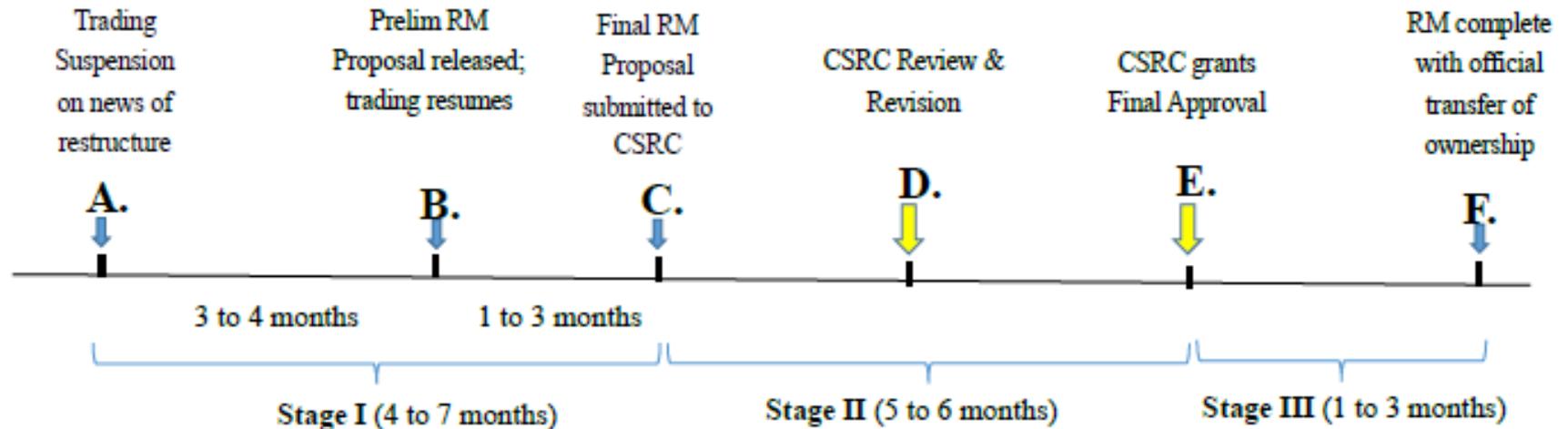
3. Additional Implications of ESV and IPO Regulation

- Evidence on the private benefits of control in China (MARs)
- Sensitivity of firm prices to corporate earnings



The RM Process

Figure A1. The Reverse Merger Process



- A. Trading suspended on listed firm (typically followed shortly by news of a potential restructuring event, without details).
- B. Trading resumed on listed firm (typically accompanied by release of a “Preliminary RM proposal,” containing details of the agreement, subject to final Board and Shareholder approval).
- C. The listed company holds general meeting of shareholders. The finalized RM proposal is approved and is submitted to the CSRC.
- D. CSRC Restructuring Committee conducts review, provides feedback, asks for supplemental material as needed; if all goes well, it issues preliminary approval and a set of revision guides.
- E. Listed firm completes revisions and CSRC grants official approval for RM.
- F. The RM transaction is complete and the controlling shareholder of the listed firm is officially changed.

Data and Sample

CSMAR: Financial and Market Data (2007 to 2016)

THS (Tong Hua Shun): for RM sample (cross-checked to WIND)

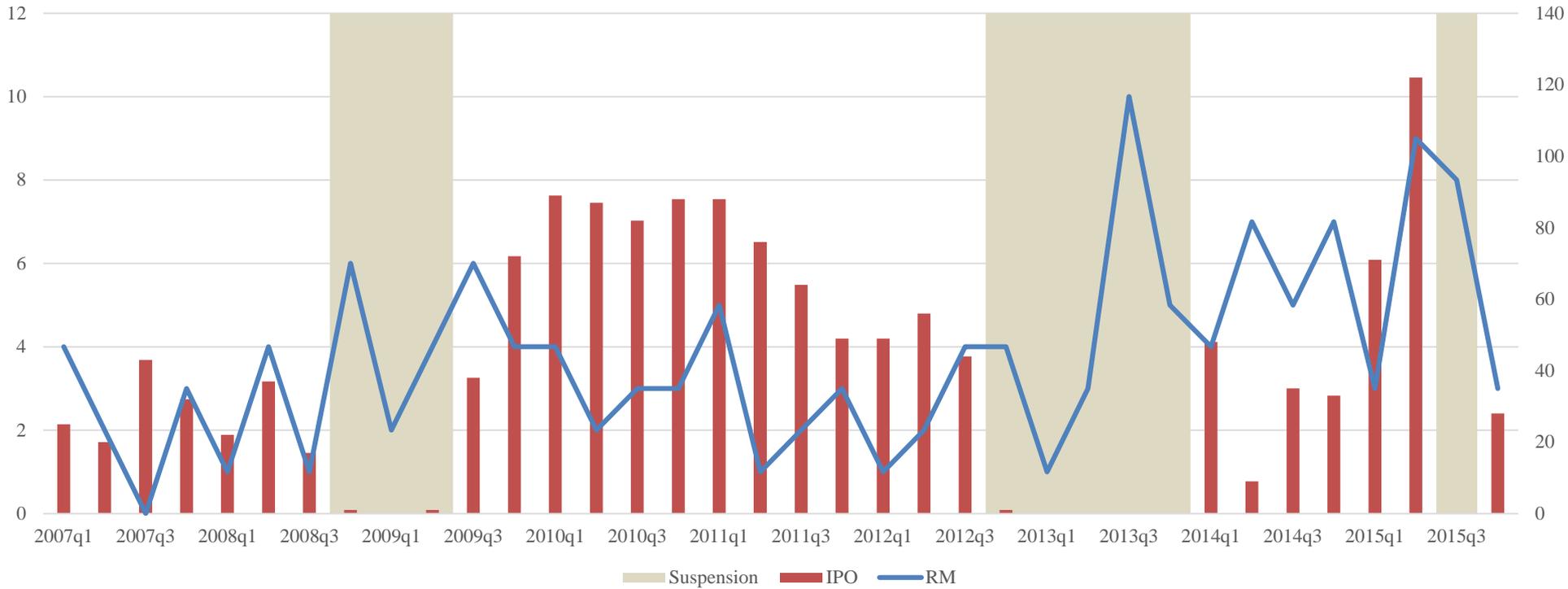
Panel A: Reverse Merger Sample	
Type	N
RM sample	249
Acquiring shares over time	-68
One-time RM sample	181
Failed	-45
In process	-2
Successful one-time RM sample	134

THS collects this sample by applying the CSRC definition of a RM transaction:

- Control right changed, and
- Transaction value > BV of shell firm prior to deal

We impose further requirements to focus on “single transaction” RMs with sufficient data for estimating shell values.

IPO vs. RM



Shell Value Calculation

$$SV = (MVCE \times SFS) - OC$$

Where

? → MVCE = Market value of combined entity (see next page)

SFS = Shell firm owners' eventual % share in combined entity

OC = Other considerations transferred to the combined entity

$$= \underset{\substack{\downarrow \\ \text{Cash}}}{C} + \underbrace{V + W}_{\text{Assets}} - \underbrace{(P' \times TS)}_{\text{Shares (at preset price, P')}}$$

Shell Value Calculation

$$SV = (MVCE \times SFS) - OC$$

Conceptually, want the timing to be as close to the consummation of the RM as possible. Prefer an estimate that is available immediately once trading resumes. But the initial price reaction still contains some uncertainty regarding the eventual completion of the deal.

How should we estimate MVCE?

SV1, based on $MVCE1 = PE_Pre \times E + W$

SV2, based on $MVCE2 = PE_Ind \times E + W$

SV3, based on $MVCE3 = P_Day1 \times (S + \Delta S)$

Use the projected year t+1 earnings of the unlisted firm (E), multiplied by a “peer-based P/E ratio.” This ratio is computed using either the self-identified peer firms from the prelim proposal (PE_Pre) or a set of all firms in the same CSRC industry (PE_Ind).

Base MVCE on market capitalization of the firm after the “initial day” market reaction (note: this is likely to be conservative, as it was not known at the time whether the RM will eventually be completed)



Shell Value: Summary Stats for Key Inputs

Panel B: Summary Statistics

variable	N	mean	p5	p50	p95
PE pre	134	47.739	15.439	41.620	108.780
PE ind	134	38.217	14.655	34.712	68.452
MVCE1 (mil RMB)	134	18554.400	1647.345	11809.090	60715.610
MVCE2 (mil RMB)	134	15375.390	1706.812	9996.868	42454.000
MVCE3 (mil RMB)	134	13644.700	3532.770	8173.970	41345.110
SFS	134	0.326	0.108	0.324	0.549
OC (mil RMB)	134	356.519	-299.745	169.931	1620.917
C (mil RMB)	134	87.466	0.000	0.000	448.298
V (mil RMB)	134	219.036	0.000	0.000	917.538
W (mil RMB)	134	233.277	0.000	28.188	1202.669
percentage of C>0	134	9.000	0.000	0.000	100.000
percentage of V>0	134	41.800	0.000	0.000	100.000
percentage of W>0	134	59.000	0.000	100.000	100.000
percentage of TS>0	134	37.300	0.000	0.000	100.000
CAR_1D	134	1.034	-0.011	0.470	3.800

Table 2. Shell Value

variable	N	mean	10%	25%	50%	75%	90%
Panel A: RMB value							
SV1 (mil RMB)	134	4427.2	856.1	1846.3	3136.7	6137.5	8585.8
SV2 (mil RMB)	134	3389.9	827.7	1331.8	2745.3	4457.1	6942.3
SV3 (mil RMB)	134	2903.9	1137.5	1541.1	2302.8	3327.7	5572.8
Panel B: Deflated by the mean market value							
SV1_mean	134	0.280	0.062	0.121	0.235	0.348	0.538
SV2_mean	134	0.214	0.067	0.106	0.189	0.272	0.403
SV3_mean	134	0.192	0.084	0.112	0.160	0.226	0.313
Panel C: Deflated by the median market value							
SV1_median	134	0.916	0.272	0.492	0.766	1.074	1.911
SV2_median	134	0.730	0.256	0.377	0.590	0.876	1.370
SV3_median	134	0.656	0.306	0.411	0.560	0.740	1.069

Average Forex rate during this period is 6.75 RMB per USD. So SV in USD is:

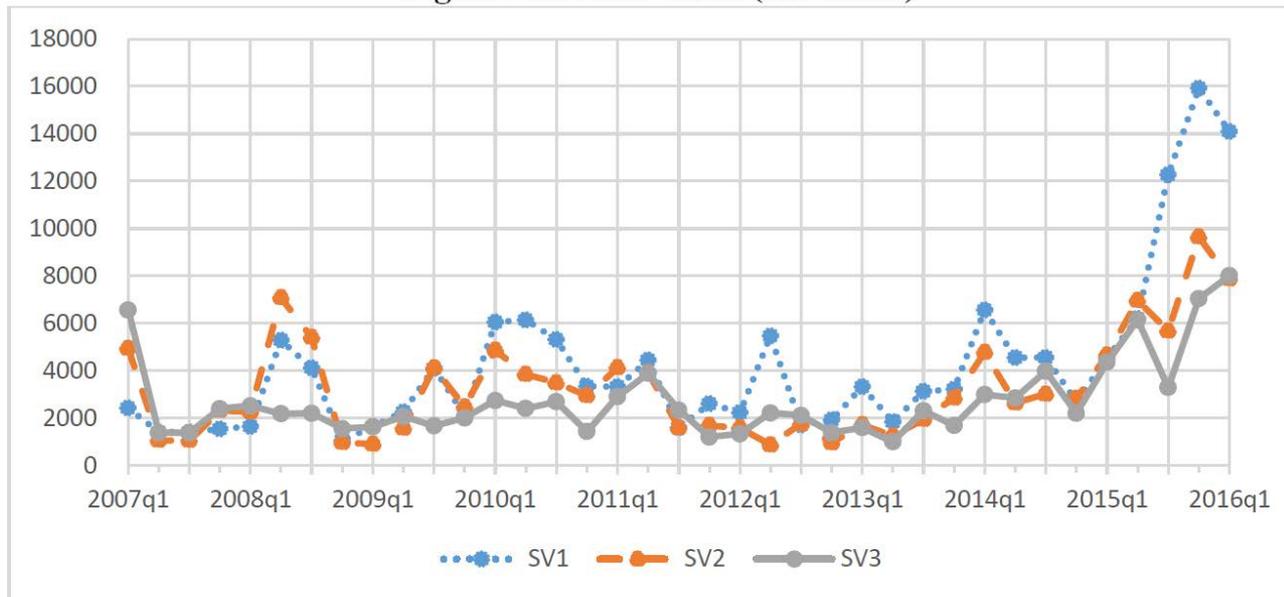
	<u>Mean</u>	<u>Median</u>
SV1	\$655M	\$465M
SV2	\$502M	\$407M
SV3	\$430M	\$341M

These shell values represent anywhere from 56% to 92% of the median market capitalization of the listed firms at the time of each RM

Figure 2. Shell Value over Time

The prevailing shell value, based on average realized SV in quarter t-1 (or past 2 qtrs)

Figure 2A. Shell value (mil RMB)

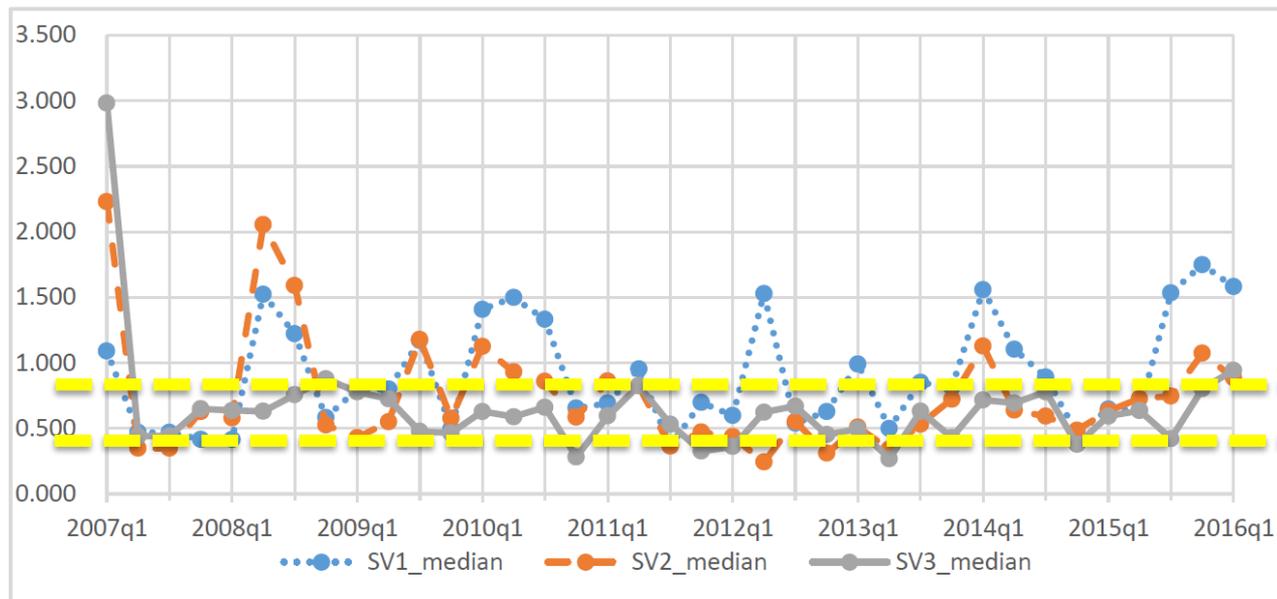


We can now create a market-wide index of the average “prevailing” shell value for each quarter over our sample period (2007 to 2016)

Figure 2. Shell Value over Time

The prevailing shell value, based on average realized SV in quarter t-1 (or past 2 qtrs)

Figure 2C. Shell value deflated by the median market value of equity



Same graph with the shell values deflated by the median market capitalization at each point in time

Most of the time, the shell value falls between 40% & 80% of the median market cap

Table 3. Shell Firm Characteristics

Panel A: Shell firm-year						
Variable	N	mean	sd	5%	50%	95%
Rsize	244	-0.752	0.455	-1.255	-0.921	0.159
Profit	244	0.003	0.051	-0.070	-0.000	0.095
ST	244	0.361	0.481	0.000	0.000	1.000
ShrCon	244	0.473	0.134	0.289	0.461	0.718
Lev	244	0.571	0.261	0.136	0.571	0.937
Cash	244	0.153	0.136	0.016	0.105	0.422
CFO	244	0.027	0.075	-0.095	0.022	0.159

Panel B: Non-Shell firm-year						
Variable	N	mean	sd	5%	50%	95%
Rsize	16,272	0.184	0.910	-1.029	0.012	2.152
Profit	15,559	0.047	0.052	-0.041	0.043	0.143
ST	16,272	0.065	0.247	0.000	0.000	1.000
ShrCon	16,460	0.567	0.155	0.296	0.574	0.812
Lev	16,464	0.493	0.211	0.149	0.497	0.845
Cash	16,465	0.177	0.129	0.029	0.141	0.432
CFO	15,560	0.047	0.075	-0.087	0.046	0.173

Shell targets typically are:

- ✓ • Small (market cap) firms
- ✓ • Lower profits
- ✓ • ST Status (two consecutive years of losses and trading under restrictions)
- ✓ • Lower ShrCon (ownership less concentrated in top ten shareholders)
- Higher Lev
- Lower cash holdings
- Lower CFO

Panel C: Comparison							
	Rsize	Profit	ST	ShrCon	Lev	Cash	CFO
Diff in mean	-0.936***	-0.044***	0.296***	-0.094***	0.078***	-0.024***	-0.020***
Diff in median	-0.933***	-0.043***	0.000***	-0.112***	0.074***	-0.036***	-0.024***

An Aside: Shell Acquirer Characteristics (Online Appendix)

In the Online Appendix, we conduct a more detailed analysis of Shell Acquirers (some of these results are not yet tabulated)

- Main finding is that these are healthy, profitable, growing firms at the time of the RM. They have higher growth trajectories and profits
 - Compared to IPOs
 - Compared to other similar sized firms in same industry
- Their subsequent performance, both operating and in terms of stock returns, are also strong.

Bottom Line: The firms that pay to acquire shells are solid, robust, growth firms (eager to access capital)



Table 4. Pooled Regression to Estimate Probability of Becoming a Shell Target

- Four variables have predictive power for the likelihood of becoming a shell target in the next 12 months.

- We then use the estimated coefficients on these four variables in 5-year rolling regressions to develop an ex ante estimated shell probability (ESP) score for each firm-year obs.

- $ESP = f(\text{Rsize}, \text{Profit}, \text{ST}, \text{ShrCon})$

	Exp. Sign	(1)	(2)	(3)	(4)	(5)	(6)
Rsize	-	-1.839*** (-9.93)	-1.839*** (-9.89)	-1.845*** (-9.93)	-1.844*** (-9.96)	-1.817*** (-9.90)	-1.803*** (-9.75)
Profit	-	-7.163*** (-3.91)	-7.318*** (-3.92)	-7.442*** (-3.99)	-7.662*** (-3.96)	-7.810*** (-4.03)	-7.598*** (-3.87)
ST	+	0.679*** (3.92)	0.715*** (3.88)	0.696*** (3.77)	0.696*** (3.76)	0.680*** (3.63)	0.655*** (3.40)
ShrCon	-	-1.423*** (-2.79)	-1.443*** (-2.83)	-1.476*** (-2.87)	-1.476*** (-2.88)	-1.471*** (-2.88)	-1.572*** (-3.00)
Lev	+/-		-0.183 (-0.55)	-0.049 (-0.14)	-0.056 (-0.16)	-0.030 (-0.09)	-0.043 (-0.12)
Cash	+/-			0.714 (1.34)	0.682 (1.26)	0.677 (1.25)	0.580 (1.06)
CFO	+/-				0.484 (0.51)	0.525 (0.56)	0.495 (0.51)
SOE	+/-					-0.131 (-1.02)	-0.104 (-0.79)
Constant		-4.117*** (-14.67)	-4.015*** (-12.49)	-4.178*** (-12.54)	-4.180*** (-12.54)	-4.115*** (-12.06)	-3.732*** (-9.11)
Industry FE		No	No	No	No	No	Yes
N		15782	15781	15781	15781	15781	14759
pseudo. R ²		0.183	0.183	0.184	0.184	0.184	0.183

Table 5. Fama-MacBeth regressions of month t+1 excess returns on ESV and controls

- $ESV_i = (ESP_i * Avg_SV2)/MV_i$

- Log(ME), ret01, and Turnover have strong predictive power
- But, ESV is incrementally predictive of returns even after controlling for these and other “anomaly variables”
- High ESV firms earn higher returns than low ESV firms

	(1)	(2)	(3)	(4)	(5)	(6)
ESV	0.182*** (3.02)	0.187*** (2.94)	0.189*** (2.90)	0.198*** (3.11)	0.196*** (2.95)	0.170** (2.59)
log(ME)	-0.005** (-2.07)	-0.005** (-2.07)	-0.005** (-2.07)	-0.005** (-2.10)	-0.006** (-2.16)	-0.007*** (-2.71)
log(BM)	0.001 (0.51)	0.002 (0.81)	0.002 (0.83)	0.002 (0.95)	0.001 (0.71)	0.001 (0.65)
ret01		-0.075*** (-5.61)	-0.075*** (-5.63)	-0.076*** (-5.75)	-0.076*** (-5.62)	-0.056*** (-3.90)
ret212		-0.006 (-1.42)	-0.006 (-1.39)	-0.007 (-1.46)	-0.006 (-1.38)	-0.003 (-0.54)
ChgAt			0.001 (0.55)	0.000 (0.40)	-0.000 (-0.01)	0.001 (1.32)
Profit				0.013 (0.72)		
EP					0.026 (1.45)	
Turnover						-0.018*** (-6.05)
Constant	0.057** (2.16)	0.060** (2.18)	0.060** (2.18)	0.060** (2.21)	0.062** (2.23)	0.082*** (2.92)
N	67	67	67	67	67	67
Avg. R ²	0.049	0.084	0.086	0.090	0.088	0.098

Table 6. Monthly ESV Decile Returns

- For each ESV decile, we report the VW monthly excess return, as well as the Alpha and Betas from a regression on the FF 5-factor model
- Top ESV firms earn 2.44% more per month than bottom ESP firms (mostly from high ESV firms)
- Even after controlling for all five FF factors, the hedged ESV portfolio earns 0.45% per month in abnormal returns

group	Ex ret	alpha	MKT	SMB	HML	RMW	CMA
1	0.351 (0.38)	0.240** (2.38)	0.946*** (79.44)	-0.195** (-2.49)	0.161* (1.80)	0.277** (2.24)	0.208*** (3.08)
2	0.764 (0.71)	0.009 (0.04)	0.997*** (13.98)	0.077 (0.56)	-0.178** (-2.54)	-0.286 (-1.19)	-0.086 (-0.60)
3	0.854 (0.78)	-0.250* (-1.72)	0.986*** (11.99)	0.282* (1.98)	-0.175* (-1.91)	-0.385 (-1.41)	-0.188 (-1.62)
4	0.873 (0.78)	-0.482*** (-2.98)	0.948*** (11.95)	0.393** (2.09)	-0.097 (-0.98)	-0.528 (-1.64)	-0.112 (-0.88)
5	1.126 (0.98)	-0.331** (-2.37)	0.971*** (16.22)	0.487*** (3.36)	-0.277*** (-4.03)	-0.347 (-1.47)	0.003 (0.02)
6	1.297 (1.18)	-0.317** (-2.45)	0.938*** (17.12)	0.559*** (6.03)	-0.172** (-2.25)	-0.440*** (-3.02)	0.040 (0.47)
7	1.535 (1.32)	-0.209 (-1.41)	0.961*** (19.16)	0.620*** (6.66)	-0.117 (-1.42)	-0.335** (-2.20)	0.291** (2.42)
8	1.759 (1.52)	-0.206 (-1.56)	0.957*** (26.52)	0.834*** (11.49)	-0.159** (-2.22)	-0.017 (-0.19)	0.391*** (4.58)
9	2.097* (1.69)	0.056 (0.39)	0.934*** (23.49)	0.827*** (9.12)	-0.077 (-0.72)	-0.246* (-1.94)	0.352*** (3.69)
10	2.794** (2.16)	0.687*** (3.19)	0.856*** (20.79)	0.882*** (6.26)	-0.344*** (-2.99)	0.038 (0.15)	0.958*** (5.58)
10-1	2.442*** (2.91)	0.447*** (2.92)	-0.090** (-2.43)	1.077*** (13.09)	-0.505*** (-9.86)	-0.239 (-1.39)	0.749** (5.50)

Table 8. Policy Shocks and Hedged ESV Portfolio Return

The difference in excess returns between highest and lowest ESV portfolios around six policy Shock events in a 3-day window [-1,1]

			Ex ret	t stat
Tighten RM	Event1 (2011.05.06)		-0.457	(-1.11)
	Event2 (2013.12.02)		-5.103***	(-12.70)
	Event3 (2016.06.20)		-1.559***	(-3.25)
	Overall		-2.482***	(-9.20)
Tighten IPO	Event1 (2014.05.20)		1.334***	(5.01)
	Event2 (2016.03.16)		1.606***	(4.51)
	Event3 (2016.09.08)		2.321***	(7.59)
	Overall		1.769***	(9.35)

If the return to this portfolio reflects regulatory risk, it should respond to regulatory events

Shell Premium and Size Premium

- A puzzle:
 - Enormous premium associated with small firms (Chen et al., 2015)
 - The economic mechanism behind this large size effect is not clear.
- We provide a perspective:
 - Small firms are more likely to be a shell, thus they have larger shell premium.
 - $\text{Size premium} = \text{real size premium} + \text{shell premium}$

Shell Premium and Size Premium

Table 9: **Ten Size Portfolio** Explained by 5 and 6 factors

Panel A: Under 5 factors						
group	alpha	MKT	SMB	HML	RMW	CMA
1	0.722*** [2.68]	0.862*** [22.22]	0.956*** [8.65]	-0.233*** [-2.94]	-0.084 [-0.42]	0.636*** [6.66]
10	0.223* [1.93]	0.957*** [77.37]	-0.182** [-2.47]	0.182** [2.15]	0.296** [2.49]	0.212*** [2.97]
1-10	0.500** [2.62]	-0.095*** [-2.71]	1.138*** [13.84]	-0.415*** [-3.67]	-0.380** [-2.59]	0.425*** [3.89]

Panel B: Under 6 factors							
group	alpha	MKT	SMB	HML	RMW	CMA	SV
1	0.361* (1.91)	0.934*** (41.95)	0.086 (0.94)	0.175** (2.49)	0.110 (1.15)	0.031 (0.24)	0.808*** (12.90)
10	0.205* (1.94)	0.960*** (67.25)	-0.224** (-2.07)	0.202** (2.50)	0.306** (2.64)	0.182** (2.29)	0.040 (0.69)
1-10	0.156 (1.43)	-0.026 (-1.20)	0.310*** (4.35)	-0.027 (-0.23)	-0.197** (-2.28)	-0.151 (-0.95)	0.768*** (14.80)

Table 10. ESV and Future Major Asset Restructurings (MARs)

- Given the high SV, why don't we see more RM transactions?
- Demand-size constraint? (Few firms can afford the price?)... more likely a supply-size issue (few listed firms willing to surrender control)
- We use CSRC filings on Major Asset Restructurings (MARs) to test this latter conjecture
- Estimate a logit regression of the probability a listed firm will under take a MAR in next 12 months

	(1)	(2)	(3)	(4)	(5)	(6)
High5	0.330** (2.45)					
High10		0.341*** (3.40)				
High20			0.290*** (3.07)			
High30				0.190* (1.94)		
High40					0.063 (0.60)	
High50						-0.250** (-2.29)
Rsize	-0.312*** (-6.00)	-0.274*** (-5.07)	-0.241*** (-4.02)	-0.257*** (-3.98)	-0.310*** (-4.36)	-0.462*** (-6.13)
Lev	0.178 (0.99)	0.173 (0.96)	0.185 (1.02)	0.194 (1.07)	0.204 (1.13)	0.197 (1.09)
Profit	-6.230*** (-7.03)	-6.085*** (-6.93)	-6.053*** (-6.86)	-6.224*** (-6.97)	-6.461*** (-7.22)	-6.971*** (-7.85)
ST	-0.180 (-1.18)	-0.171 (-1.20)	-0.113 (-0.81)	-0.059 (-0.43)	-0.034 (-0.24)	-0.037 (-0.27)
SOE	-0.424*** (-5.80)	-0.424*** (-5.79)	-0.431*** (-5.88)	-0.431*** (-5.90)	-0.432*** (-5.91)	-0.421*** (-5.77)
Constant	-1.634*** (-6.51)	-1.678*** (-6.69)	-1.717*** (-6.75)	-1.711*** (-6.62)	-1.665*** (-6.28)	-1.452*** (-5.44)
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	12077	12077	12077	12077	12077	12077
Pseudo R ²	0.042	0.042	0.042	0.042	0.041	0.042

High-ESV firms are more likely to undertake a future MAR

Figure 4. Frequency of Future Major Asset Restructurings (MARs) by ESV Decile



Almost one in five firms in the top ESV decile will undertake a MAR within the next 12 months!

Table 11. ESV and the Relation Between Price and Earnings

- High ESV firms should be trading primarily on their shell value, and not on their corporate profits
- Thus we should expect a decreased price sensitivity to earnings among high ESV firms
- We examine this proposition by estimating the following Fama-MacBeth regression:
- $B/M = f(\text{ROA}, \text{ROA} \times \text{Ind})$, where Ind is an indicator variable based on a firm's relative ESV ranking

	(1)	(2)
ROA	-1.091*** (-9.48)	-1.555*** (-11.47)
High33	-0.140*** (-7.90)	-0.200*** (-10.64)
High33×ROA	1.325*** (16.87)	1.790*** (15.35)
Med33		-0.109*** (-15.92)
Med33×ROA		1.057*** (9.33)
Constant	0.329*** (6.77)	0.418*** (8.37)
Industry FE	Yes	Yes
Observations	6	6
Avg. R2	0.172	0.186

- Expect coefficient on ROA to be negative
- Expect coefficient on High33xROA and Med33xROA to be positive

Summary

- China's IPO policies dramatically impact the “functional efficiency” of its equity market.
 - The cost of accessing public equity market is extremely high.
 - Good firms are prevented from listing
 - Bad firms are “prevented” from sunseting.
- These regulations impacts the prices and returns of listed firms.
 - Listed firms are trading at artificially high PE multiples.
 - The valuation are vulnerable to the change of the regulations.
 - Returns of small firms are driven by a proxy for regulatory risk (SV factor).

Summary

- Regulations serve a purpose.
 - The government explicitly suggests that the stock market mainly serves to raise capital for enterprises by tapping domestic savings and for the purpose of reforming inefficient state-owned enterprises
 - Pistor and Xu (2005) and Du and Xu (2009): Administrative governance can substitute for formal legal governance including the absence of a functioning and effective court system, the lack of an independent judicial system and weak law enforcement.
- Weigh the benefits against its costs. The cost seems quite large.
 - Djankov, La Porta, Lopez-de Silanes, and Shleifer (2002): Countries with heavier regulation of entry have higher corruption and larger unofficial economies, but not better quality of public or private goods.
 - Klapper, Laeven, and Rajan (2006): screen out small young firms and mute the disciplinary effects of competition. No incentive to improve
- Limiting the access to public equity markets is inefficient. Improve enforcement of insider trading laws, increase corporate transparency and quality of disclosure.

Thank you!

