

# Stock market reaction to capital raise announcements: Evidence from Tehran Stock Exchange

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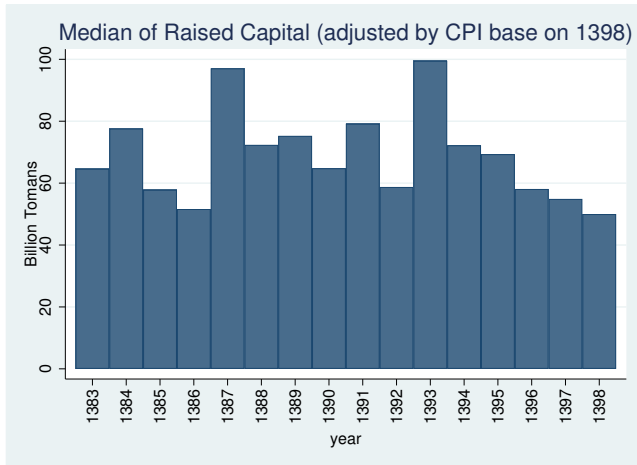
# Data

- Data consist of 1439 capital raise for 448 companies
- Four different sources for capital rising: Cash, Resereves, Cash & Resereves , and Revaluation

	Cash	Resereves	Cash & Resereves	Revaluation	Sum
Event	754	408	180	97	1439
Percent	52.4	28.4	12.5	6.7	100

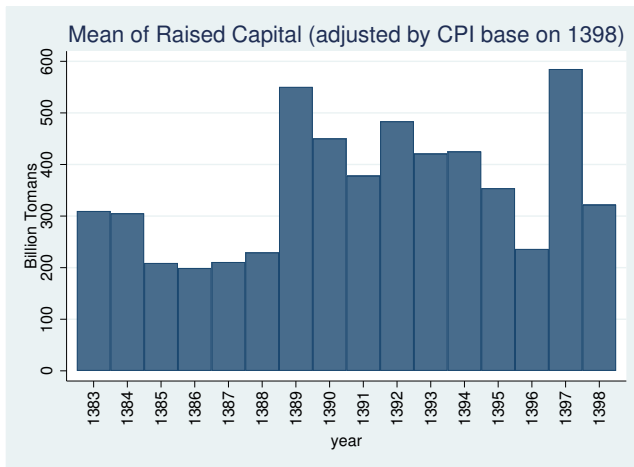
# Data Summary

## Raised Capital for each Firm



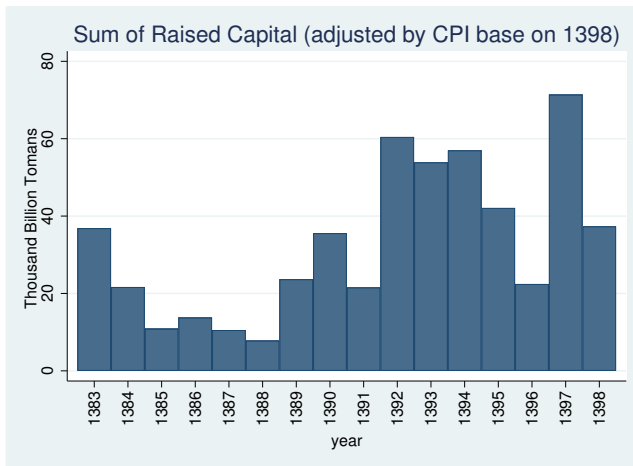
# Data Summary

## Raised Capital for each Firm



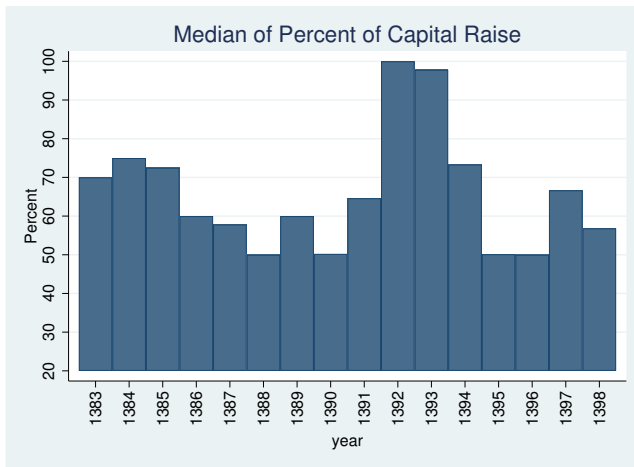
# Data Summary

## Adjusted Value of Raised Capital in market



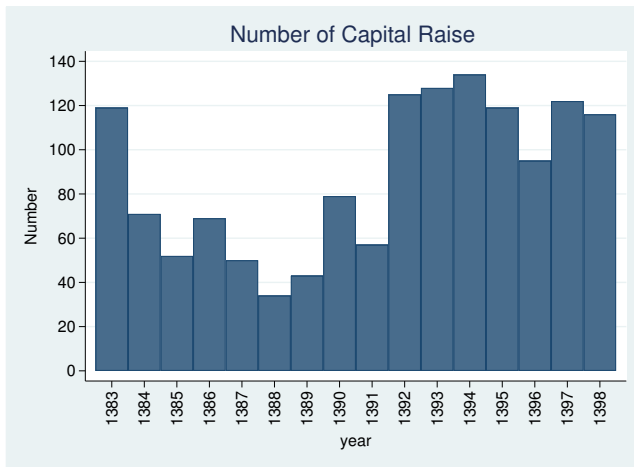
# Data Summary

Percent of Raised Capital for each Firm



# Data Summary

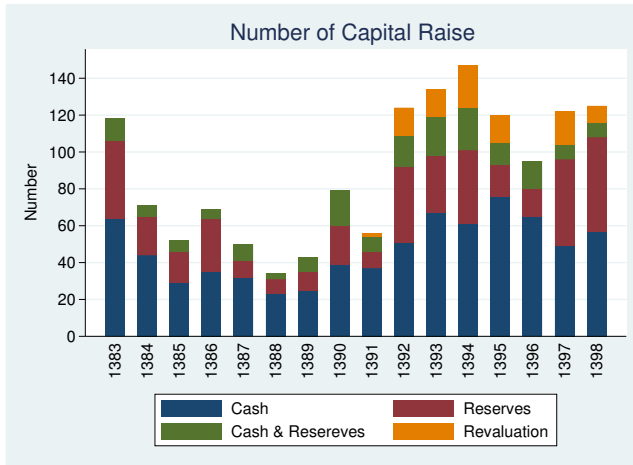
## Number of Capital Raise



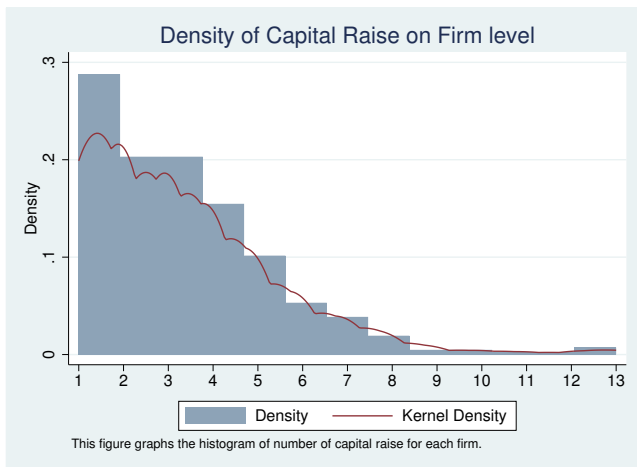


# Data Summary

## Number of Capital Raise



# Number of Capital Raise for each Firm



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# Abnormal Return

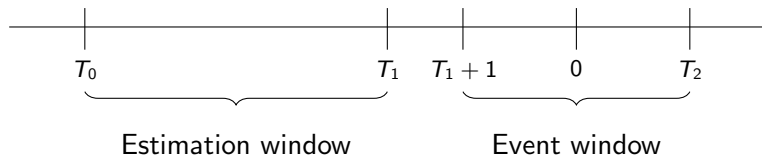
- Abnormal return is the difference between the observed return and the predicted return

$$AR_{i,t} = R_{i,t} - E(R_{i,t}|X_t)$$

- Predicted return
  - Mean-adjusted returns Model (MAR)  $\rightarrow \bar{R}_i$
  - Market-adjusted returns Model (MKAR)  $\rightarrow R_{M,t}$
  - Risk-adjusted returns Model (RAR)  $\rightarrow \alpha_i + \beta_i R_{M,t}$

# Abnormal Return Calculation

## First Step



- Event windows specifically 3-day, 7-day, and 11-day event periods
- Estimation window : Each event window implies a particular estimation window interval. (For example, 3-day event window  $[-1,+1]$  is associated with  $[-122,-2]$  estimation window)
- Fama,Fisher,Jensen, and Roll use Event Window as Estimation window [IER-1969-The Adjustment of Stock Prices to New Information]

# Abnormal Return Calculation

## Second Step

- For each Firm :

$$R_{i,t} = \hat{\alpha}_i + \hat{\beta}_i(R_{m,t}) + \boxed{\varepsilon_{i,t}} \rightarrow AR_{i,t}$$

- Average abnormal return during period t:  $N_t$  is the number of firms in the sample during period t

$$AAR_t = \sum_{i=1}^{N_t} \frac{AR_{it}}{N_t}$$

- Cumulative Abnormal Returns

$$CAR_t(t_1, t_2) = \sum_{t=t_1}^{t_2} AR_{it}$$

- Cumulative Average Abnormal Return from period  $t_1$  to period  $t_2$

$$CAAR_{t_1, t_2} = \sum_{i=t_1}^{t_2} CAR_i(t_1, t_2)$$

# Abnormal Return Calculation

Cross-Sectional Test (Test  $AAR = 0$ )

- Hypothesis is  $\begin{cases} H_0 : AAR = 0 \\ H_1 : AAR \neq 0 \end{cases}$
- The t-statistics for this test is
  - $t_{AAR} = \sqrt{N} \frac{AAR}{S_{AAR}}$
  - $S_{AAR}^2 = \frac{1}{N-1} \sum_{i=1}^N (AR_i - AAR)^2$

# Abnormal Return Calculation

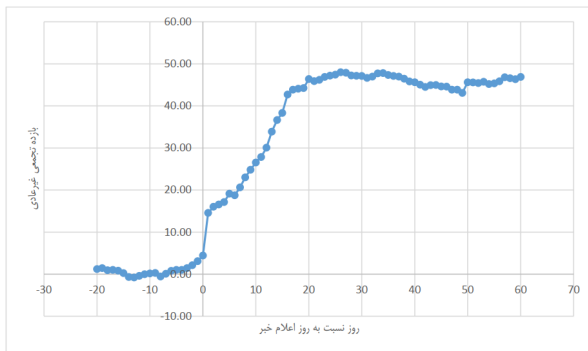
Cross-Sectional Test (Test  $CAAR = 0$  )

- Hypothesis is  $\begin{cases} H_0 : CAAR = 0 \\ H_1 : CAAR \neq 0 \end{cases}$
- The t-statistics for this test is
  - $t_{CAAR} = \sqrt{N} \frac{CAAR}{S_{CAAR}}$
  - $S_{CAAR}^2 = \frac{1}{N-1} \sum_{i=1}^N (CAR_i - CAAR)^2$
  - $CAR_i = \sum_{t=t_1}^{t_2} AR_{i,t}$



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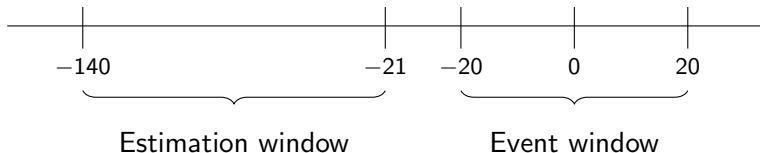


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# Abnormal Return

- We use the Risk-adjusted returns Model (CAPM) to predict returns.
  - We accumulate factors' return in close days for using in the model.
- We set estimation and event window as:

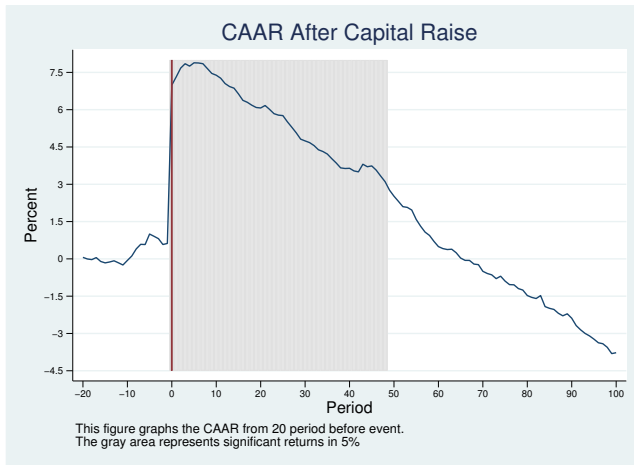


- We test whether  $CAAR = 0$  or not

# Estimation Results

	mean	std	min	25%	50%	75%	max
Beta CAPM	0.80	0.84	-3.62	0.28	0.69	1.18	8.81
Alpha CAPM	0.16	0.39	-2.42	-0.05	0.09	0.28	3.60
Beta Market	0.79	0.73	-5.41	0.32	0.72	1.19	4.65
Beta SMB	0.14	0.28	-1.14	-0.01	0.07	0.22	2.33
Beta HML	0.02	0.27	-1.43	-0.09	0.02	0.14	1.65
Beta WL	0.06	0.26	-0.71	-0.07	0.03	0.15	2.10
Alpha Four	0.10	0.41	-2.15	-0.07	0.06	0.22	4.71

# Abnormal Return

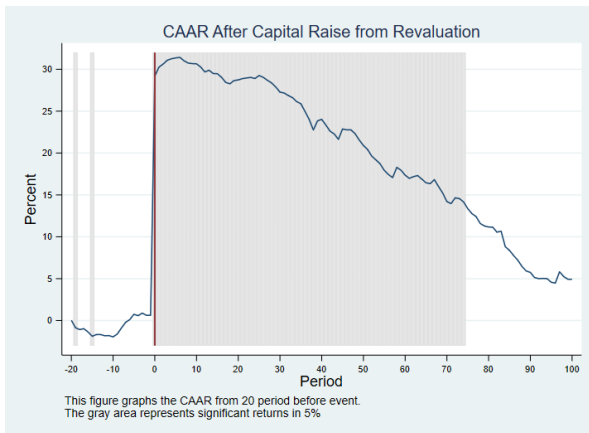


Analysis of abnormal return in days surrounding the capital raise announcements

Period	AAR	CAAR	t-stat	Period	AAR	CAAR	t-stat
-20	0.06	0.06	0.45	0	6.38	6.99	7.88
-19	-0.06	0.00	-0.02	1	0.33	7.32	8.10
-18	-0.03	-0.03	-0.15	2	0.32	7.67	8.34
-17	0.08	0.05	0.23	3	0.18	7.85	8.39
-16	-0.16	-0.10	-0.42	4	-0.07	7.75	8.12
-15	-0.06	-0.16	-0.59	5	0.13	7.89	7.95
-14	0.04	-0.13	-0.43	6	-0.02	7.88	7.87
-13	0.05	-0.08	-0.24	7	-0.08	7.85	7.77
-12	-0.08	-0.16	-0.47	8	-0.19	7.65	7.52
-11	-0.09	-0.25	-0.68	9	-0.22	7.46	7.24
-10	0.18	-0.06	-0.17	10	-0.07	7.39	7.08
-9	0.18	0.12	0.29	11	-0.12	7.27	6.88
-8	0.29	0.40	0.93	12	-0.22	7.05	6.65
-7	0.16	0.59	1.30	13	-0.11	6.93	6.46
-6	-0.01	0.58	1.23	14	-0.04	6.87	6.28
-5	0.41	1.00	1.80	15	-0.19	6.64	6.02
-4	-0.09	0.91	1.59	16	-0.26	6.38	5.71
-3	-0.11	0.81	1.37	17	-0.10	6.30	5.54
-2	-0.22	0.58	0.95	18	-0.15	6.18	5.36
-1	0.04	0.62	1.01	19	-0.09	6.09	5.24

# Abnormal Return

## Abnormal return of raised capital from Revaluation



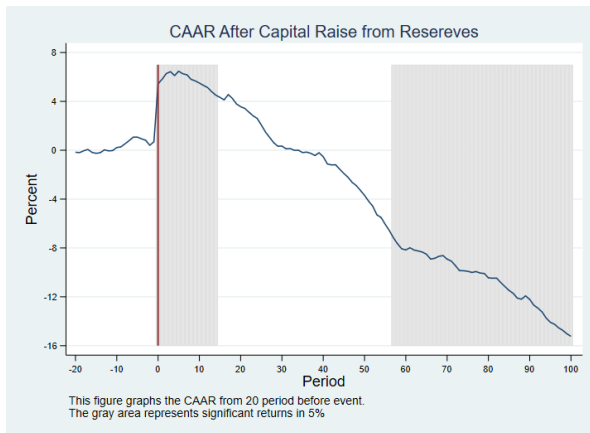


Analysis of abnormal return in days surrounding the Revaluation announcements

Period	AAR	CAAR	t-stat	Period	AAR	CAAR	t-stat
-20	0.04	0.04	0.13	0	28.55	29.18	6.41
-19	-0.89	-0.86	-2.02	1	1.08	30.26	6.58
-18	-0.26	-1.08	-1.83	2	0.35	30.61	6.58
-17	0.11	-0.97	-1.50	3	0.47	31.08	6.55
-16	-0.39	-1.36	-1.82	4	0.17	31.25	6.43
-15	-0.52	-1.88	-2.26	5	0.10	31.36	6.34
-14	0.21	-1.67	-1.72	6	0.07	31.42	6.26
-13	0.00	-1.67	-1.48	7	-0.40	31.02	6.11
-12	-0.14	-1.81	-1.40	8	-0.28	30.74	6.01
-11	0.02	-1.80	-1.35	9	-0.07	30.67	5.90
-10	-0.15	-1.95	-1.45	10	-0.02	30.65	5.83
-9	0.33	-1.61	-1.15	11	-0.38	30.27	5.66
-8	0.72	-0.89	-0.59	12	-0.59	29.68	5.59
-7	0.67	-0.22	-0.14	13	0.21	29.89	5.62
-6	0.33	0.12	0.07	14	-0.15	29.49	5.39
-5	0.63	0.75	0.44	15	-0.02	29.47	5.34
-4	-0.16	0.58	0.32	16	-0.43	29.05	5.21
-3	0.30	0.89	0.43	17	-0.61	28.43	5.09
-2	-0.26	0.63	0.29	18	-0.17	28.27	5.02
-1	0.01	0.63	0.28	19	0.39	28.65	5.03

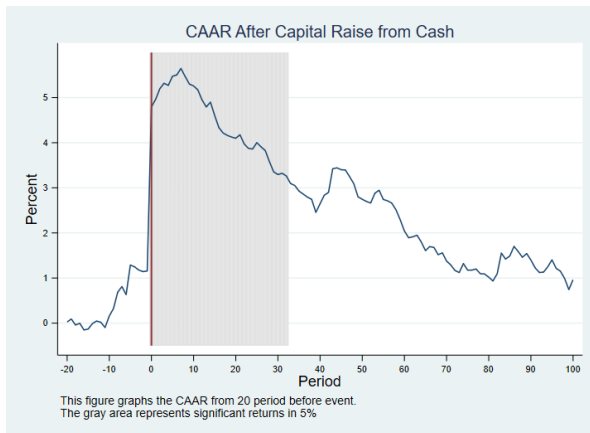
# Abnormal Return

## Abnormal return of raised capital from Reserves



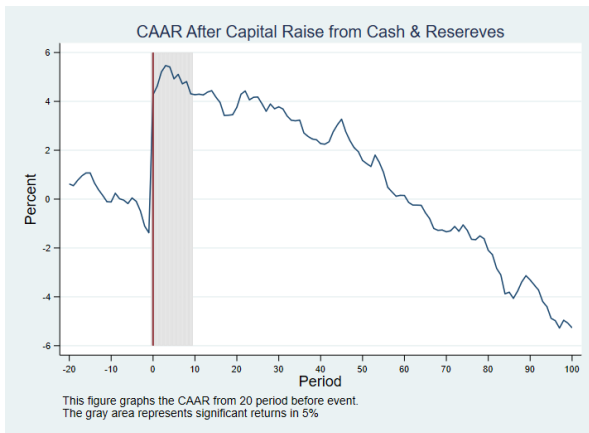
# Abnormal Return

## Abnormal return of raised capital from Cash

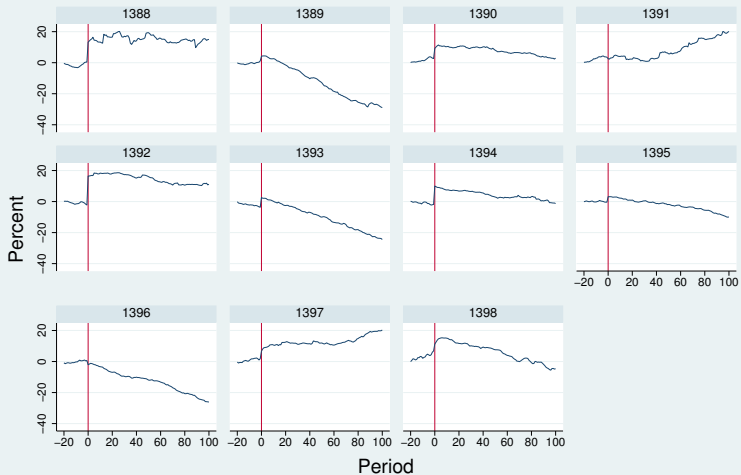


# Abnormal Return

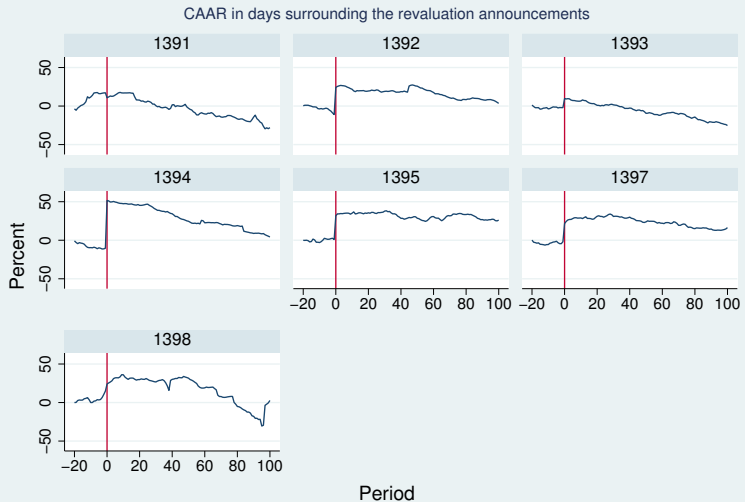
## Abnormal return of raised capital from Cash & Reserves



CAAR in days surrounding the capital raise announcements

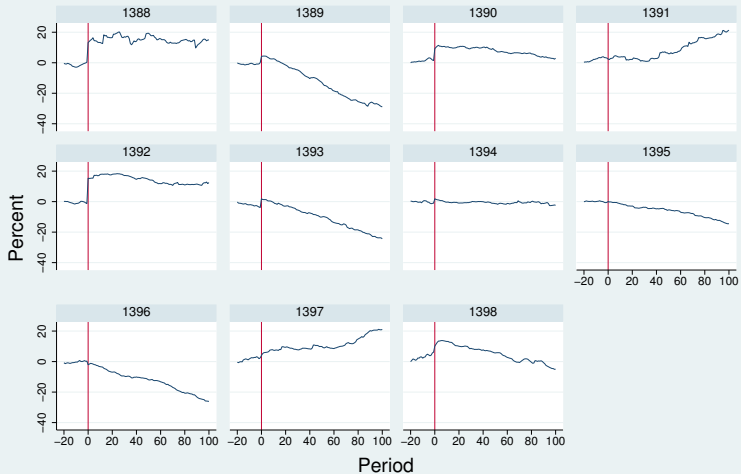


Graphs by year



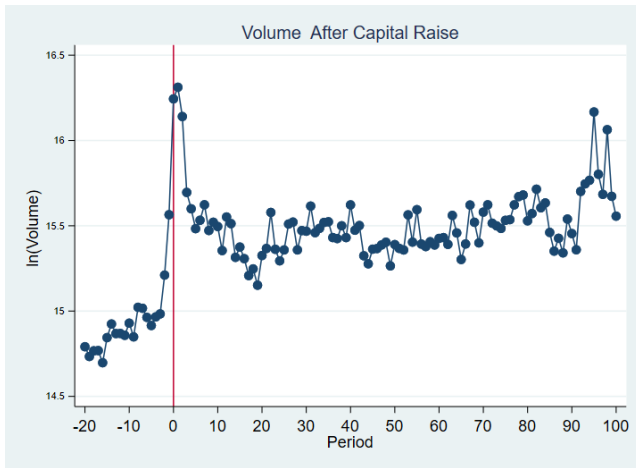
Graphs by year

CAAR in days surrounding the capital raise announcements that it is not from revaluation



Graphs by year

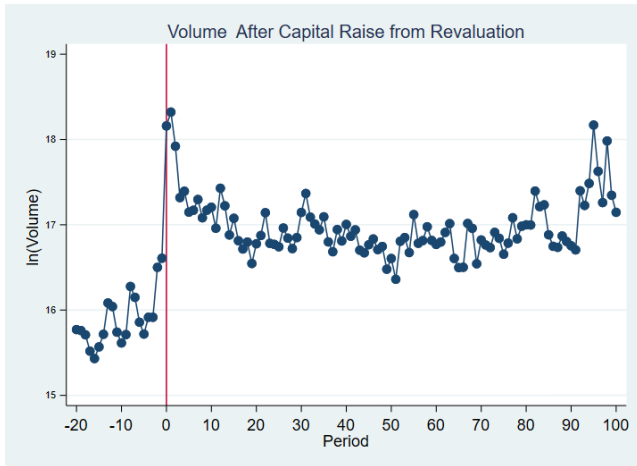
# Volume





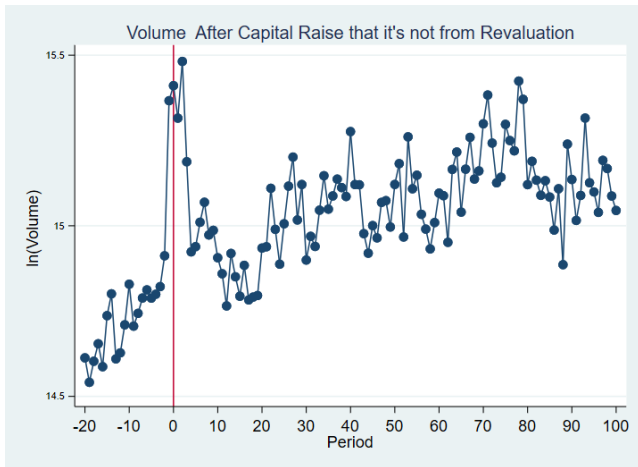
# Volume

## Volume of raised capital from Revaluation

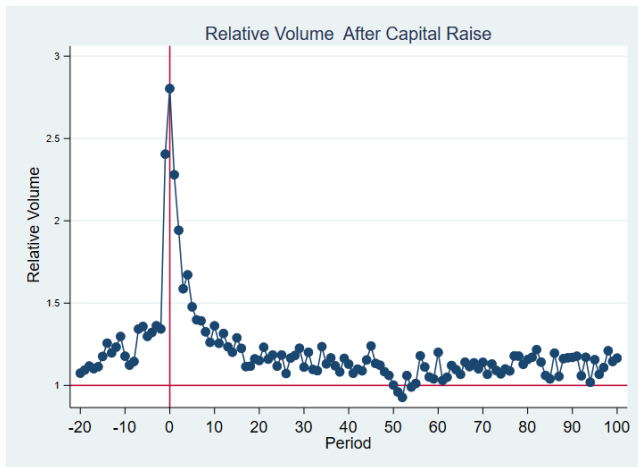


# Volume

Volume of raised capital that it's not from Revaluation

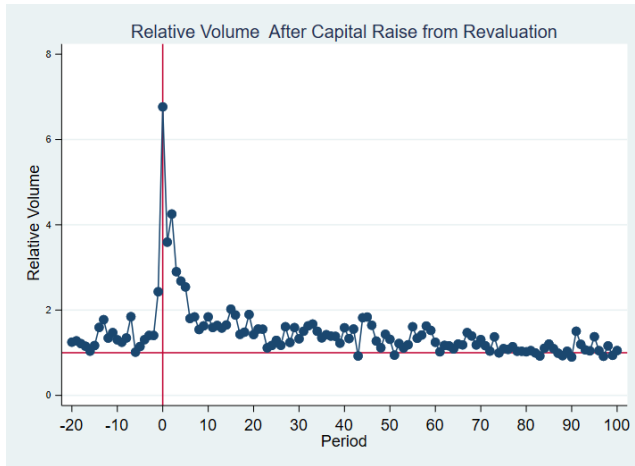


# Relative volume



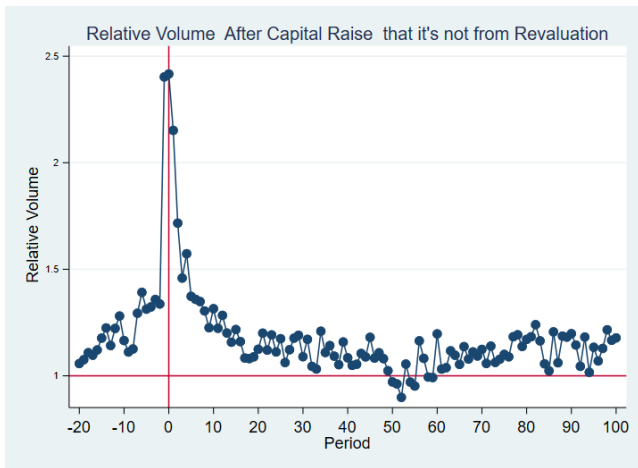
# Relative volume

## Relative Volume of raised capital from Revaluation

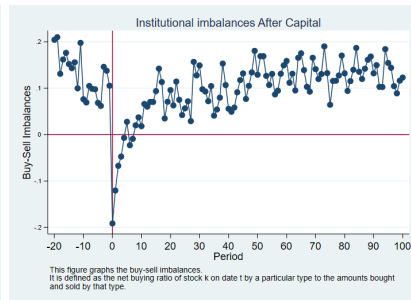
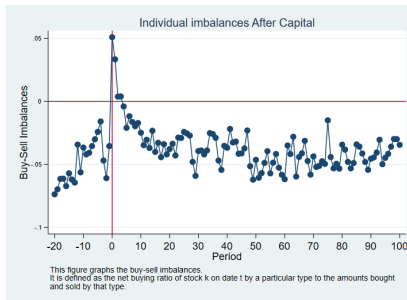


# Relative volume

Relative Volume of raised capital that it's not from Revaluation

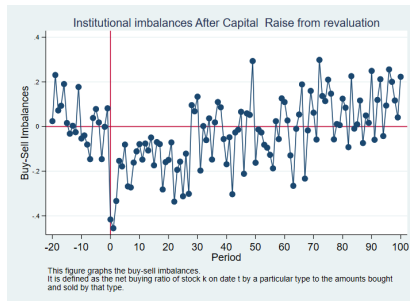
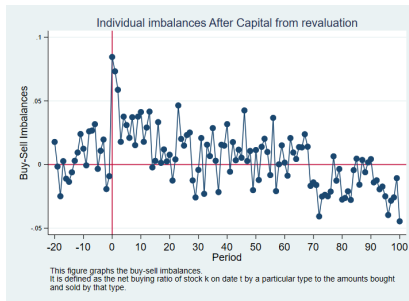


# Buy-sell Imbalances



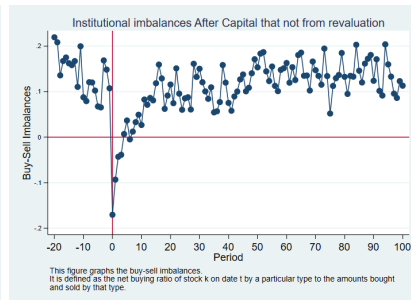
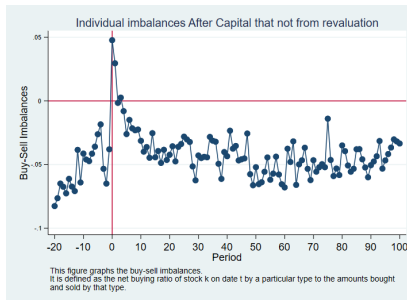
# Buy-sell Imbalances

## Buy-sell Imbalances of raised capital from Revaluation



# Buy-sell Imbalances

Buy-sell Imbalances of raised capital that it's not from Revaluation





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*Abnormal Return at event day**Panel A: Market Cap*

Sub sample	Revaluation		Total
	No	Yes	
Small	6.73	39.64	9.48
sd	19.66	40.16	23.82
n	285	26	311
Middle	3.73	37.33	6.47
sd	12.88	41.20	19.24
n	282	25	307
Large	2.37	12.68	3.38
sd	11.21	16.96	12.26
n	293	32	325
Full sample	4.26	28.55	6.40
sd	15.11	35.47	19.10
n	860	83	943
Small - Large	4.366***	26.96**	6.101***
P-Value	0.001	0.003	0

*Abnormal Return at event day**Panel B: P/E ratio*

Sub sample	Revaluation		Total
	No	Yes	
Low	2.39	35.88	4.99
sd	15.22	42.50	20.67
n	214	18	232
Middle	4.76	37.58	7.07
sd	20.26	41.74	23.84
n	224	17	241
High	3.83	18.20	5.14
sd	9.95	23.17	12.41
n	219	22	241
Full sample	3.68	29.56	5.74
sd	15.77	36.48	19.56
n	657	57	714
Low - High	-1.436	17.68	-0.149
P-Value	0.247	0.126	0.924

*Abnormal Return at event day**Panel C: Book-to-Market*

Sub sample	Revaluation		Total
	No	Yes	
Low	5.48	36.85	8.08
sd	19.07	47.28	24.23
n	288	26	314
Middle	3.14	28.41	5.03
sd	12.87	33.15	16.62
n	285	23	308
High	4.15	22.30	6.07
sd	12.38	24.60	15.18
n	287	34	321
Full sample	4.26	28.55	6.40
sd	15.11	35.47	19.10
n	860	83	943
Low - High	1.327	14.55	2.003
P-Value	0.323	0.162	0.214

*Abnormal Return at event day**Panel D: Free Float*

Sub sample	Revaluation		Total
	No	Yes	
Low	5.13	21.17	6.59
sd	19.60	23.58	20.48
n	271	27	298
Middle	3.39	28.43	5.31
sd	12.62	41.21	17.79
n	277	23	300
High	4.20	35.52	7.32
sd	12.45	39.95	19.54
n	281	31	312
Full sample	4.24	28.72	6.42
sd	15.21	35.83	19.30
n	829	81	910
Low - High	0.929	-14.35	-0.73
P-Value	0.508	0.097	0.653

*Abnormal Return at event day**Panel E: Free Market Cap*

Sub sample	Revaluation		Total
	No	Yes	
Small	6.11	40.98	9.36
sd	20.10	46.67	25.81
n	272	28	300
Middle	4.39	27.42	6.11
sd	13.36	30.56	16.39
n	273	22	295
Large	2.30	18.58	3.90
sd	10.54	23.67	13.31
n	284	31	315
Full sample	4.24	28.72	6.42
sd	15.21	35.83	19.30
n	829	81	910
Small - Large	3.813**	22.41***	5.466***
P-Value	0.006	0.028	0.001

*Abnormal Return at event day**Panel F: Volatility(past 250 days)*

Sub sample	Revaluation		Total
	No	Yes	
Low	4.50	24.11	6.29
sd	18.72	28.69	20.56
n	269	27	296
Middle	4.90	34.68	7.32
sd	12.28	33.07	17.04
n	260	23	283
High	2.68	23.08	4.82
sd	13.92	34.70	18.31
n	264	31	295
Full sample	4.02	26.72	6.13
sd	15.27	32.33	18.73
n	793	81	874
Low - High	1.823	1.037	1.468
P-Value	0.202	0.901	0.36

*Abnormal Return at event day**Panel G: Debt ratio*

Sub sample	Revaluation		Total
	No	Yes	
Low	4.19	34.87	6.80
sd	18.95	43.56	23.61
n	280	26	306
Middle	3.69	28.19	5.67
sd	11.93	25.80	15.07
n	273	24	297
High	5.06	23.42	6.80
sd	14.24	36.81	18.36
n	277	29	306
Full sample	4.32	28.64	6.43
sd	15.34	36.25	19.36
n	830	79	909
Low - High	-0.872	11.45	-0.005
P-Value	0.539	0.301	0.998

*Abnormal Return at event day**Panel H: Leverage ratio*

Sub sample	Revaluation		Total
	No	Yes	
Low	3.80	29.24	5.97
sd	10.37	31.09	15.13
n	278	26	304
Middle	3.84	23.49	5.36
sd	12.64	29.34	15.46
n	274	23	297
High	5.31	32.06	7.92
sd	20.93	44.88	25.47
b	278	30	308
Full sample	4.32	28.64	6.43
sd	15.34	36.25	19.36
n	830	79	909
Low - High	-1.512	-2.817	-1.941
P-Value	0.281	0.784	0.251

*Abnormal Return at event day**Panel I: Market Condition*

Sub sample	Revaluation		Total
	No	Yes	
Bad	3.85	29.85	6.20
sd	12.96	37.65	18.25
n	301	30	331
Good	4.48	27.82	6.51
sd	16.15	34.52	19.56
n	559	53	612
Full sample	4.26	28.55	6.40
sd	15.11	35.47	19.10
n	860	83	943

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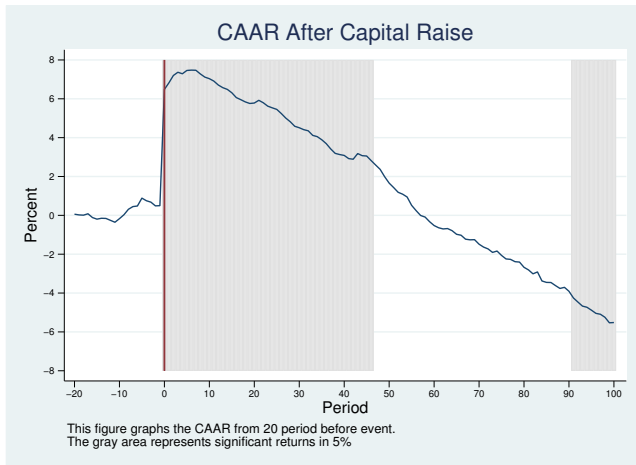
6 Appendix I : 4 Factor Abnormal Return

7 Appendix II : CAPM ( $\alpha = 0$ )

8 Appendix II : Market

9 Appendix II : Amihud

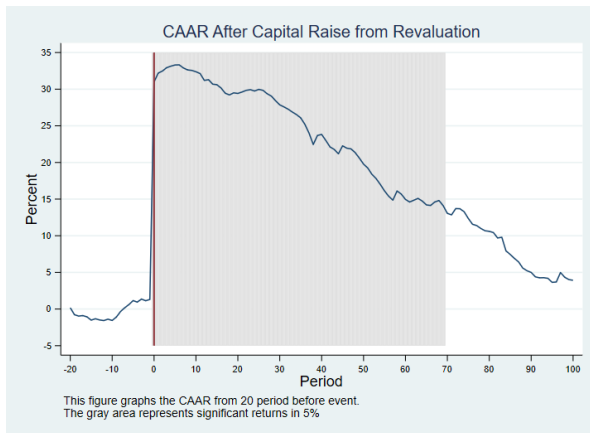
# Abnormal Return





# Abnormal Return

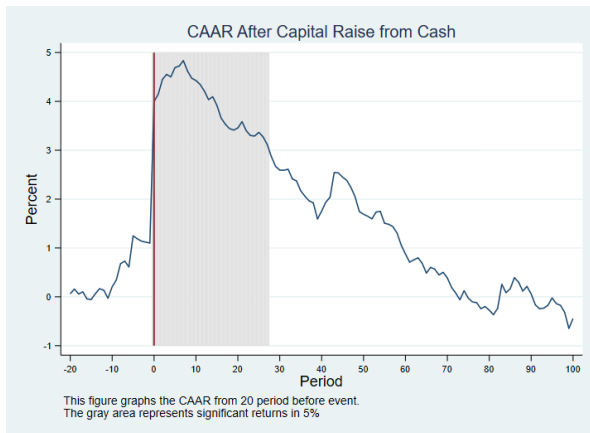
## Abnormal return of raised capital from Revaluation





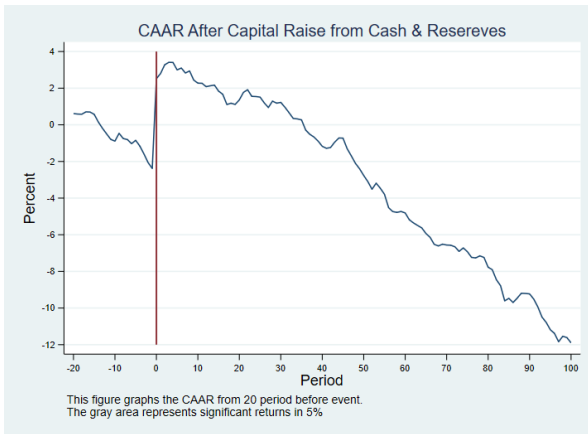
# Abnormal Return

## Abnormal return of raised capital from Cash



## Abnormal Return

## Abnormal return of raised capital from Cash & Reserves



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7 Appendix II : CAPM ( $\alpha = 0$ )

8 Appendix II : Market

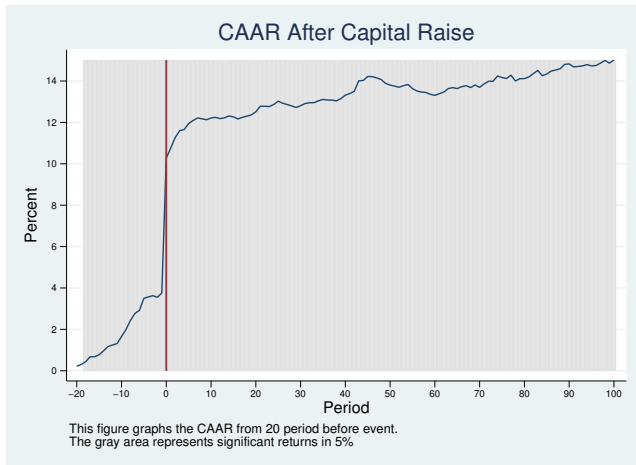
9 Appendix II : Amihud

Brooks, Chris. Introductory econometrics for finance. Cambridge university press, 2019

An interesting question is whether the expected return should incorporate the  $\alpha$  from the estimation period in addition to  $\beta$  multiplied by the market return. Most applications of event studies include this, and indeed the original study by Fama et al. (1969) includes an alpha.

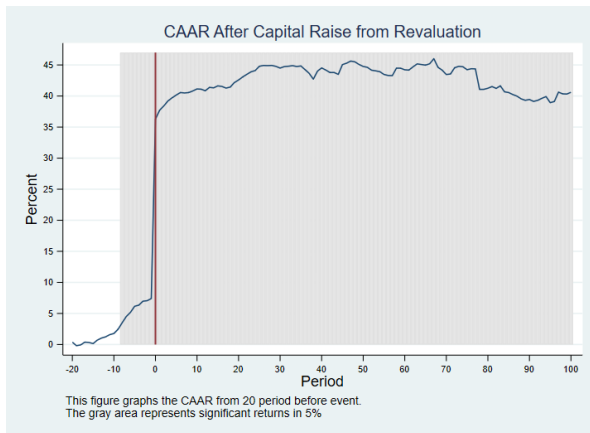
However, we need to exercise caution when doing so since if – either because of some unrelated incident affecting the price of the stock or in anticipation of the event – the alpha is particularly high (particularly low) during the estimation period, it will push up (down) the expected return. Thus it may be preferable to assume an expected value of zero for the alpha and to exclude it from the event period abnormal return calculation.

# Abnormal Return



# Abnormal Return

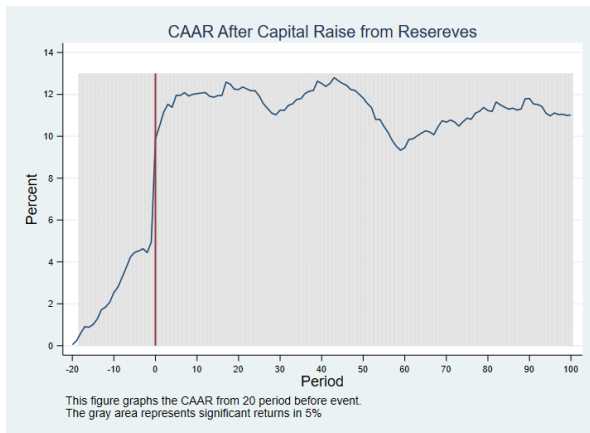
## Abnormal return of raised capital from Revaluation





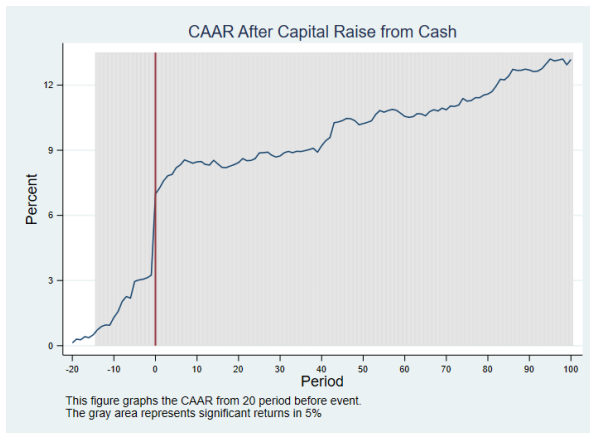
# Abnormal Return

Abnormal return of raised capital from Reserves



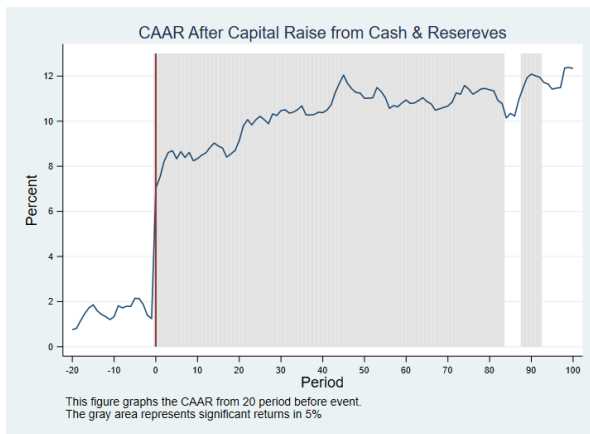
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## Abnormal return of raised capital from Cash



# Abnormal Return

## Abnormal return of raised capital from Cash & Reserves



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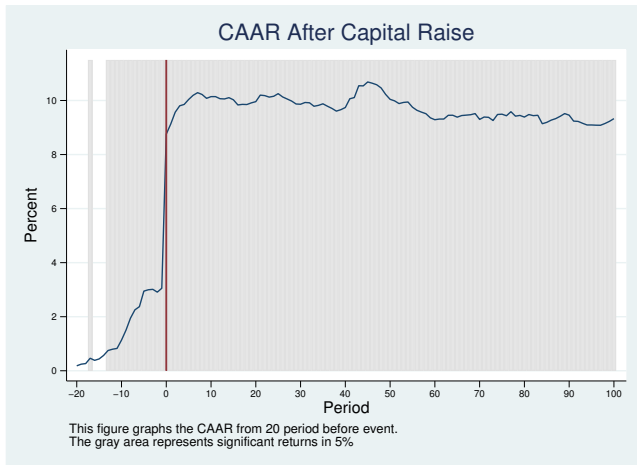
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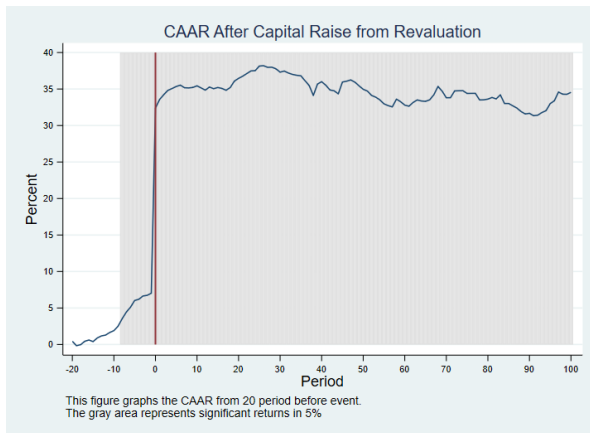
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# Abnormal Return



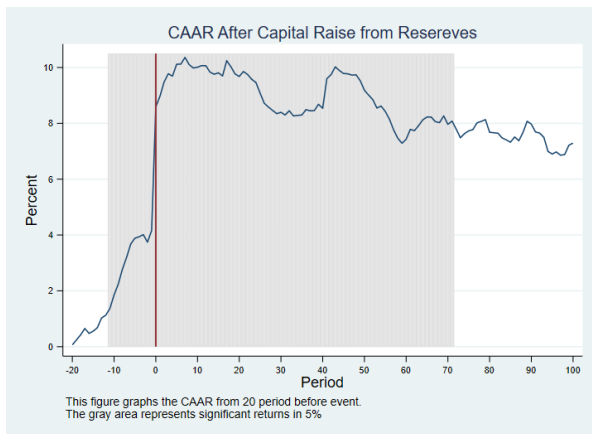
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## Abnormal return of raised capital from Revaluation



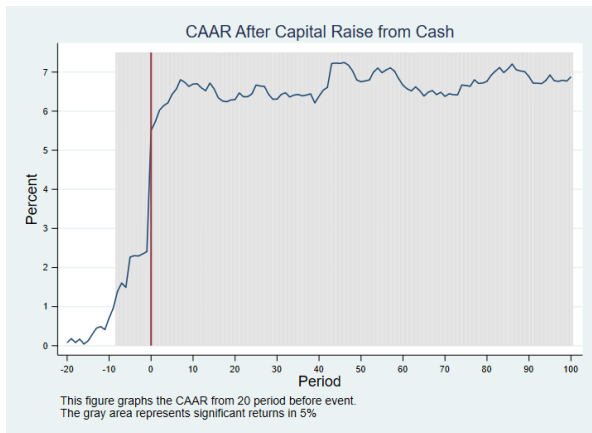
## Abnormal Return

## Abnormal return of raised capital from Reserves



## Abnormal Return

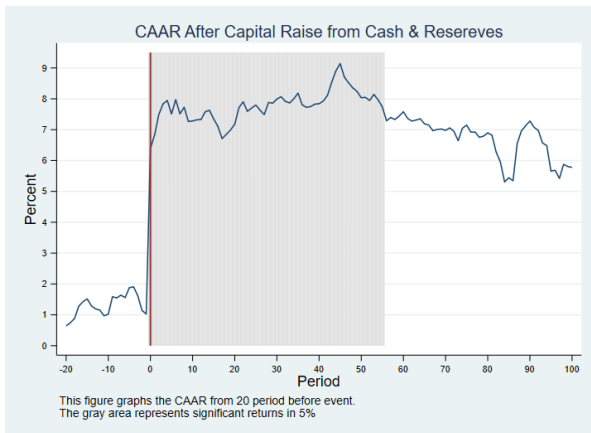
### Abnormal return of raised capital from Cash





# Abnormal Return

## Abnormal return of raised capital from Cash & Reserves



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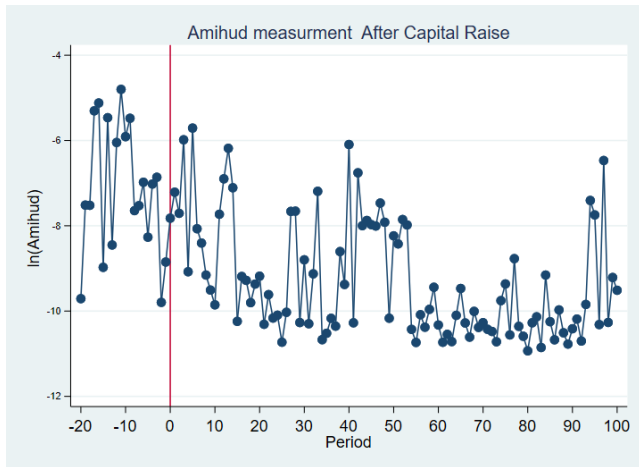
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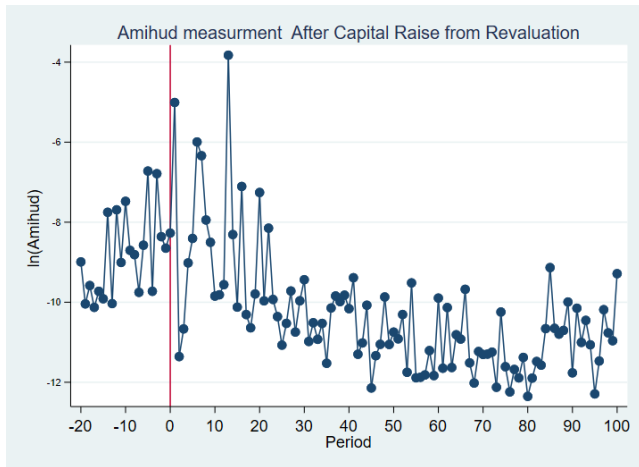
# Amihud

## Amihud of capital raise



# Amihud

## Amihud of raised capital from Revaluation



# Amihud

Amihud of raised capital that it's not from Revaluation

