Stock market reaction to capital raise announcements:

Evidence from Tehran Stock Exchange

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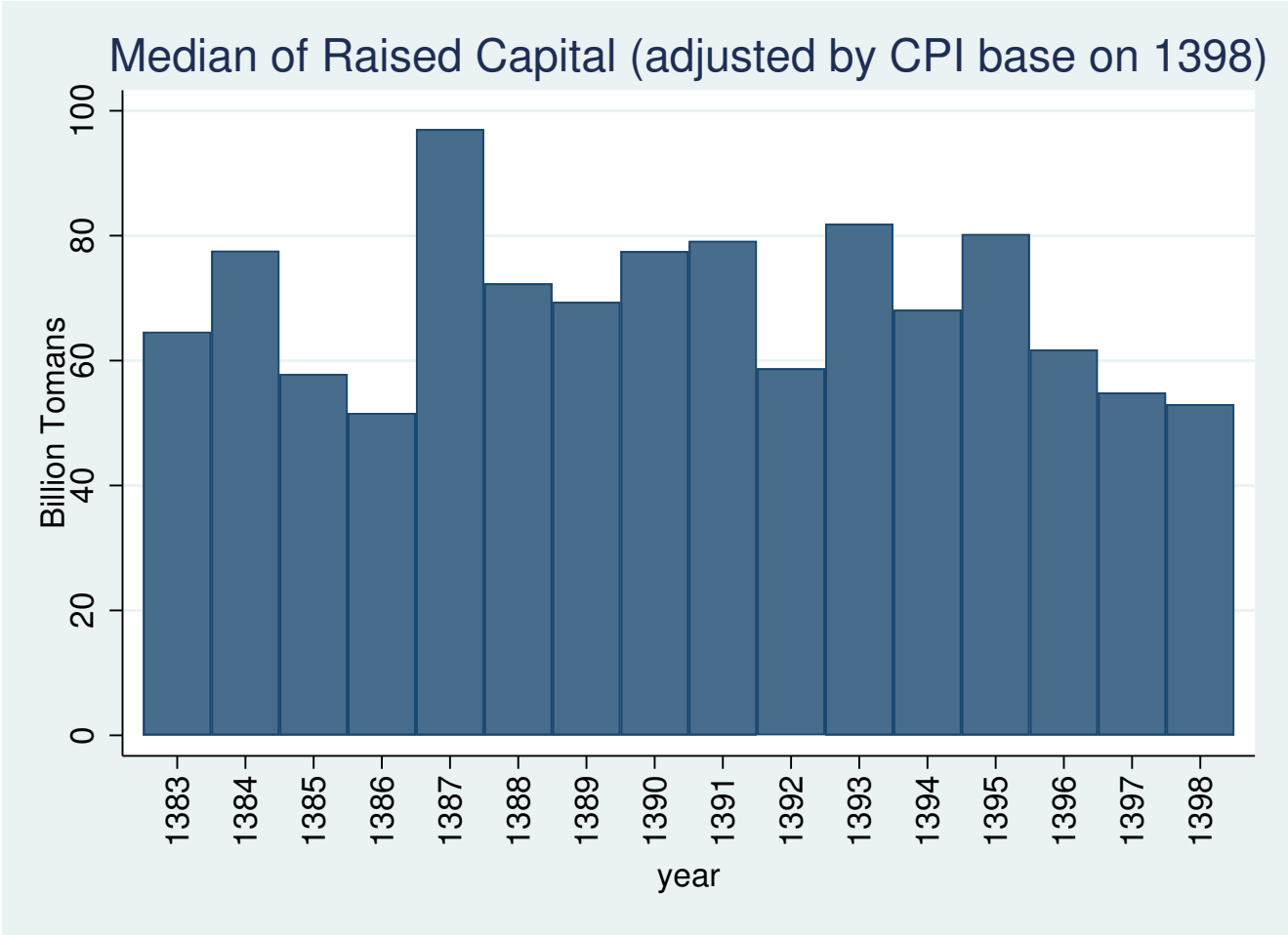
Data

- Data consist of 1290 capital raise for 448 companies
- Four different sources for capital rising: Cash, Resereves, Cash & Resereves , and Revaluation

	Cash	Resereves	Cash & Resereves	Revaluation	Sum
Event	716	358	115	101	1290
Percent	55.50	27.75	8.91	7.83	100

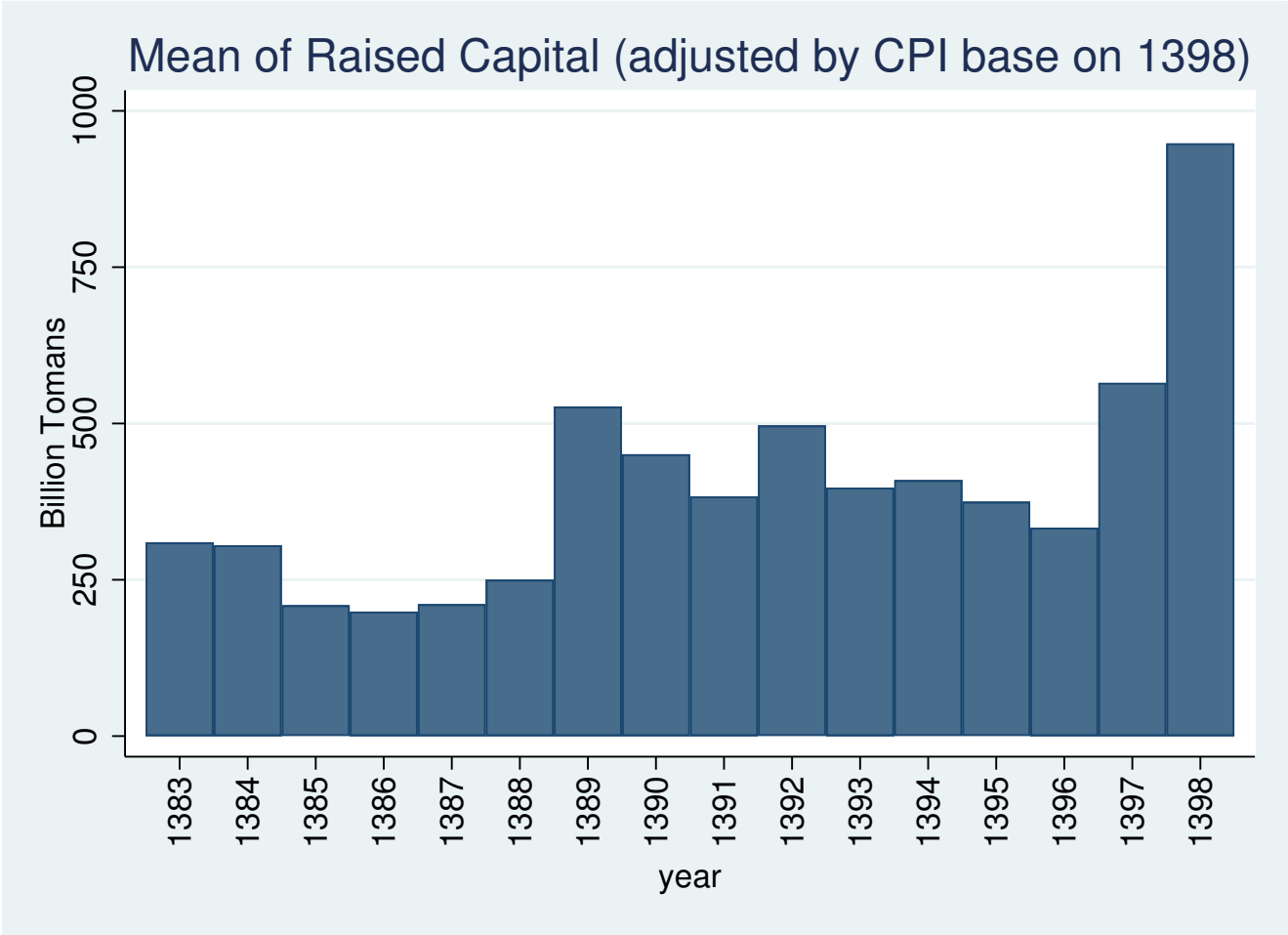
Data Summary

Raised Capital for each Firm



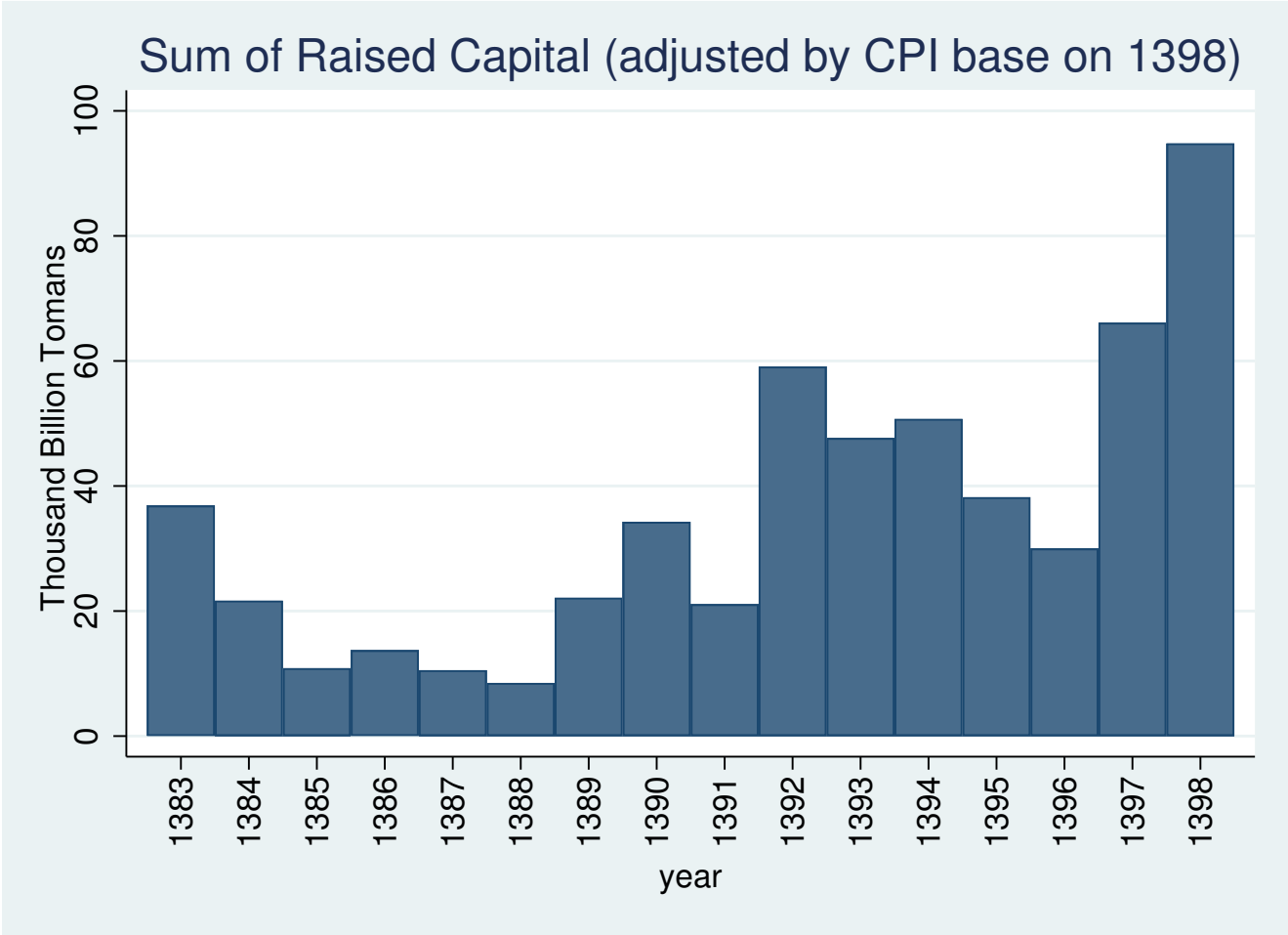
Data Summary

Raised Capital for each Firm



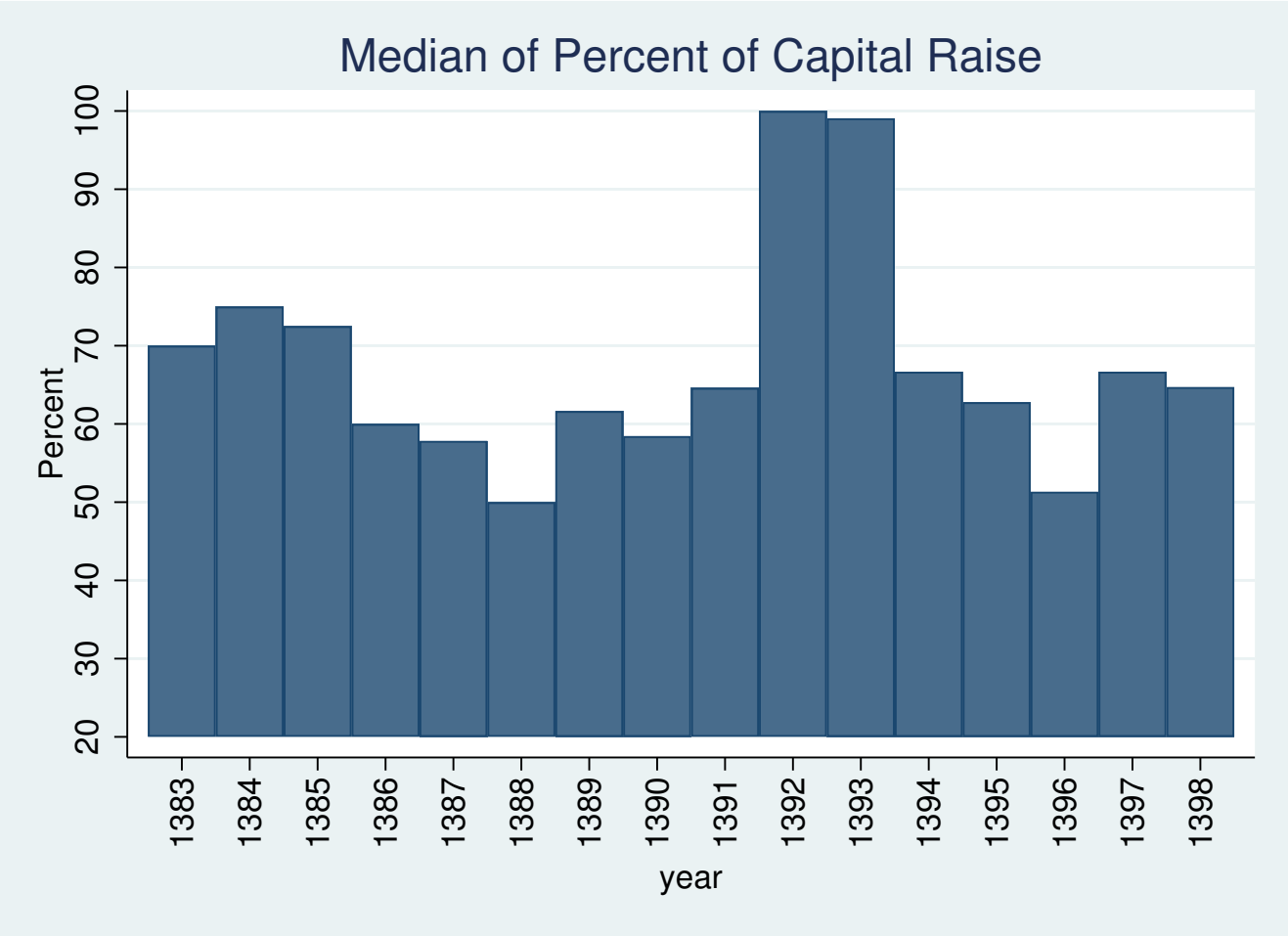
Data Summary

Adjusted Value of Raised Capital in market



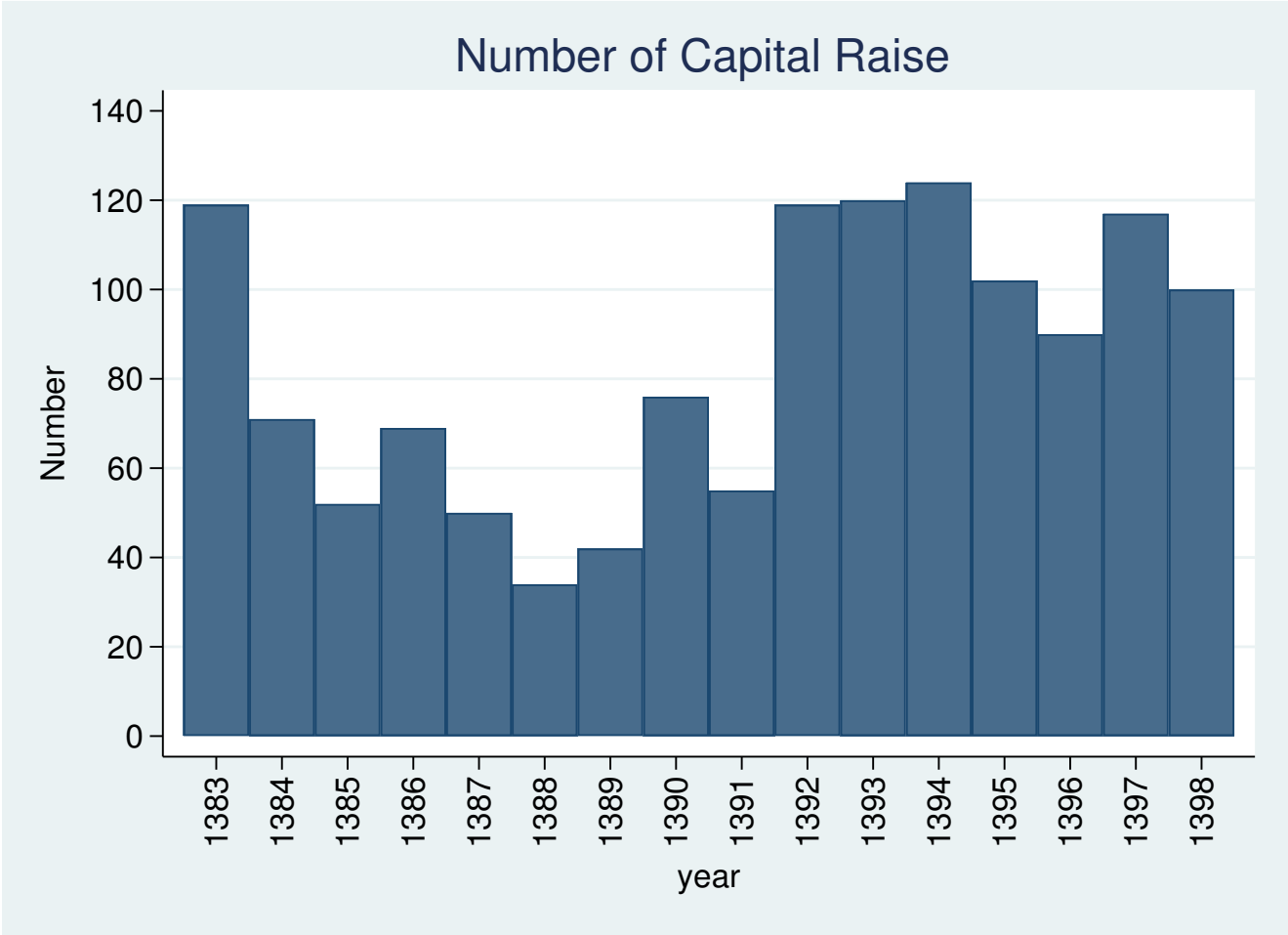
Data Summary

Percent of Raised Capital for each Firm



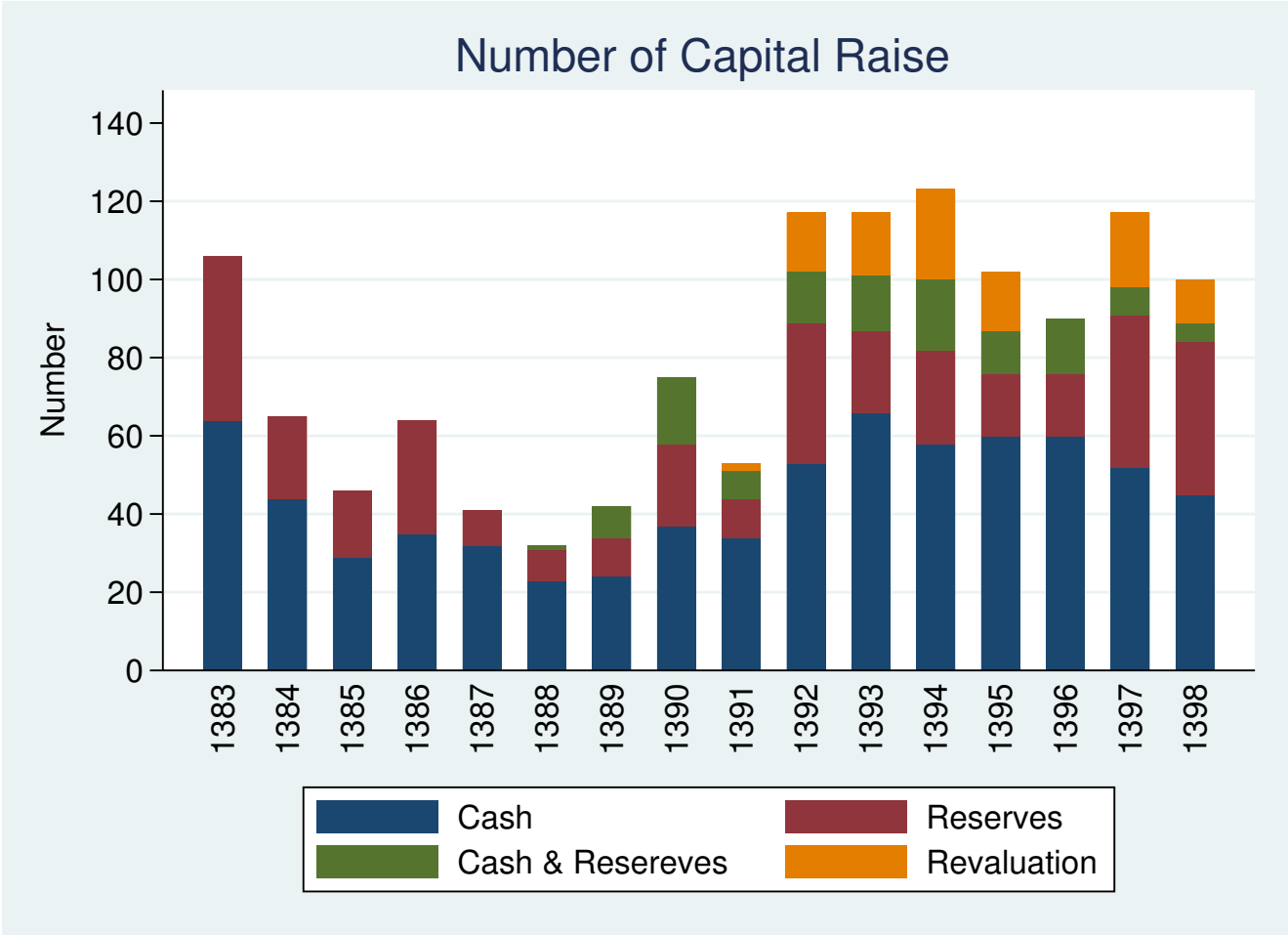
Data Summary

Number of Capital Raise

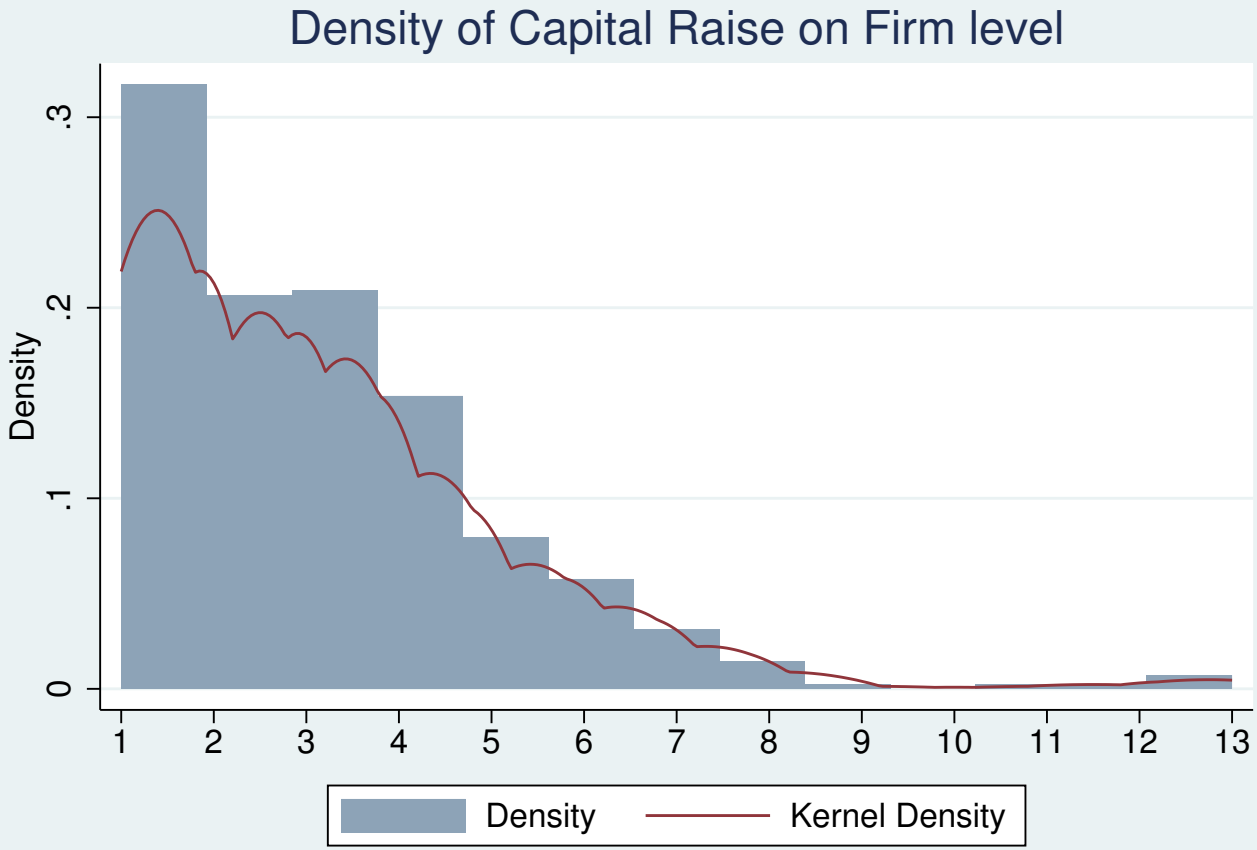


Data Summary

Number of Capital Raise



Number of Capital Raise for each Firm



This figure graphs the histogram of number of capital raise for each firm.

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Abnormal Return

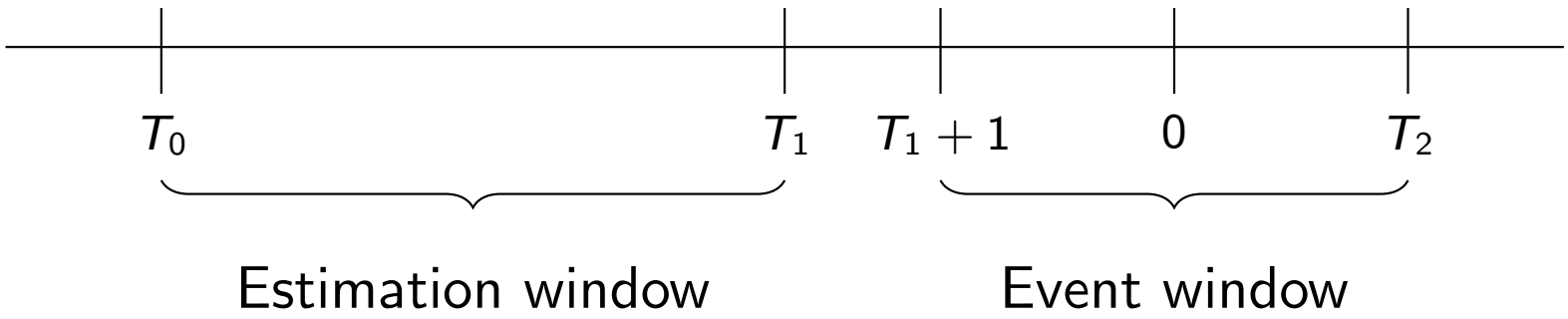
- Abnormal return is the difference between the observed return and the predicted return

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

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

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
  - $t_{AAR} = \sqrt{N}\frac{AAR}{S_{AAR}}$
  - $S^2_{AAR} = \frac{1}{N-1}\sum_{i=1}^{N}(AR_i - AAR)^2$

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
  - $t_{CAAR} = \sqrt{N}\frac{CAAR}{S_{CAAR}}$
  - $S^2_{CAAR} = \frac{1}{N-1}\sum_{i=1}^{N}(CAR_i - CAAR)^2$
  - $CAR_i = \sum_{i=t_1}^{t_2} AR_{i,t}$

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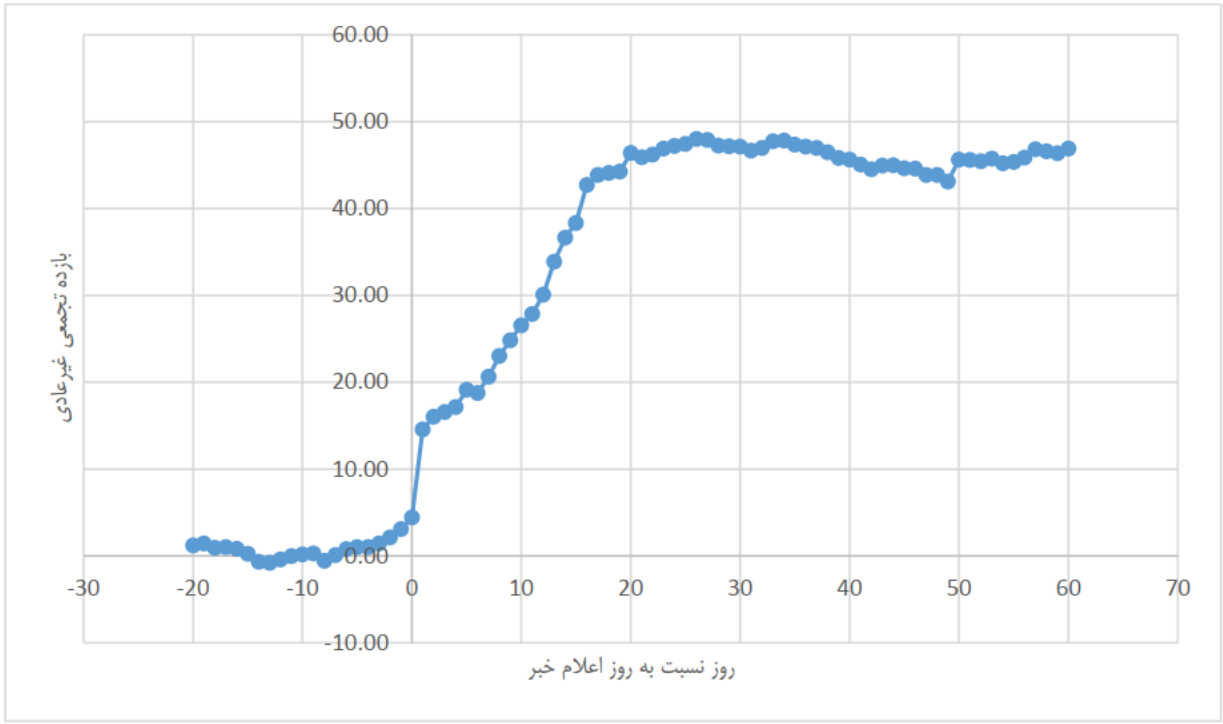
- Price reaction to equity issue announcements in high equity issue volume (HOT) periods is lower on average than in low equity issue volume (COLD) periods. [Bayless and Chaplinsky (1996)]
- Firms significantly under perform all of benchmarks over the five years following the equity issues. [Jegadeesh (2000)]
  - Similar levels of under performance for both small firms and large firms, and both growth firms and value firms.
  - Factor-model benchmarks are miss specified
- Under performance is concentrated primarily in small issuing firms with low book to market ratios. [Brav et al. (2000)]
- Price reaction to right issues for listed Indian firms is a positive but statistically insignificant.[Marisetty et al. (2008)]
  - The price reaction is significantly more negative for firms with a family group affiliation compared to firms with no family group affiliation
- When shareholders approve issuances, average announcement returns are positive [Holderness (2018)]
  - Agency problems affect equity issuances and challenge existing adverse selection, market timing, and signaling explanations.

Iran


60.00
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40.00
30.00
20.00
10.00
0.00
-10.00
-30
-20
-10
0
10
20
30
40
50
60
70
بازده تجمعی غیرعادی
روز نسبت به روز اعلام خبر

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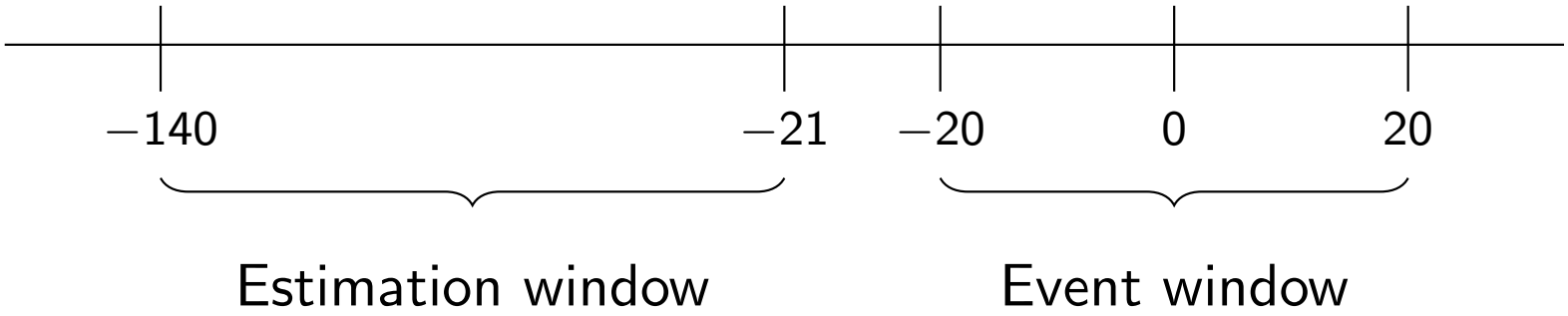
Abnormal Return

- 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:

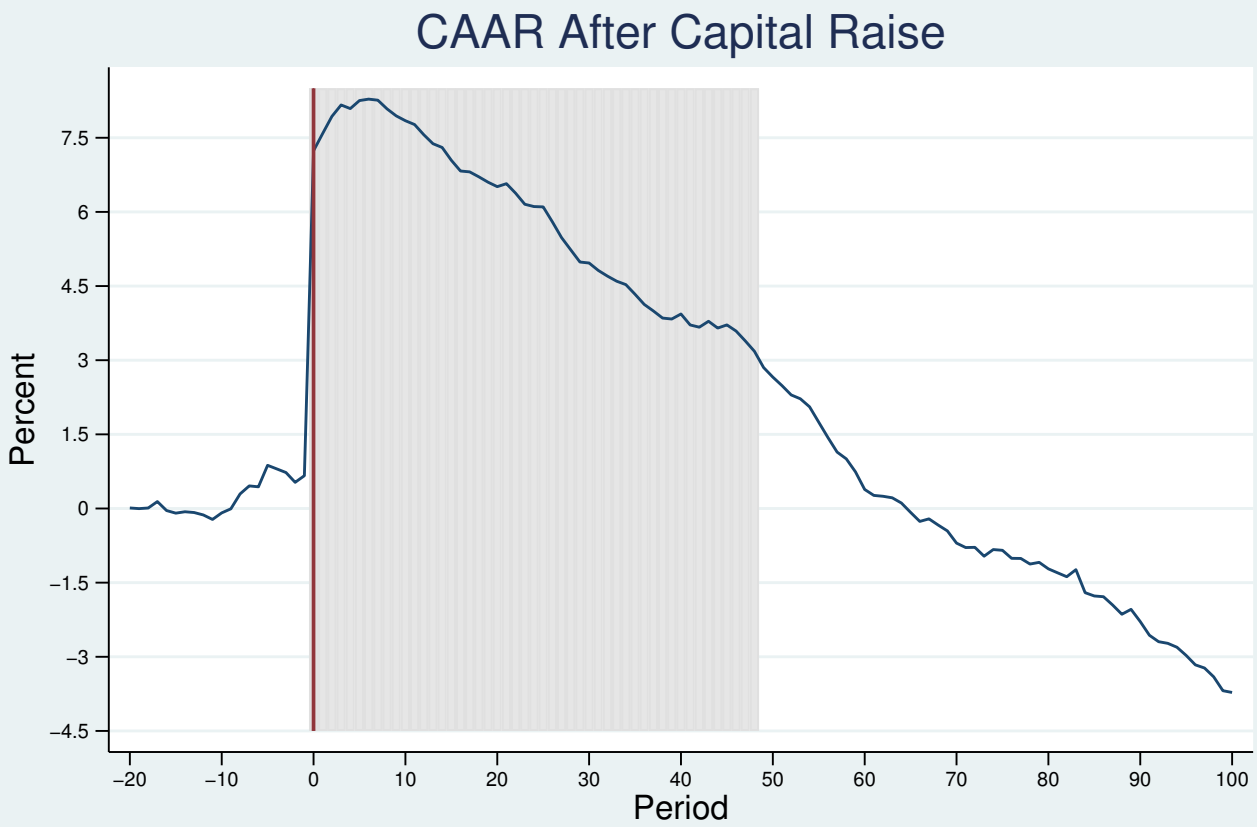


- We test whether $CAAR = 0$ or not

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



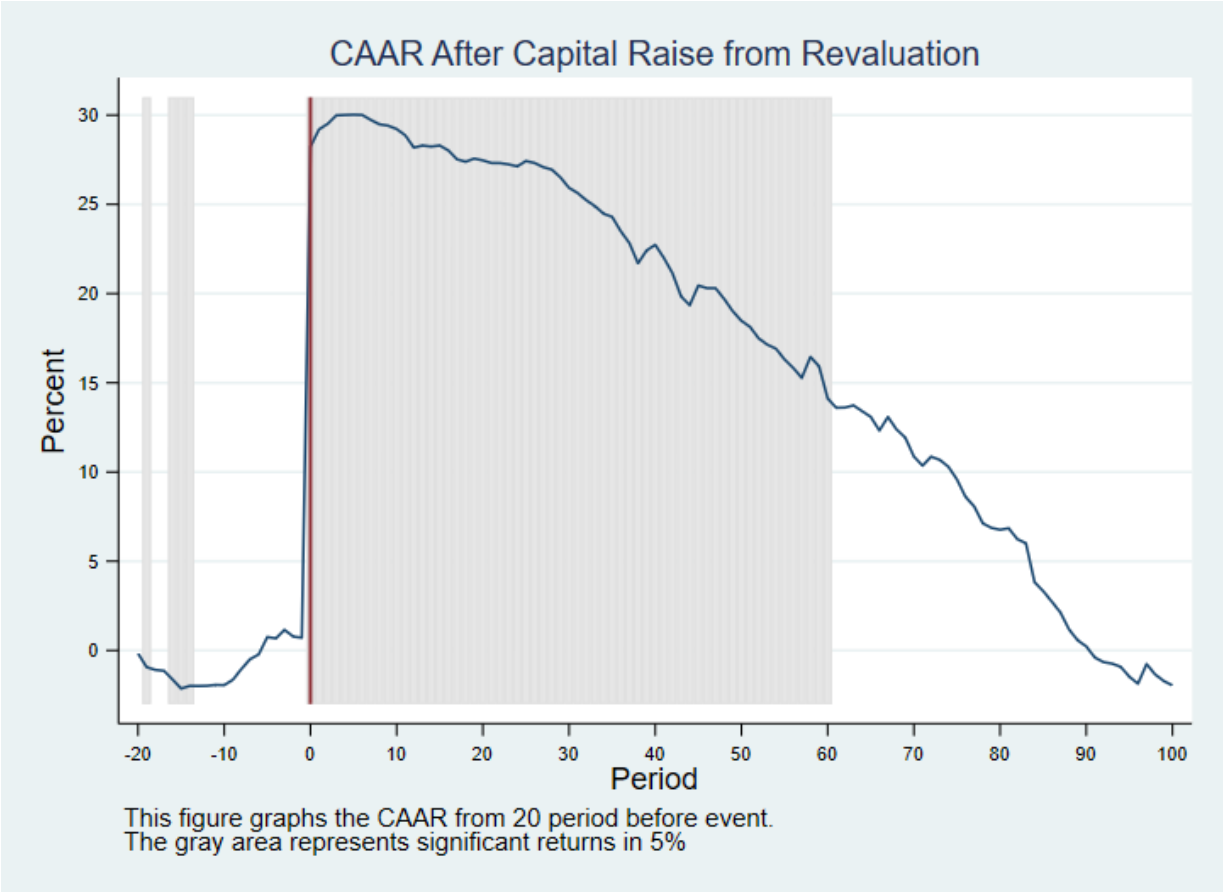
This figure graphs the CAAR from 20 period before event.
The gray area represents significant returns in 5%

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

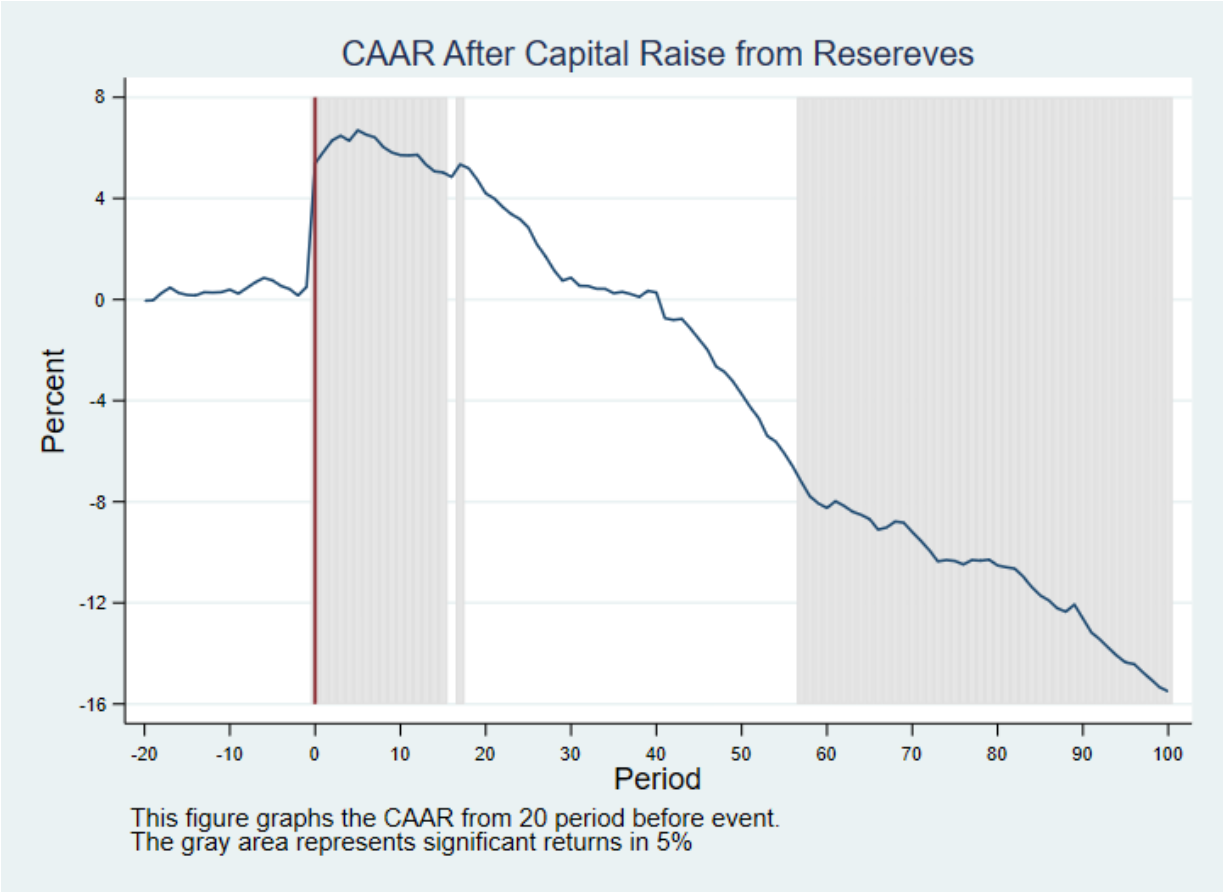


Analysis of abnormal return in days surrounding the Revaluation announcements

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

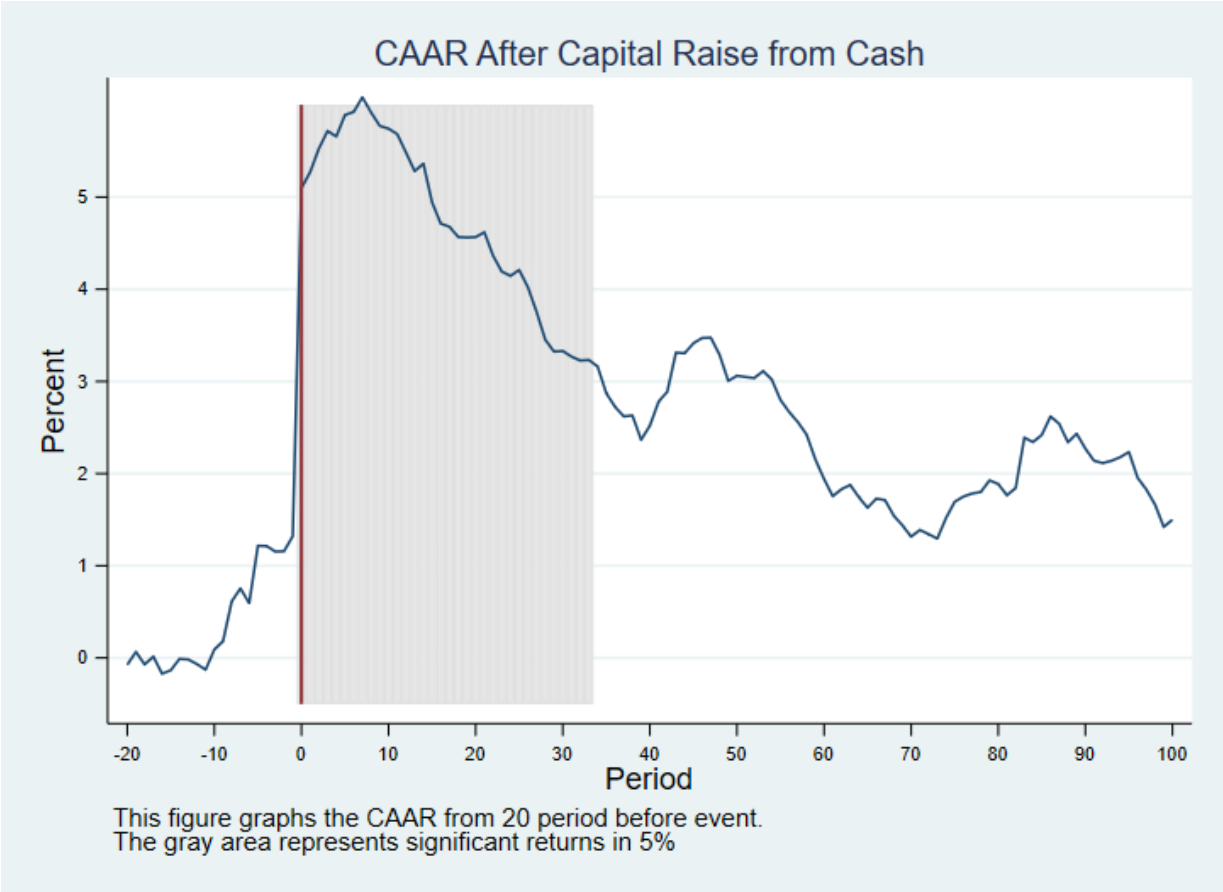
Abnormal Return

Abnormal return of raised capital from Reserves



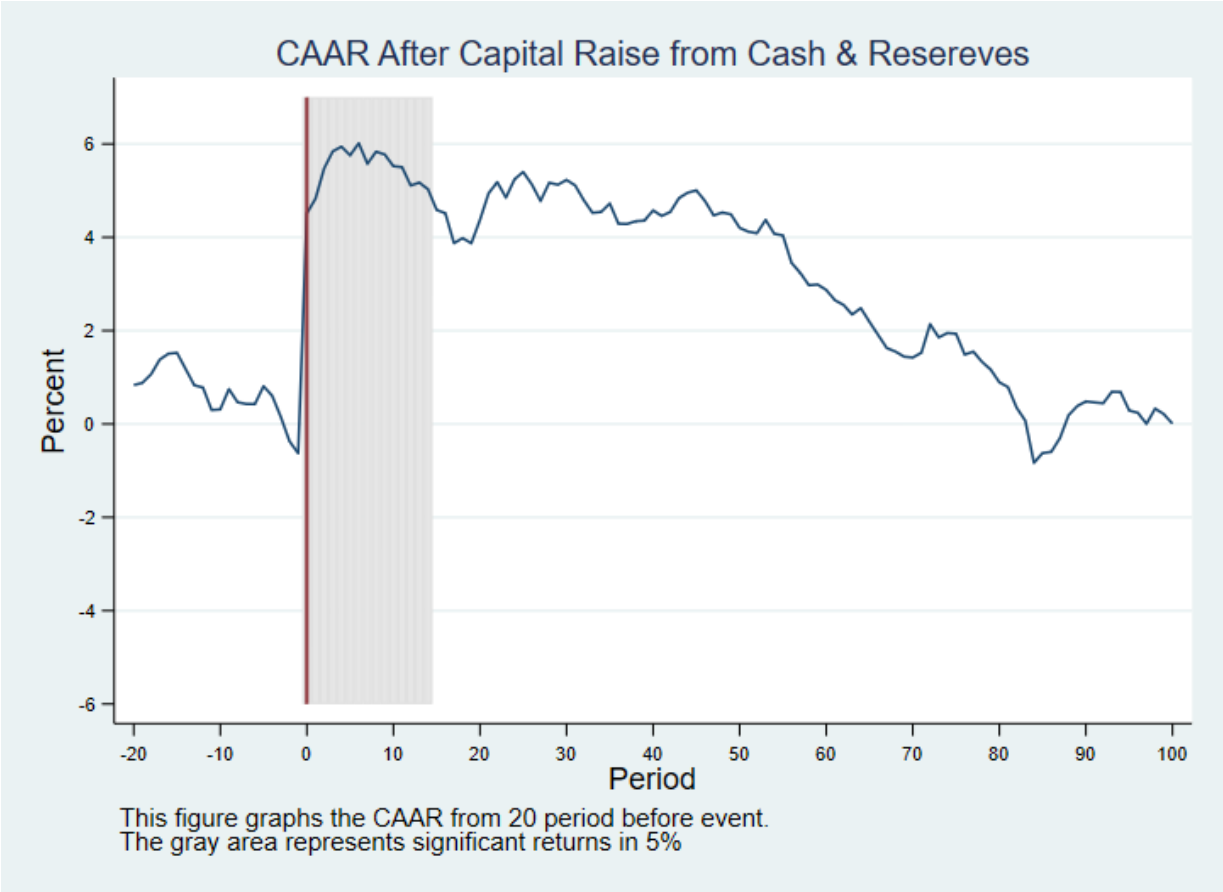
Abnormal Return

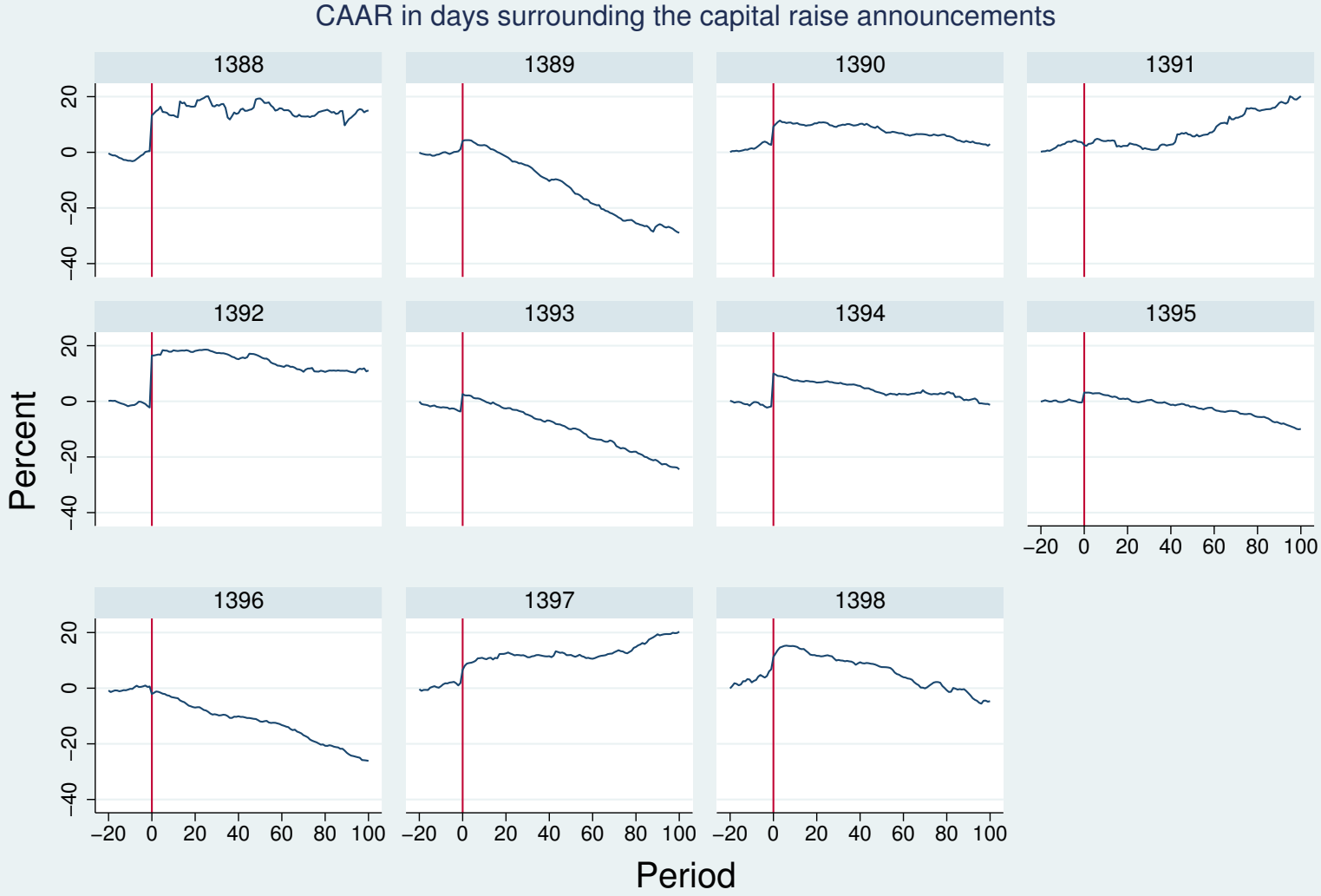
Abnormal return of raised capital from Cash

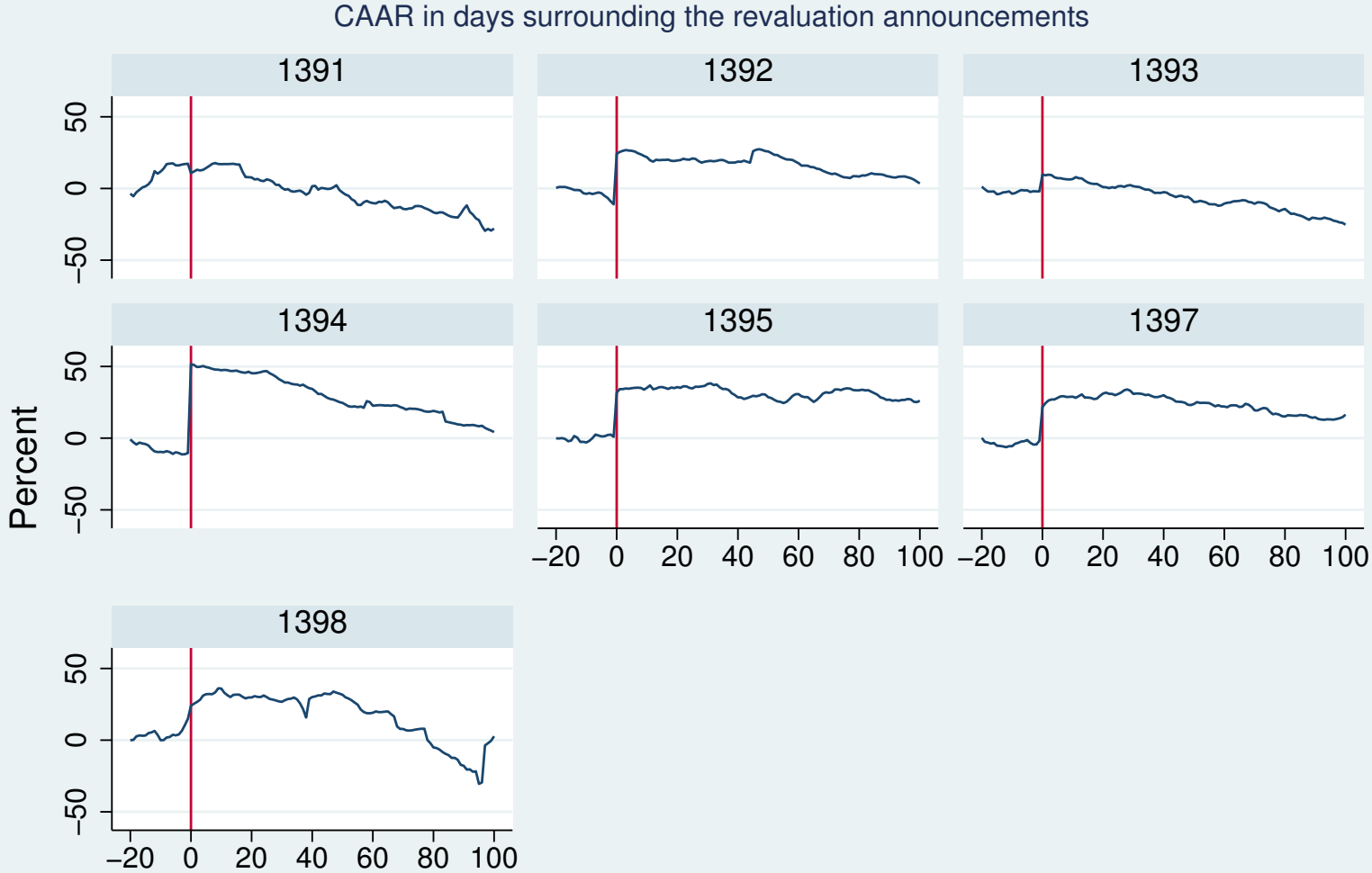


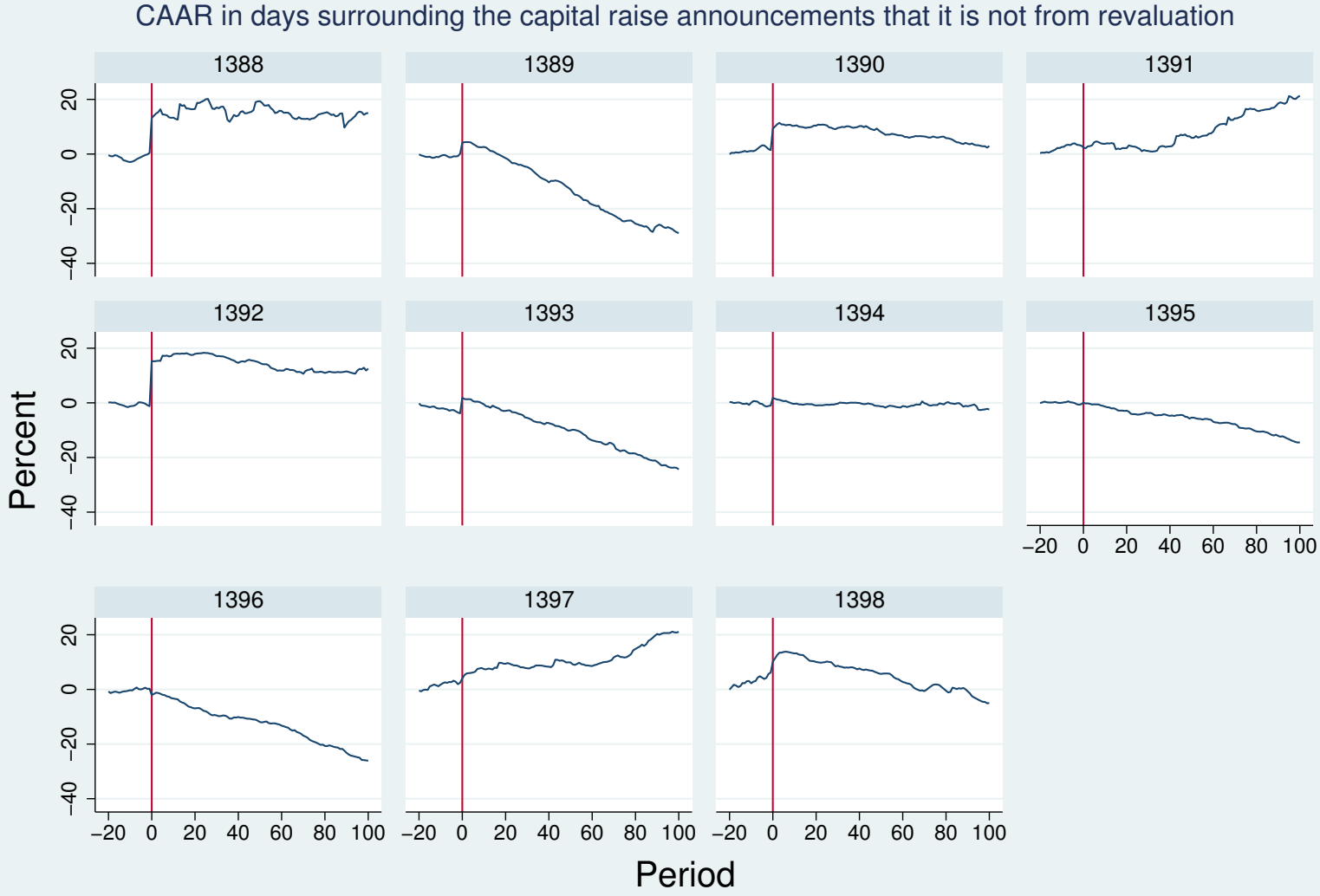
Abnormal Return

Abnormal return of raised capital from Cash & Reserves

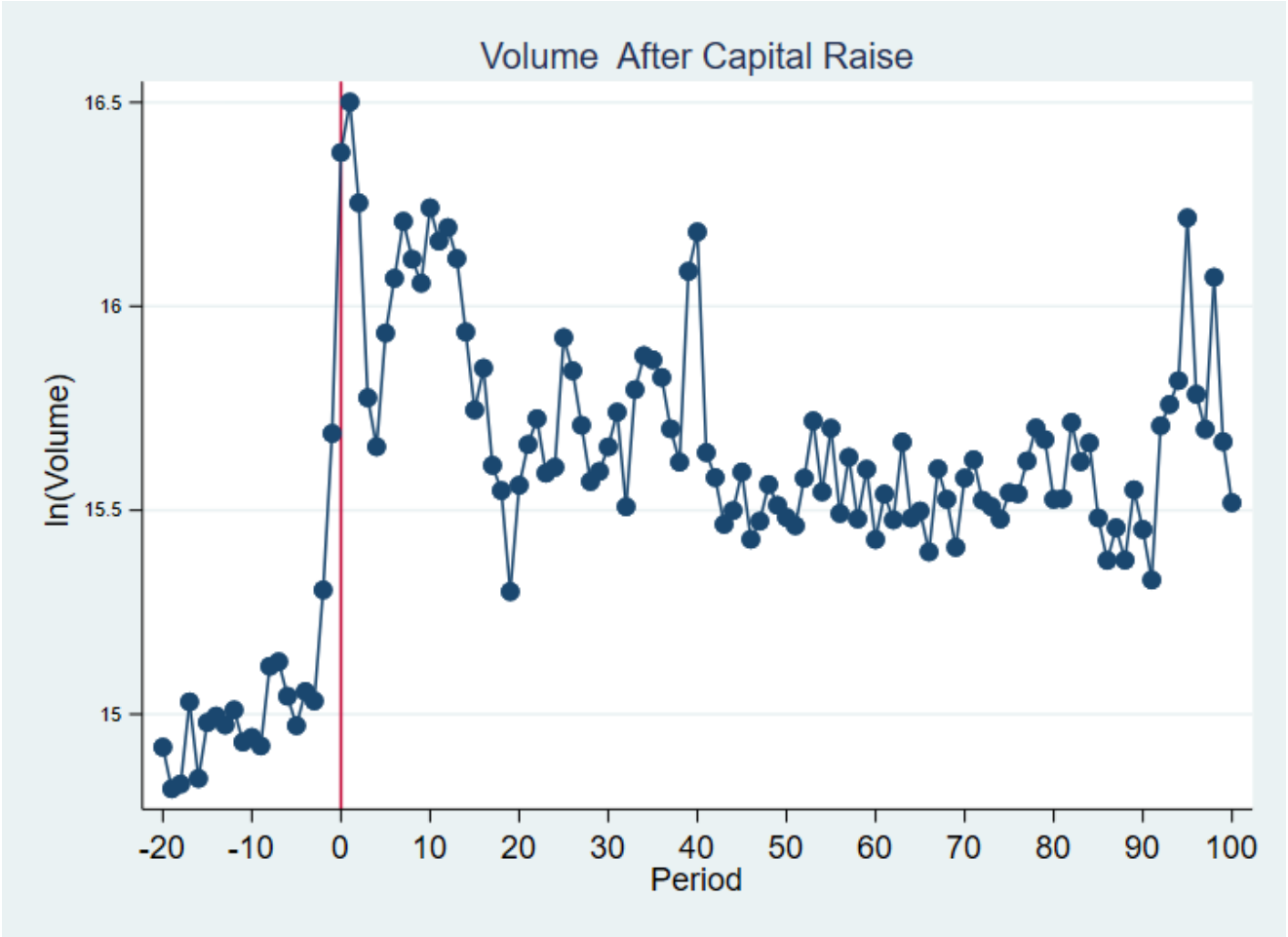



CAAR in days surrounding the capital raise announcements
1388
1389
1390
1391
1392
1393
1394
1395
1396
1397
1398
Percent
−40
−20
0
20
−20
0
20
40
60
80
100
Period
Graphs by year


CAAR in days surrounding the revaluation announcements
1391
1392
1393
1394
1395
1397
1398
Percent
50
0
−50
−20
0
20
40
60
80
100
Period
Graphs by year

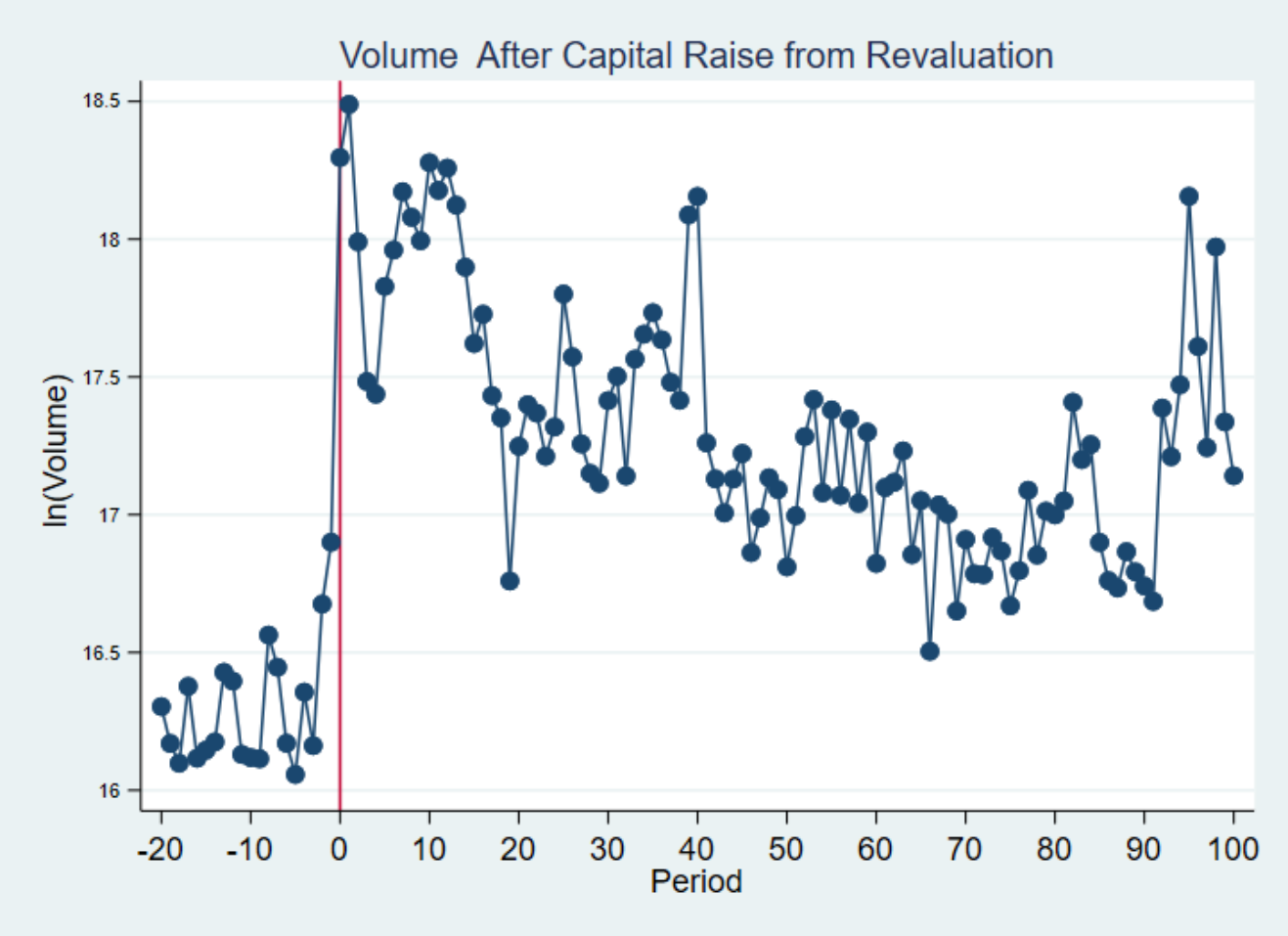

CAAR in days surrounding the capital raise announcements that it is not from revaluation
1388
1389
1390
1391
1392
1393
1394
1395
1396
1397
1398
Percent
20
0
−20
−40
−20
0
20
40
60
80
100
Period
Graphs by year

Volume


Volume After Capital Raise
ln(Volume)
16.5
16
15.5
15
-20
-10
0
10
20
30
40
50
60
70
80
90
100
Period

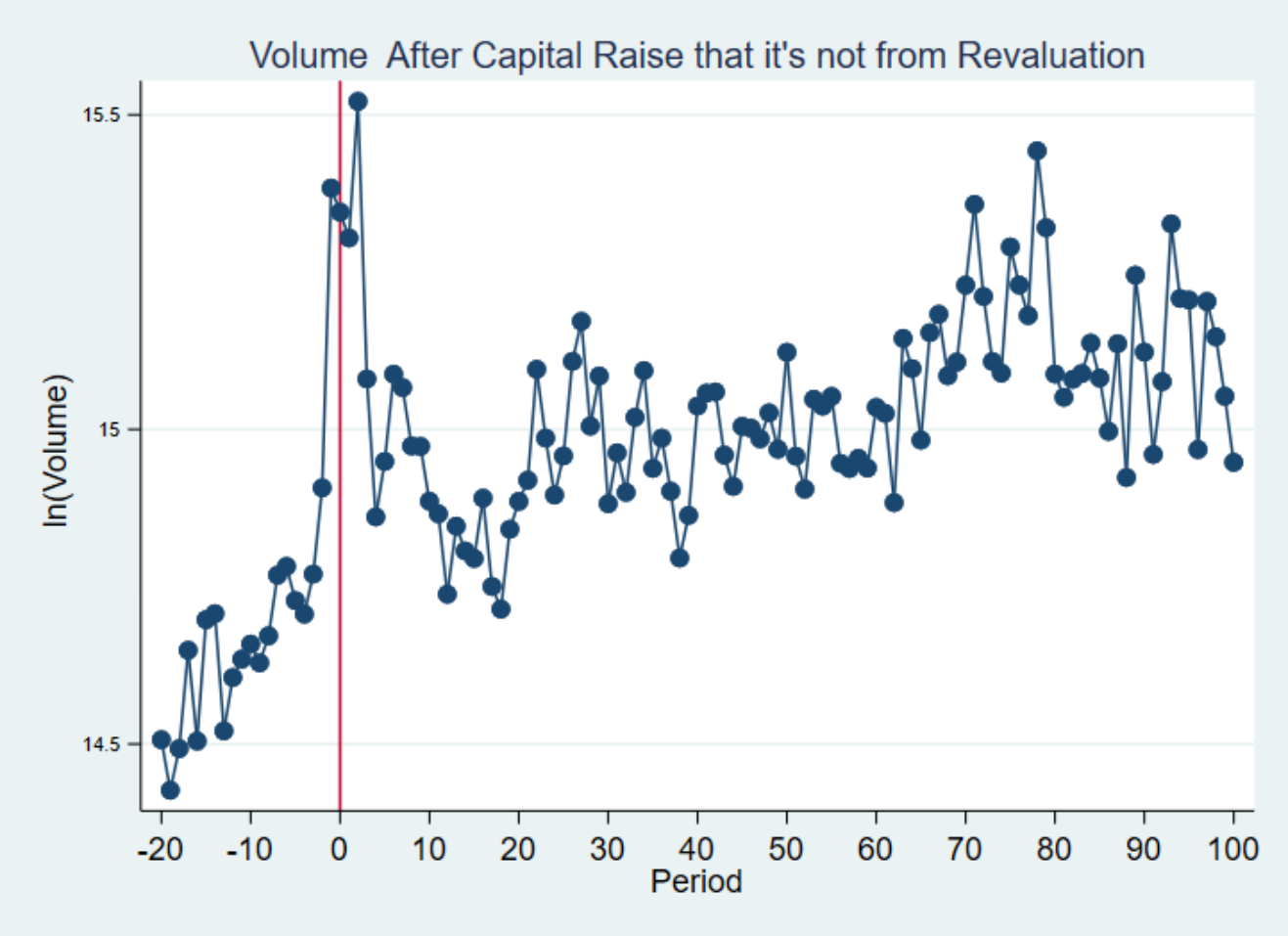
Volume

Volume of raised capital from Revaluation

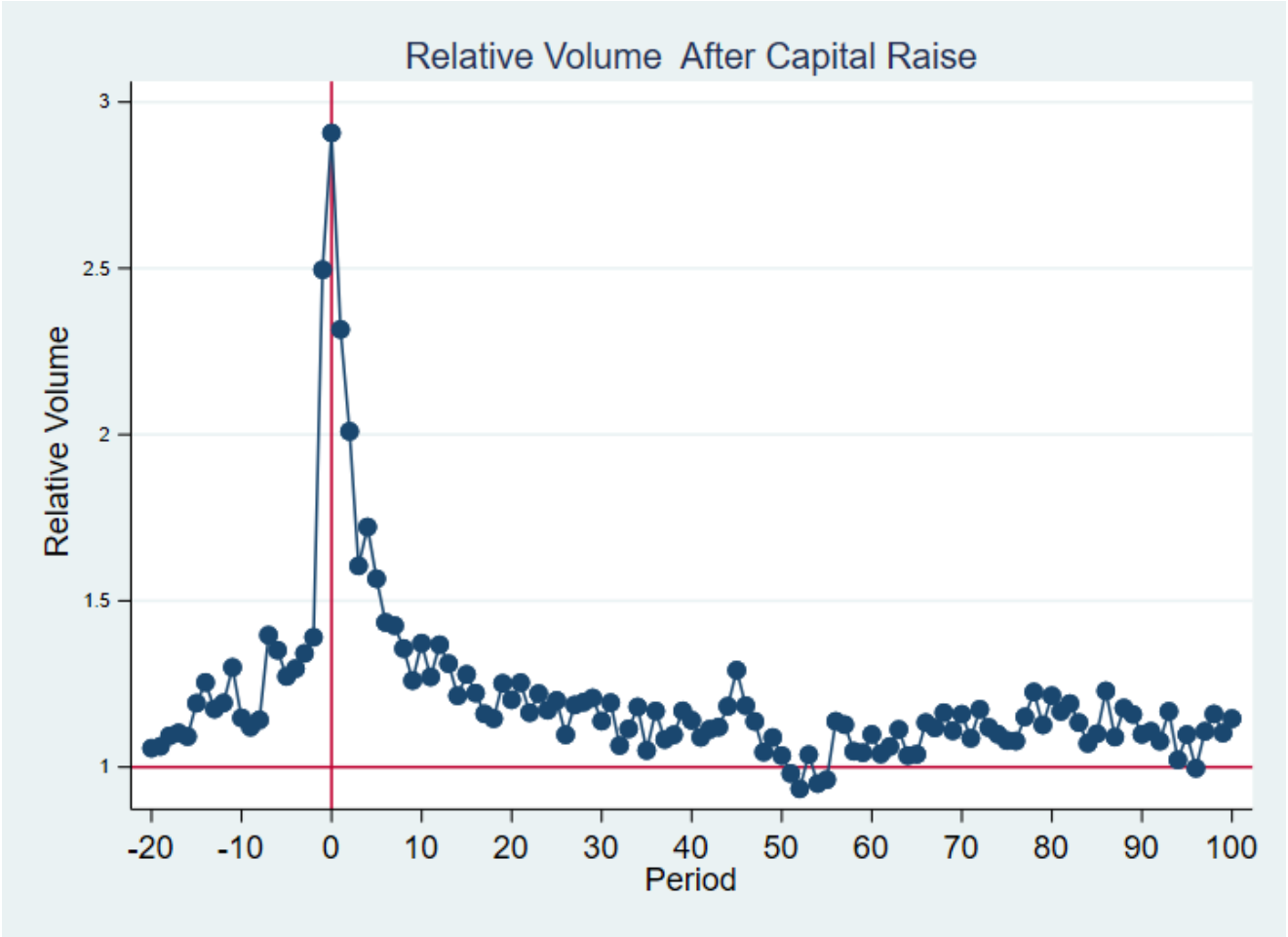


Volume

Volume of raised capital that it's not from Revaluation

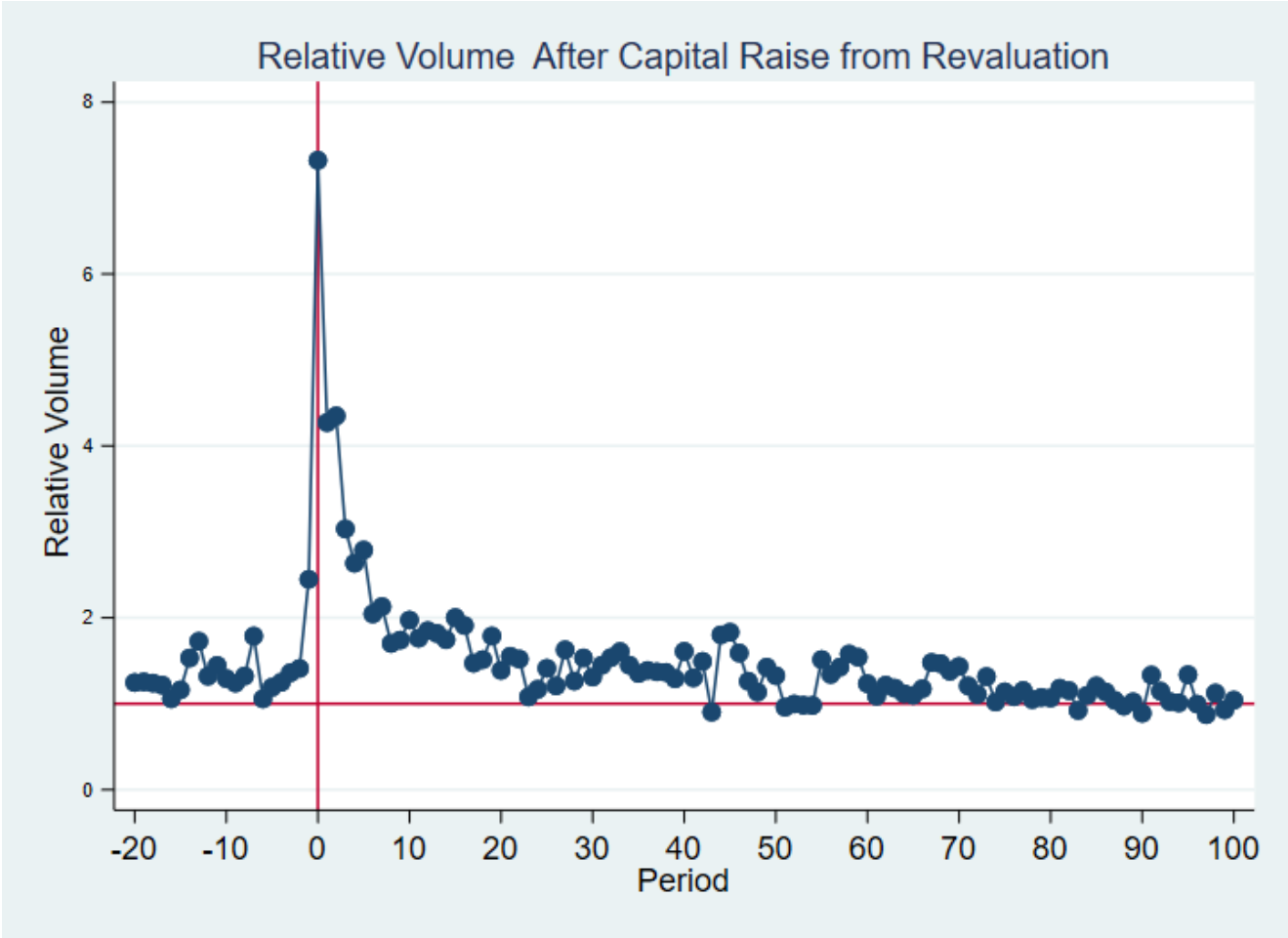


Relative volume



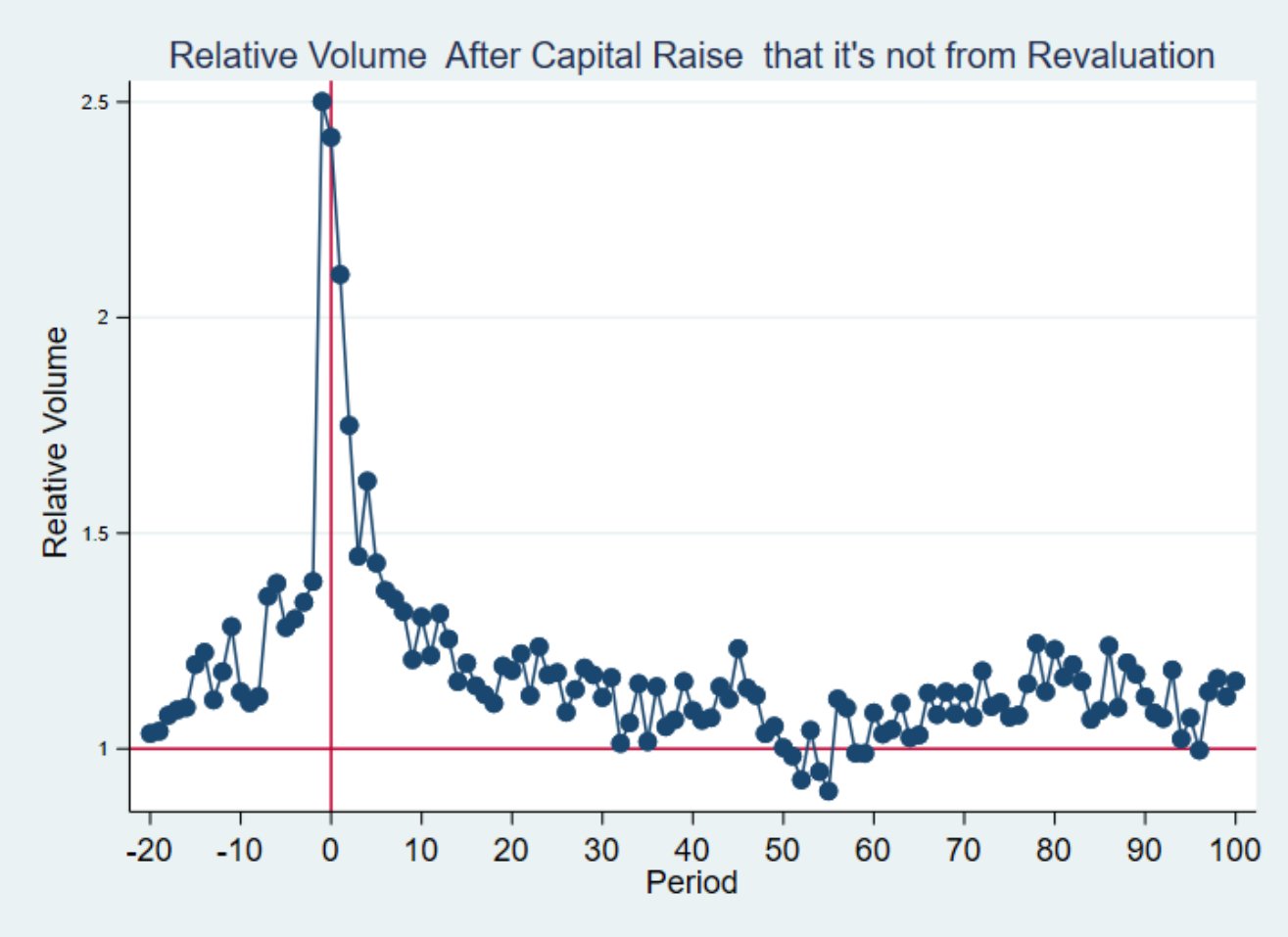
Relative volume

Relative Volume of raised capital from Revaluation

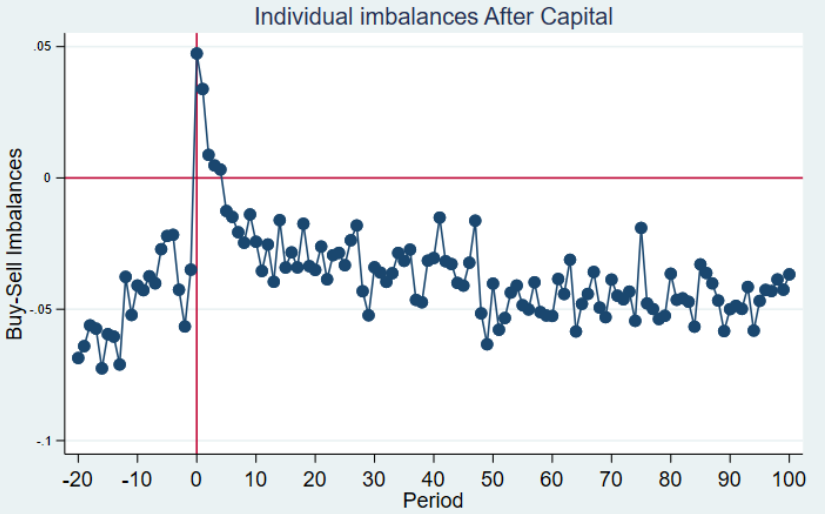


Relative volume

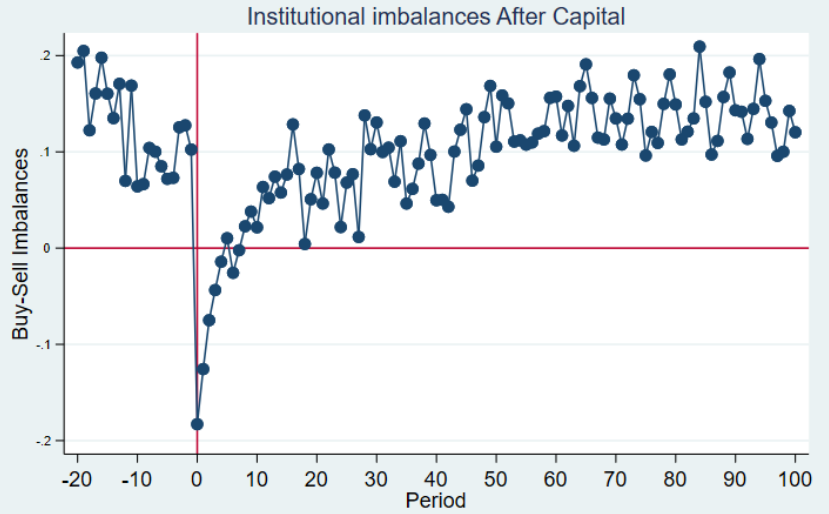
Relative Volume of raised capital that it's not from Revaluation



Buy-sell Imbalances



This figure graphs the buy-sell imbalances.
It is defined as the net buying ratio of stock k on date t by a particular type to the amounts bought and sold by that type.



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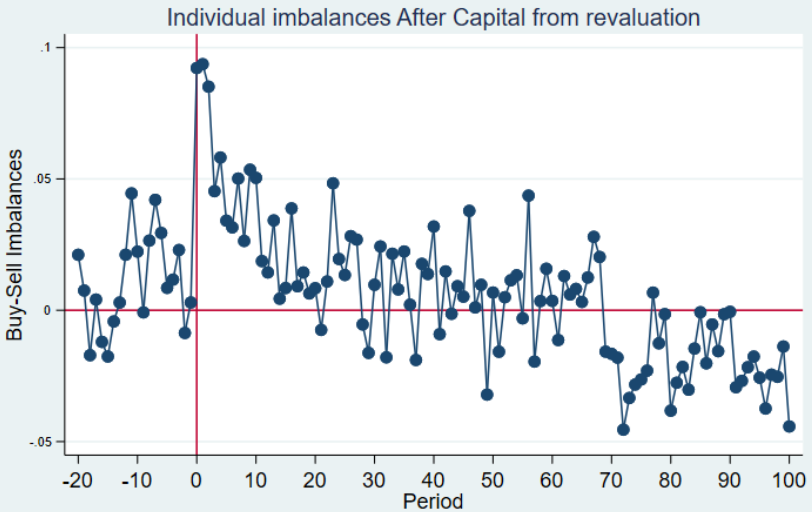
Buy-sell Imbalances

Buy-sell Imbalances of raised capital from Revaluation



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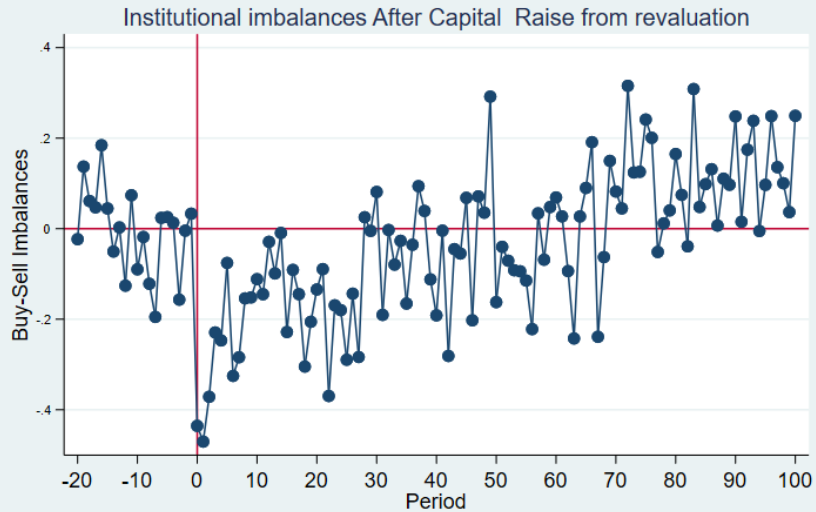

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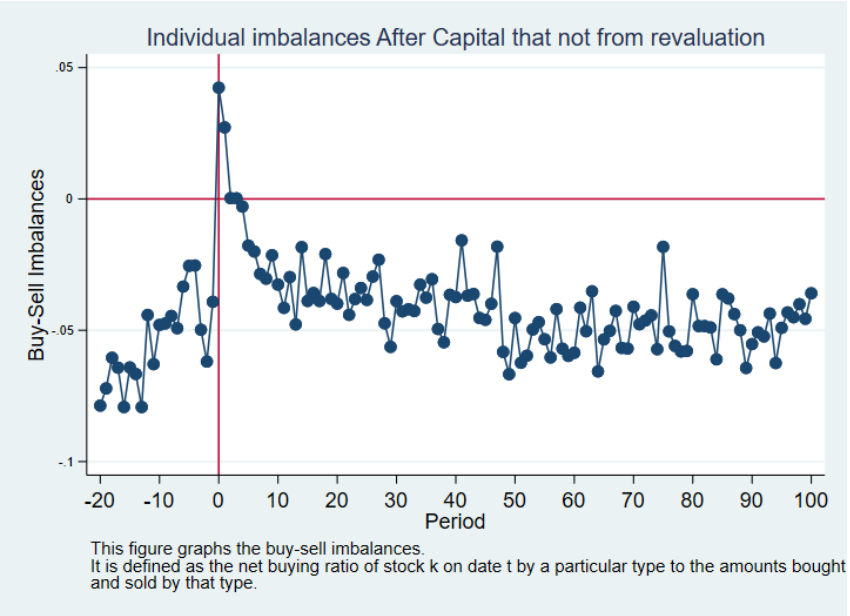
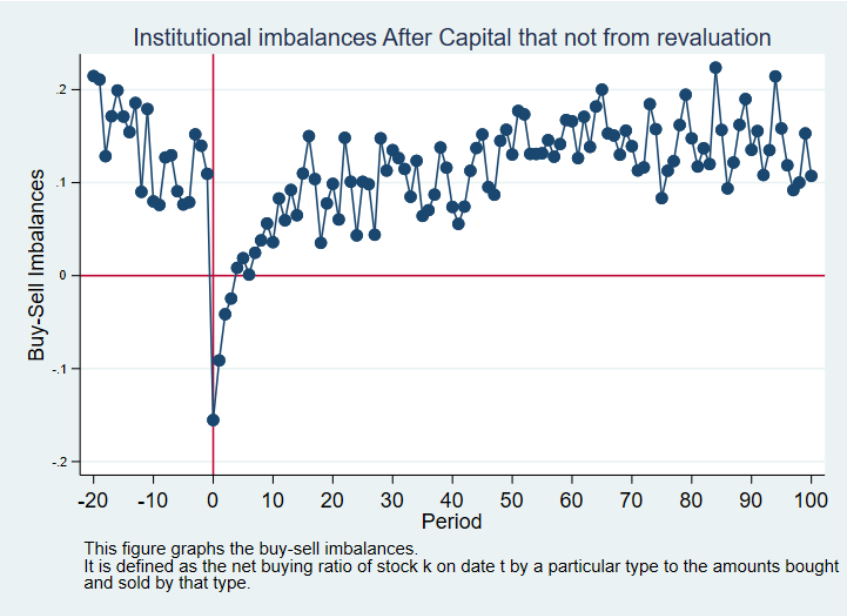
It is defined as the net buying ratio of stock k on date t by a particular type to the amounts bought and sold by that type.

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

	Revaluation		
Sub sample	No	Yes	Total
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

	Revaluation		
Sub sample	No	Yes	Total
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

	Revaluation		
Sub sample	No	Yes	Total
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

	Revaluation		
Sub sample	No	Yes	Total
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

	Revaluation		
Sub sample	No	Yes	Total
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)

	Revaluation		
Sub sample	No	Yes	Total
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

	Revaluation		
Sub sample	No	Yes	Total
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

	Revaluation		
Sub sample	No	Yes	Total
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

	Revaluation		
Sub sample	No	Yes	Total
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

References I

Bayless, M. and Chaplinsky, S. (1996). Is there a window of opportunity for seasoned equity issuance? *The Journal of Finance*, 51(1):253–278.

Brav, A., Geczy, C., and Gompers, P. A. (2000). Is the abnormal return following equity issuances anomalous? *Journal of financial economics*, 56(2):209–249.

Holderness, C. G. (2018). Equity issuances and agency costs: The telling story of shareholder approval around the world. *Journal of Financial Economics*, 129(3):415–439.

Jegadeesh, N. (2000). Long-term performance of seasoned equity offerings: Benchmark errors and biases in expectations. *Financial Management*, pages 5–30.

Marisetty, V. B., Marsden, A., and Veeraraghavan, M. (2008). Price reaction to rights issues in the indian capital market. *Pacific-Basin Finance Journal*, 16(3):316–340.

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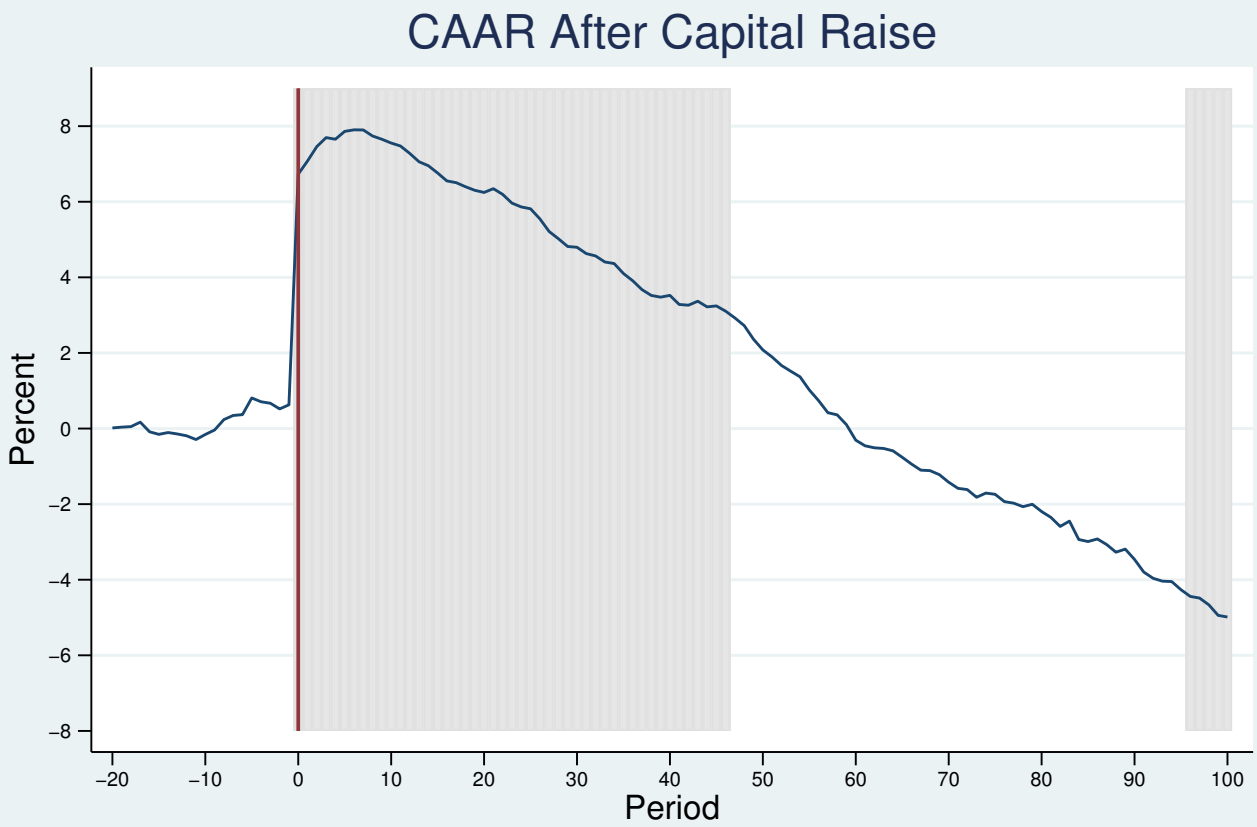
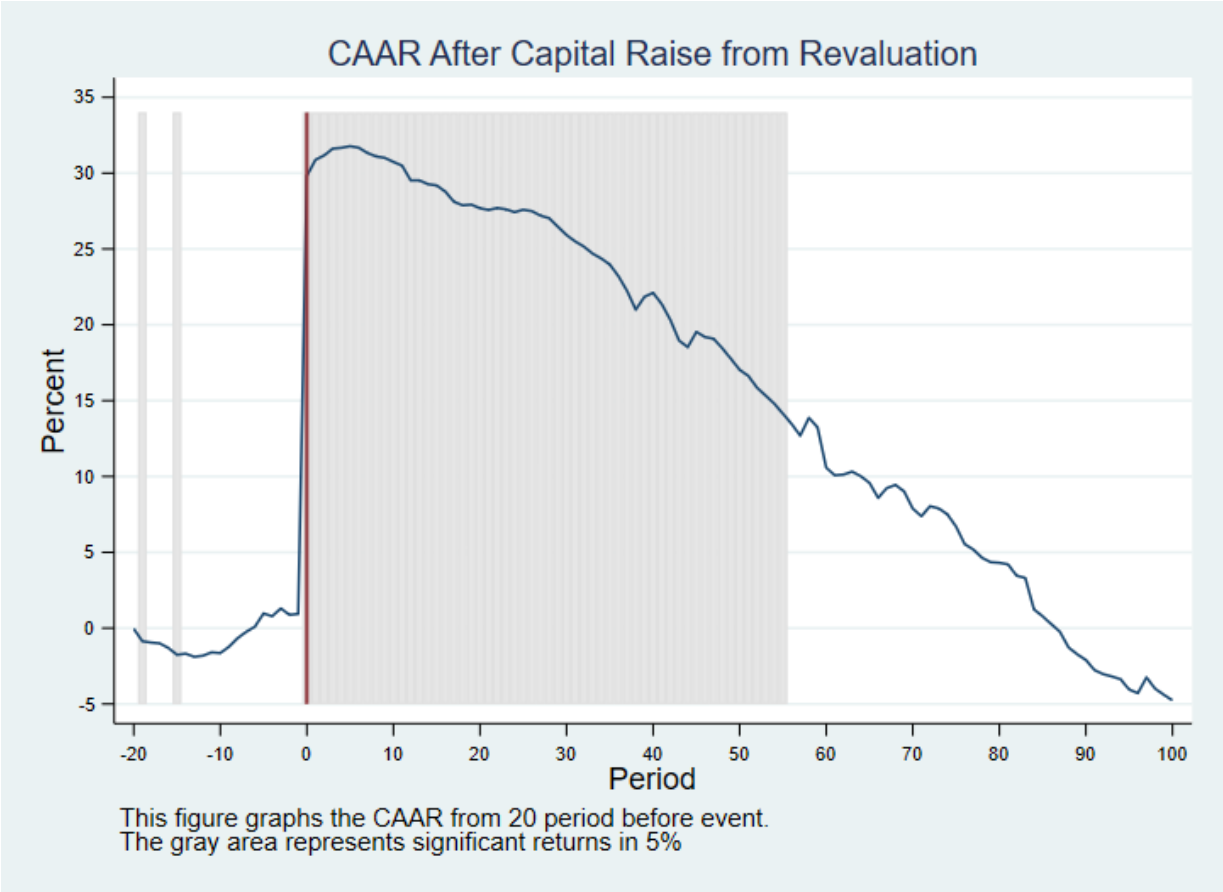
Abnormal Return



This figure graphs the CAAR from 20 period before event.
The gray area represents significant returns in 5%

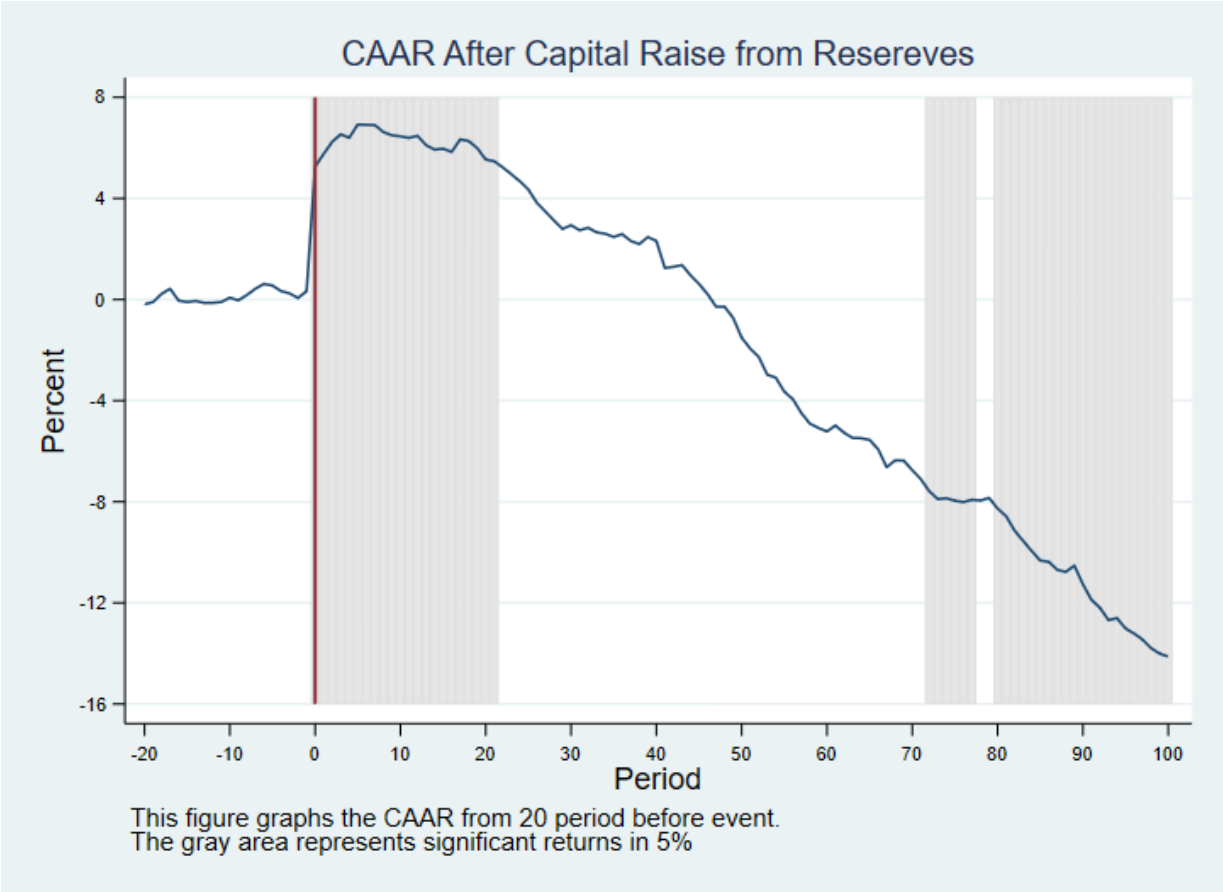
Abnormal Return

Abnormal return of raised capital from Revaluation



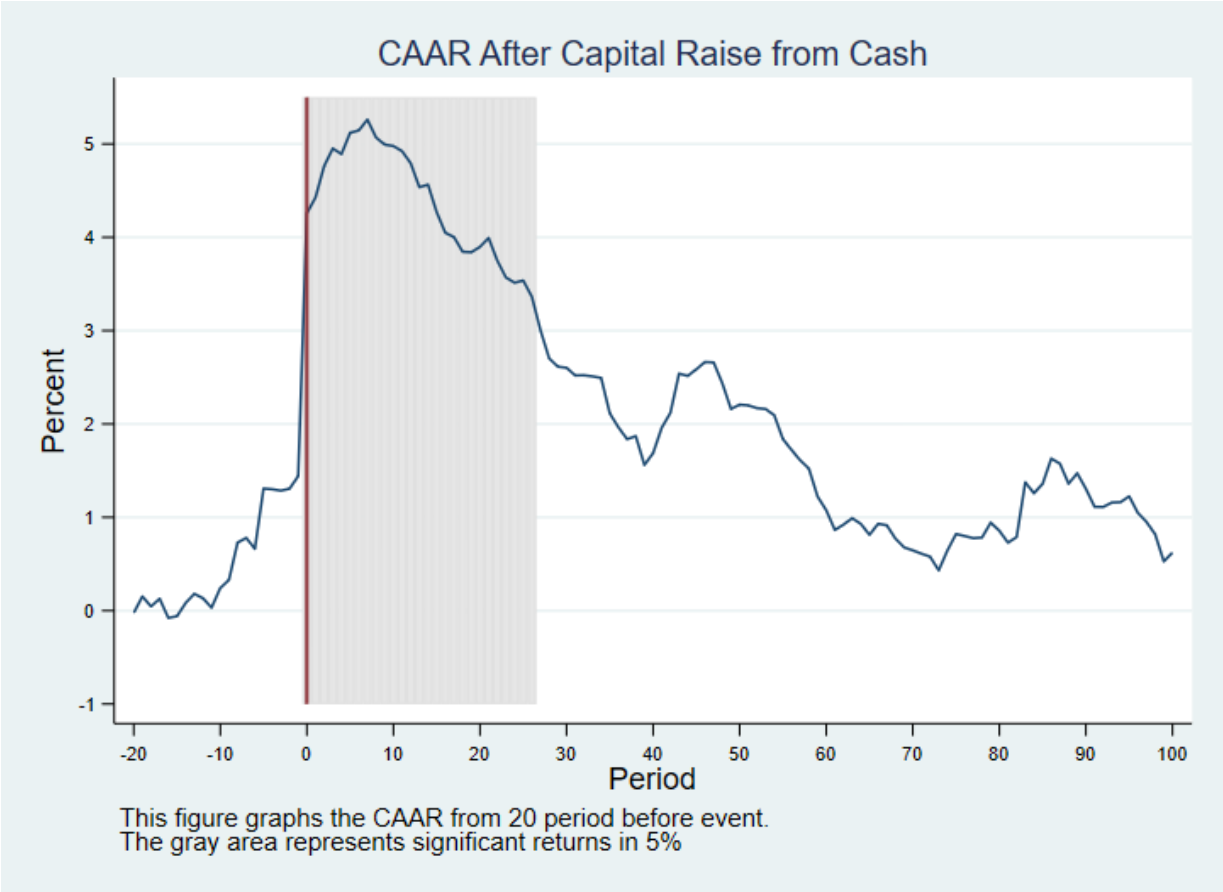
Abnormal Return

Abnormal return of raised capital from Reserves



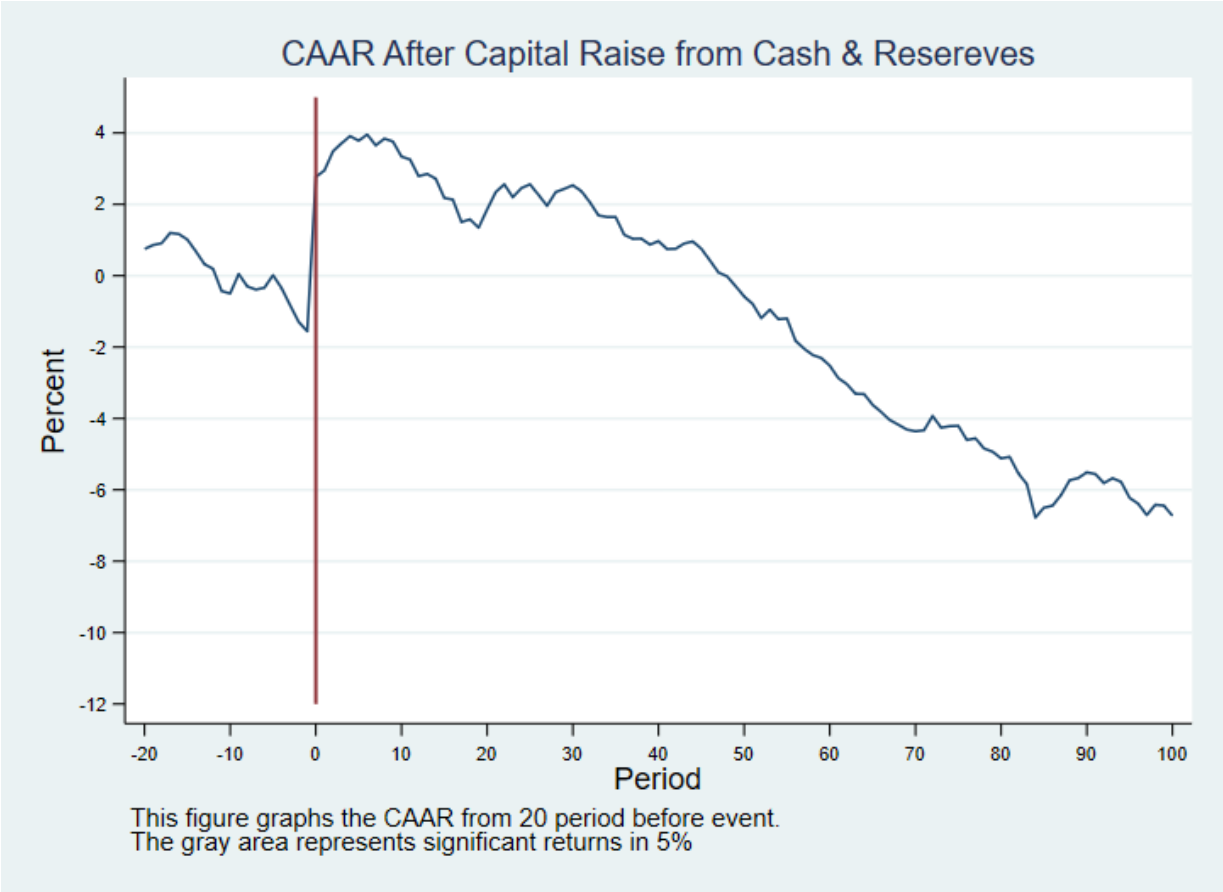
Abnormal Return

Abnormal return of raised capital from Cash



Abnormal Return

Abnormal return of raised capital from Cash & Reserves



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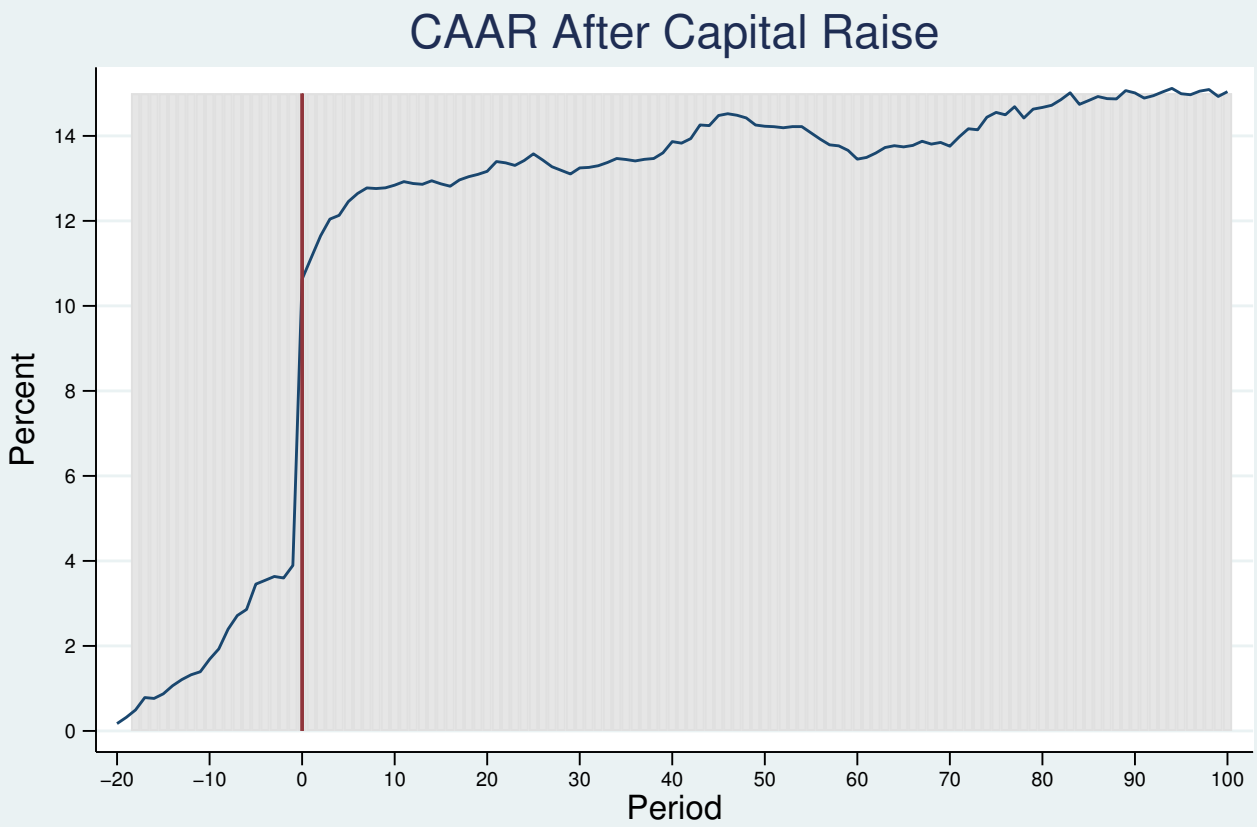
Brooks, Chris. Introductory econometrics for finance. Cambridge university press, 2019

An interesting question is whether the expected return should incorporate the α from the estimation period in addition to β 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.

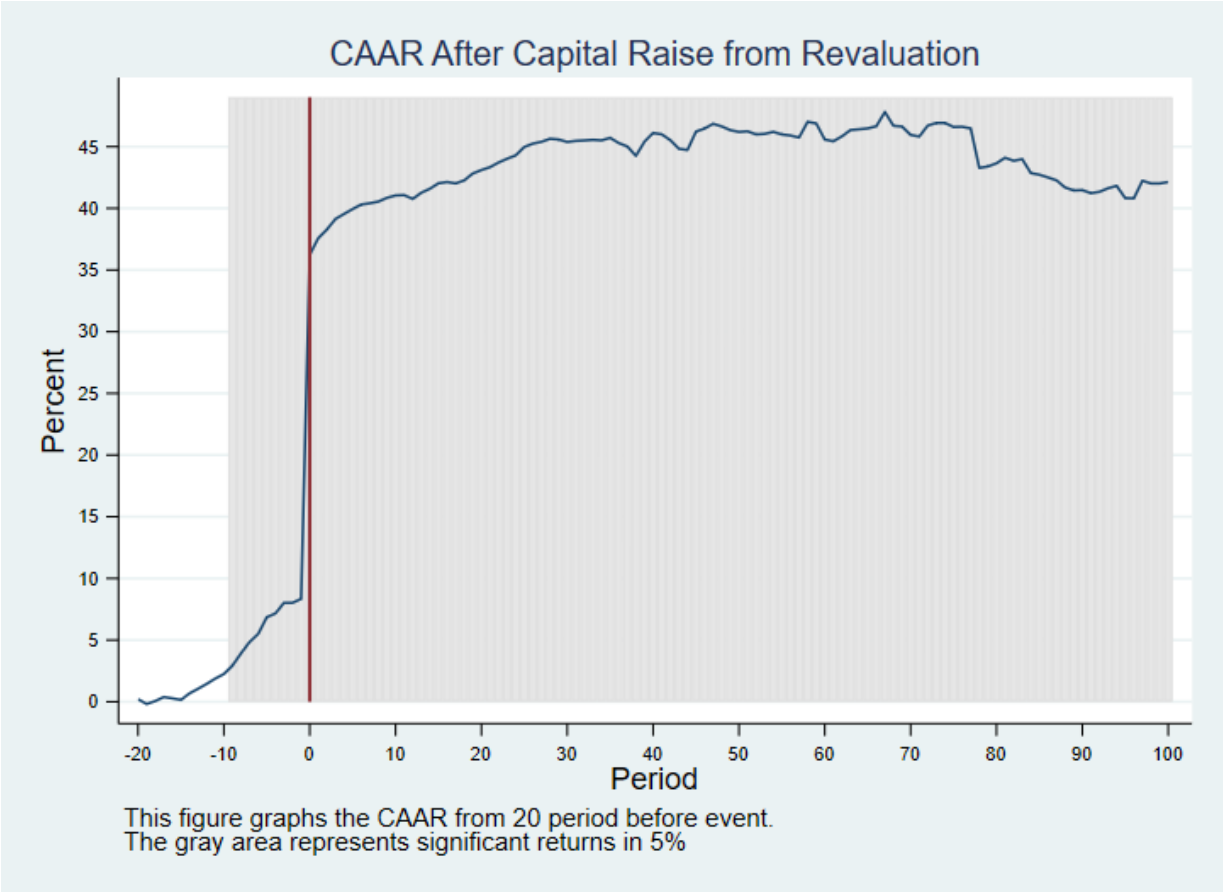
Abnormal Return



This figure graphs the CAAR from 20 period before event.
The gray area represents significant returns in 5%

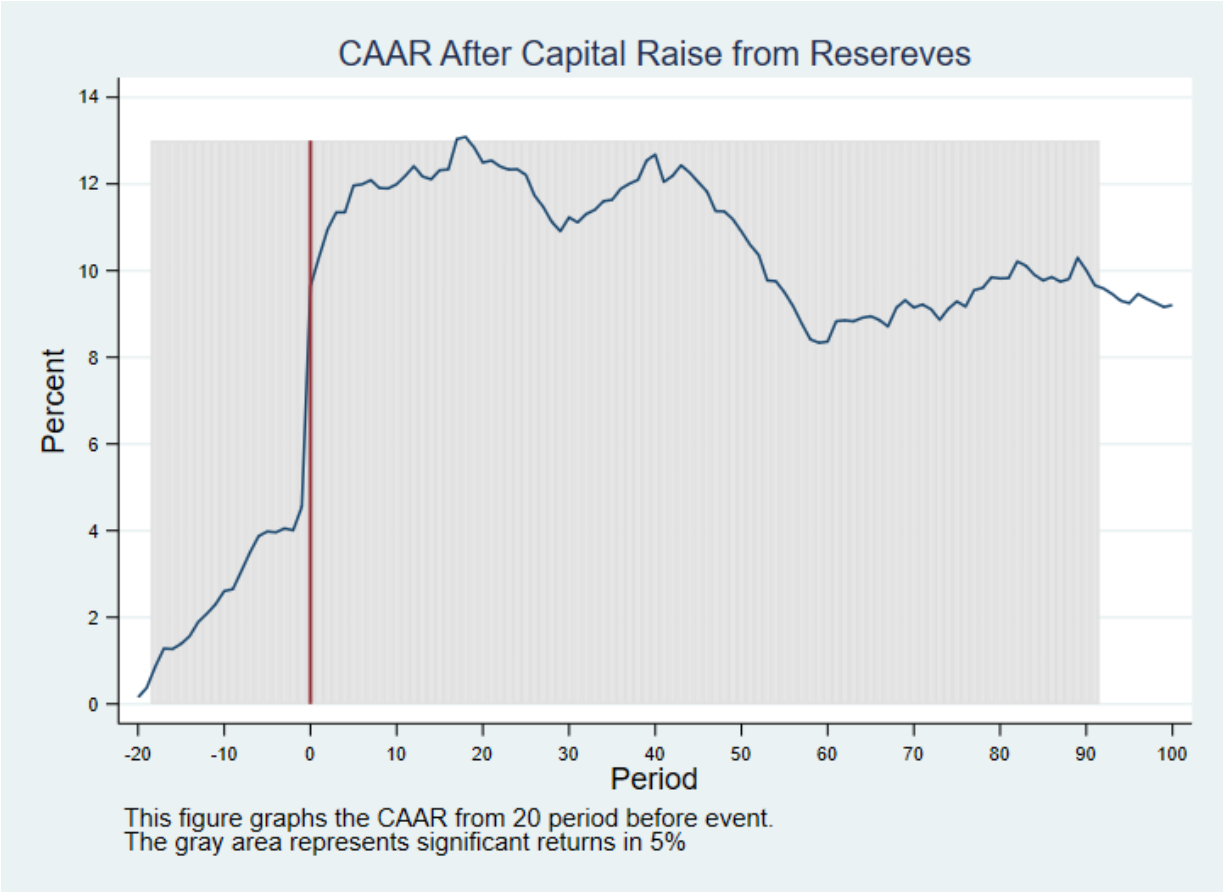
Abnormal Return

Abnormal return of raised capital from Revaluation



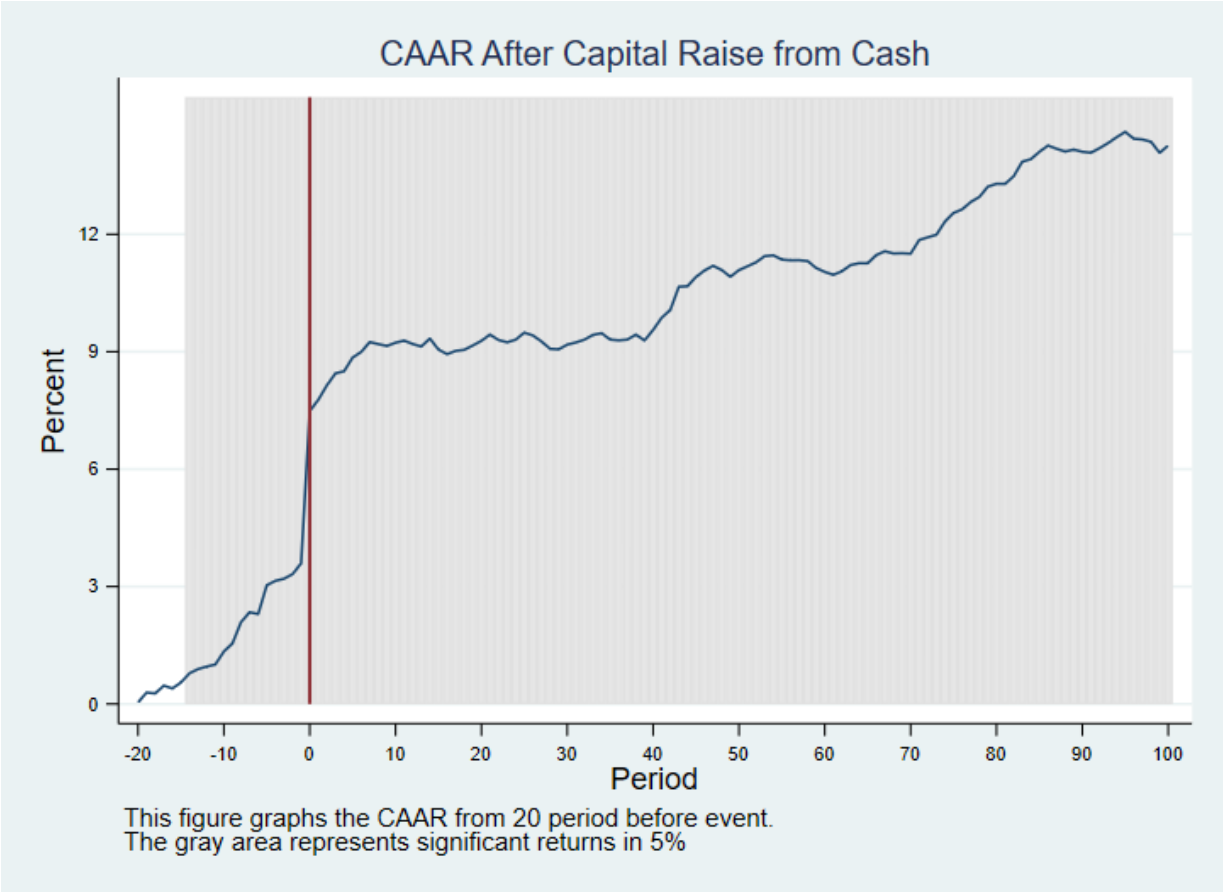
Abnormal Return

Abnormal return of raised capital from Reserves



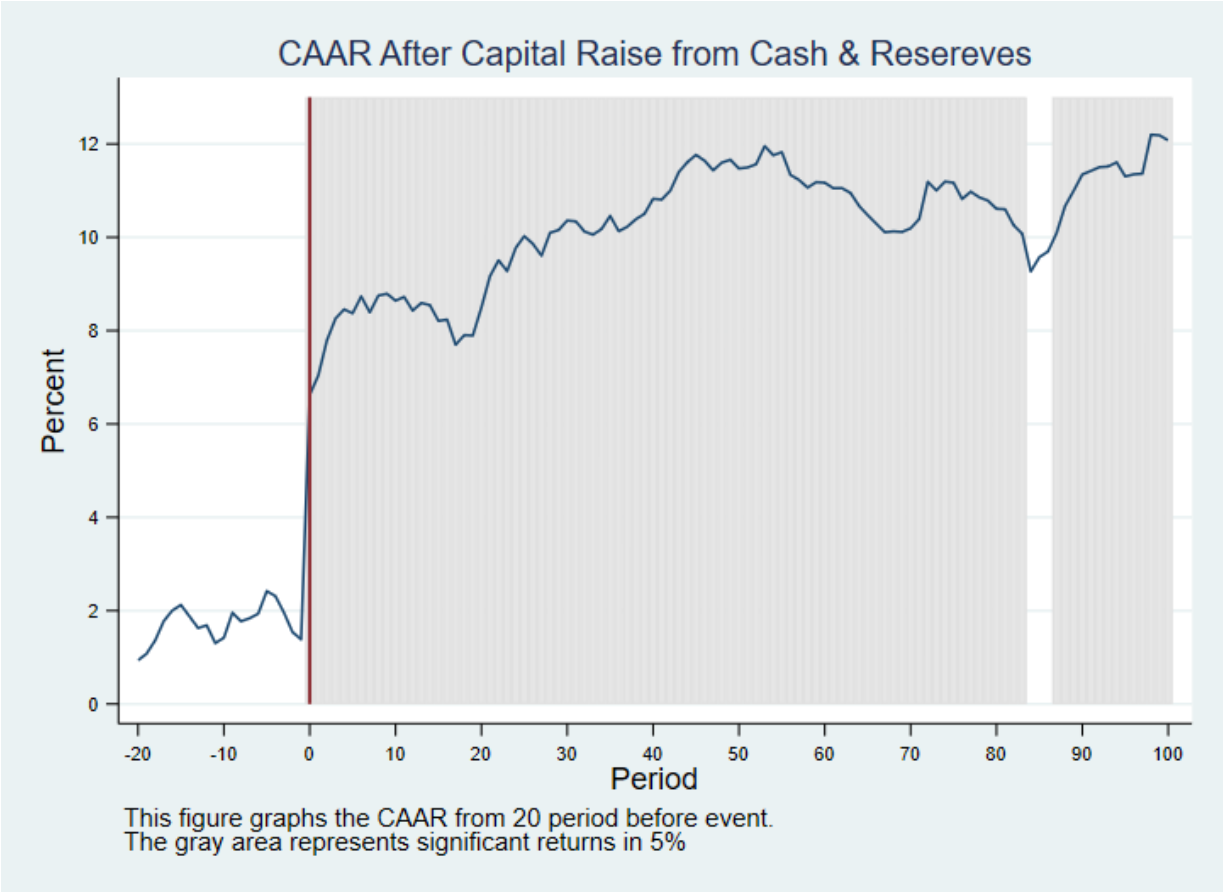
Abnormal Return

Abnormal return of raised capital from Cash



Abnormal Return

Abnormal return of raised capital from Cash & Reserves



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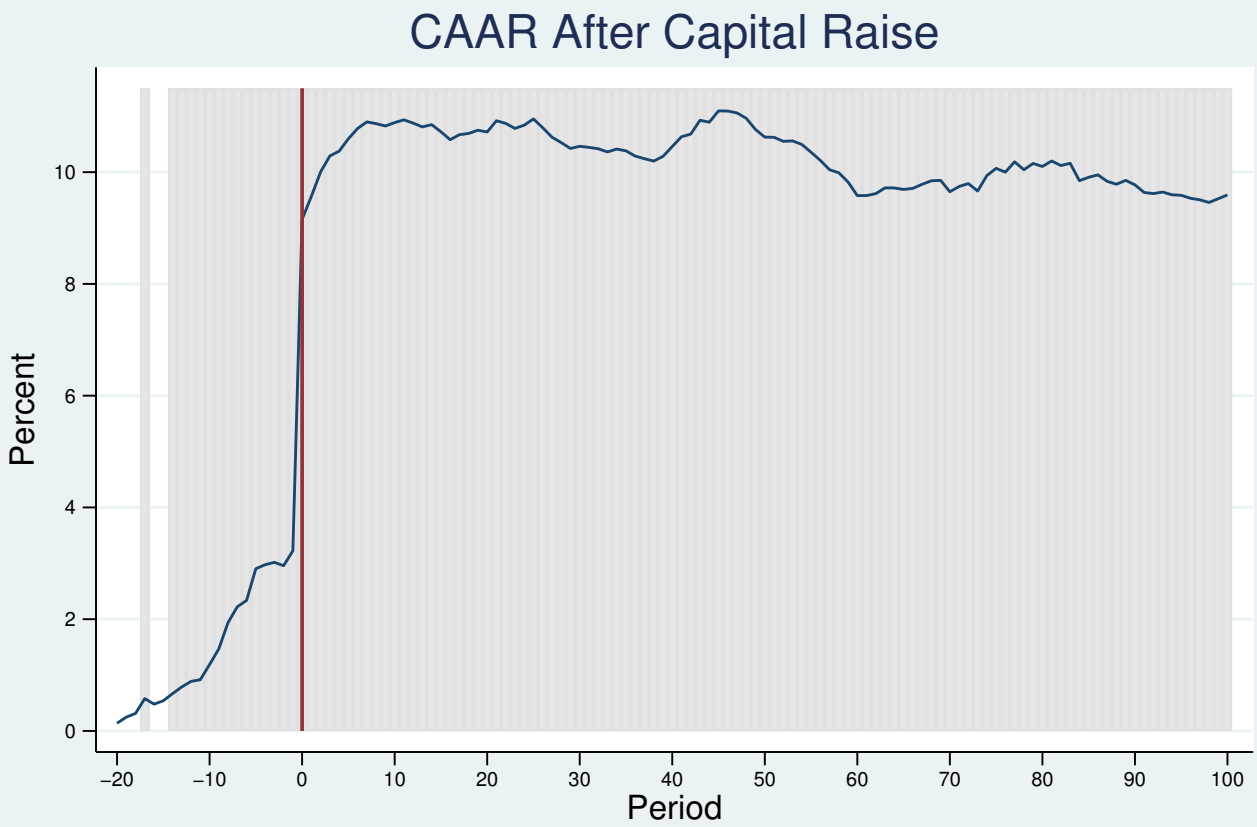
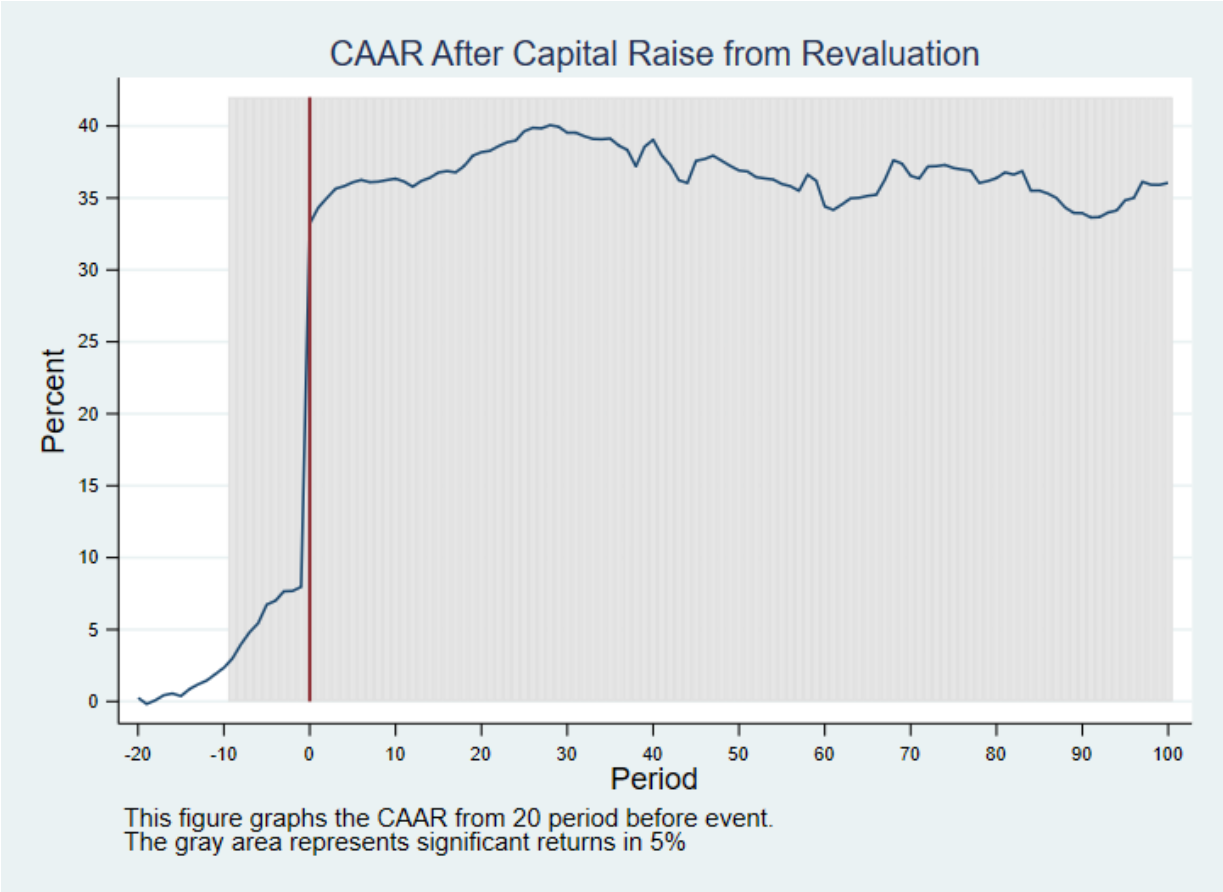
Abnormal Return



This figure graphs the CAAR from 20 period before event.
The gray area represents significant returns in 5%

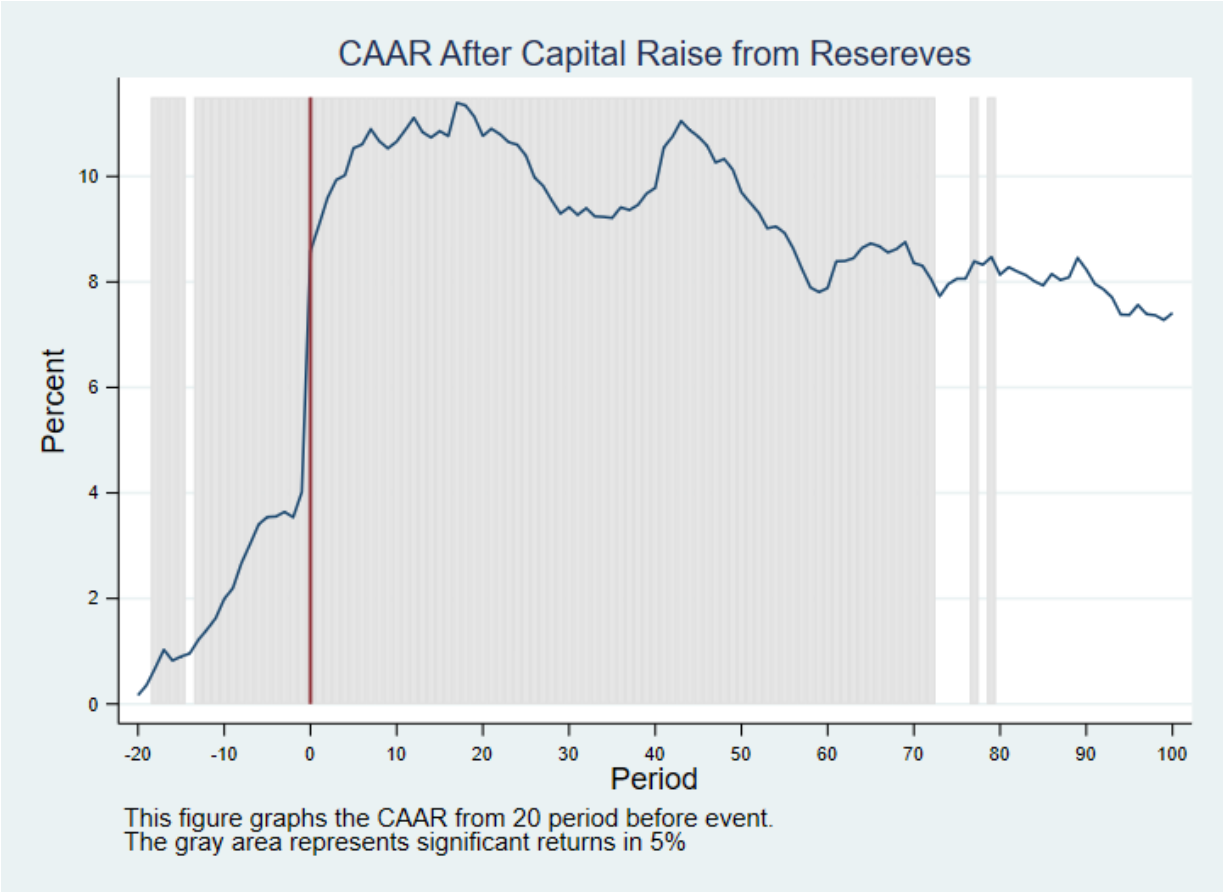
Abnormal Return

Abnormal return of raised capital from Revaluation



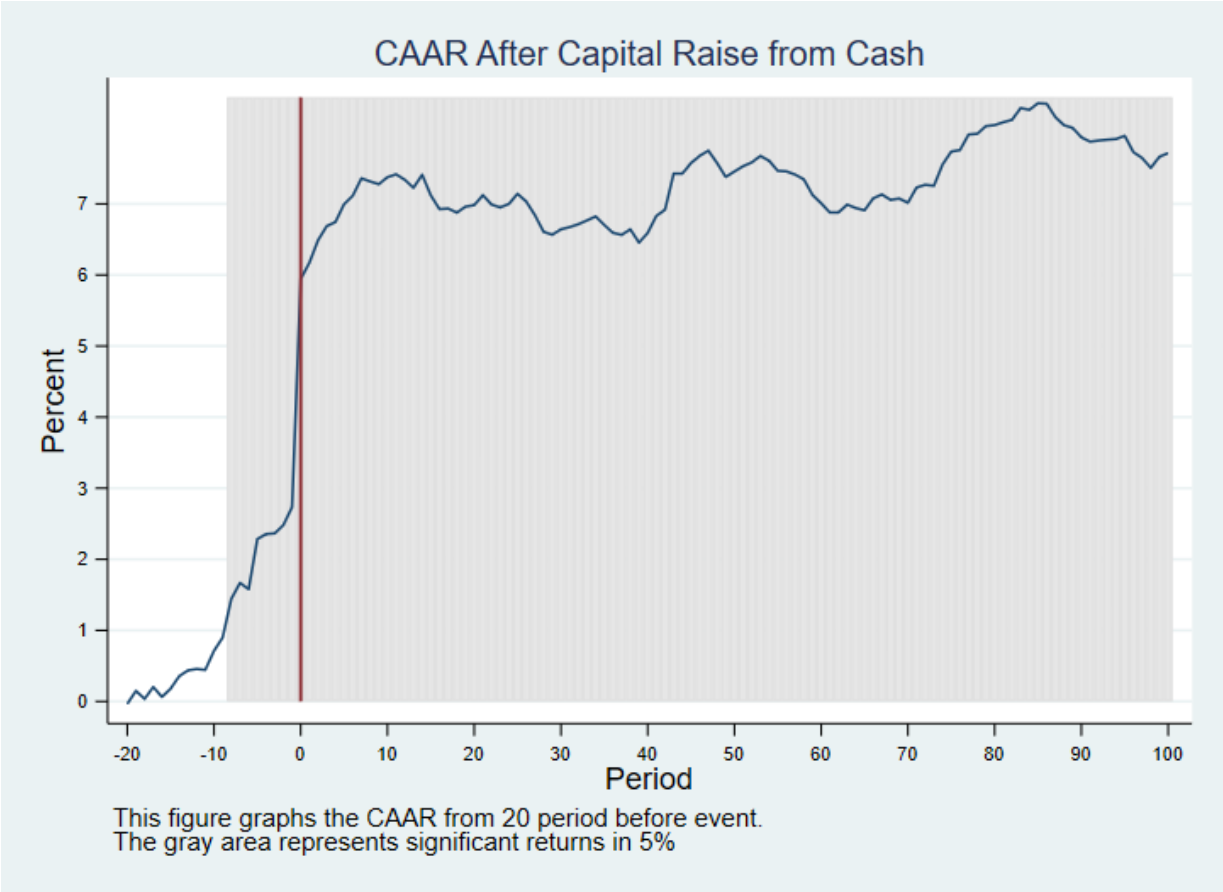
Abnormal Return

Abnormal return of raised capital from Reserves



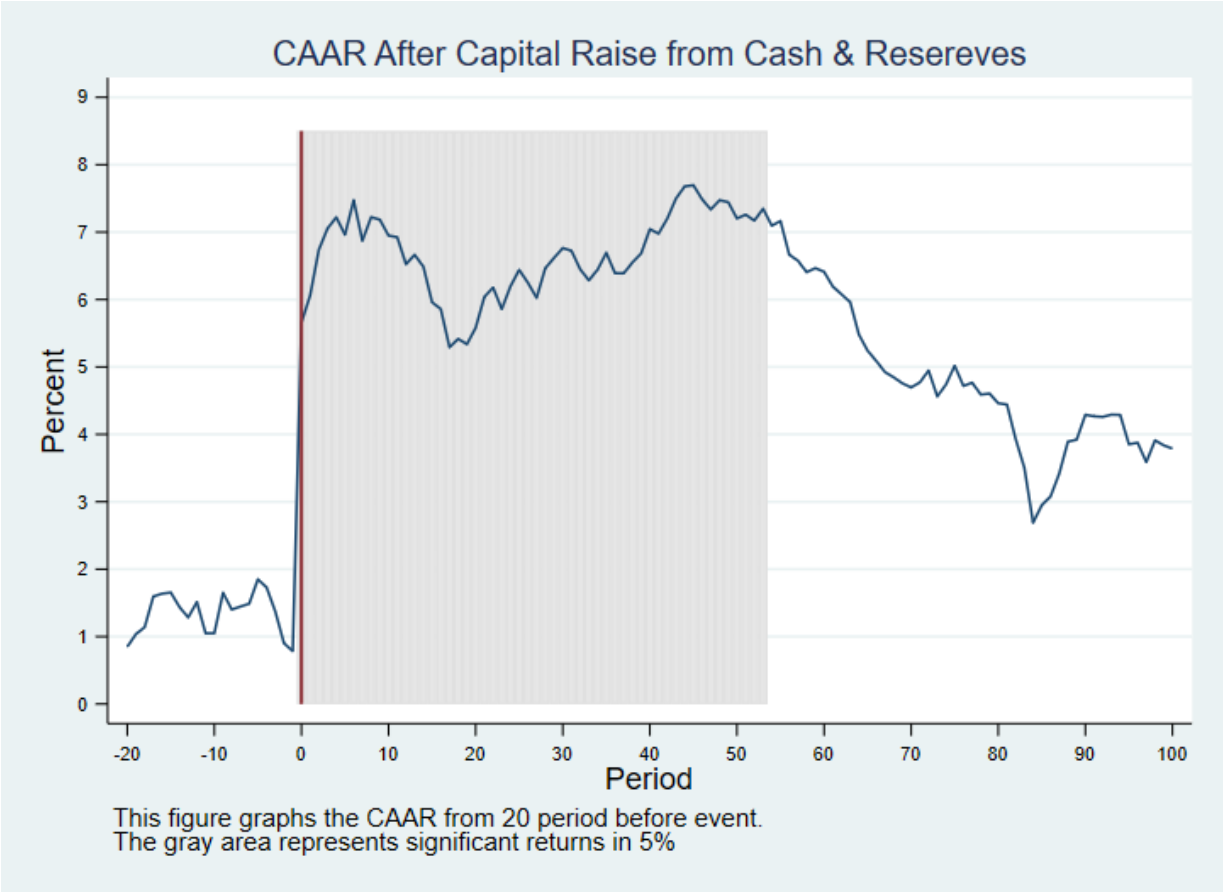
Abnormal Return

Abnormal return of raised capital from Cash



Abnormal Return

Abnormal return of raised capital from Cash & Reserves



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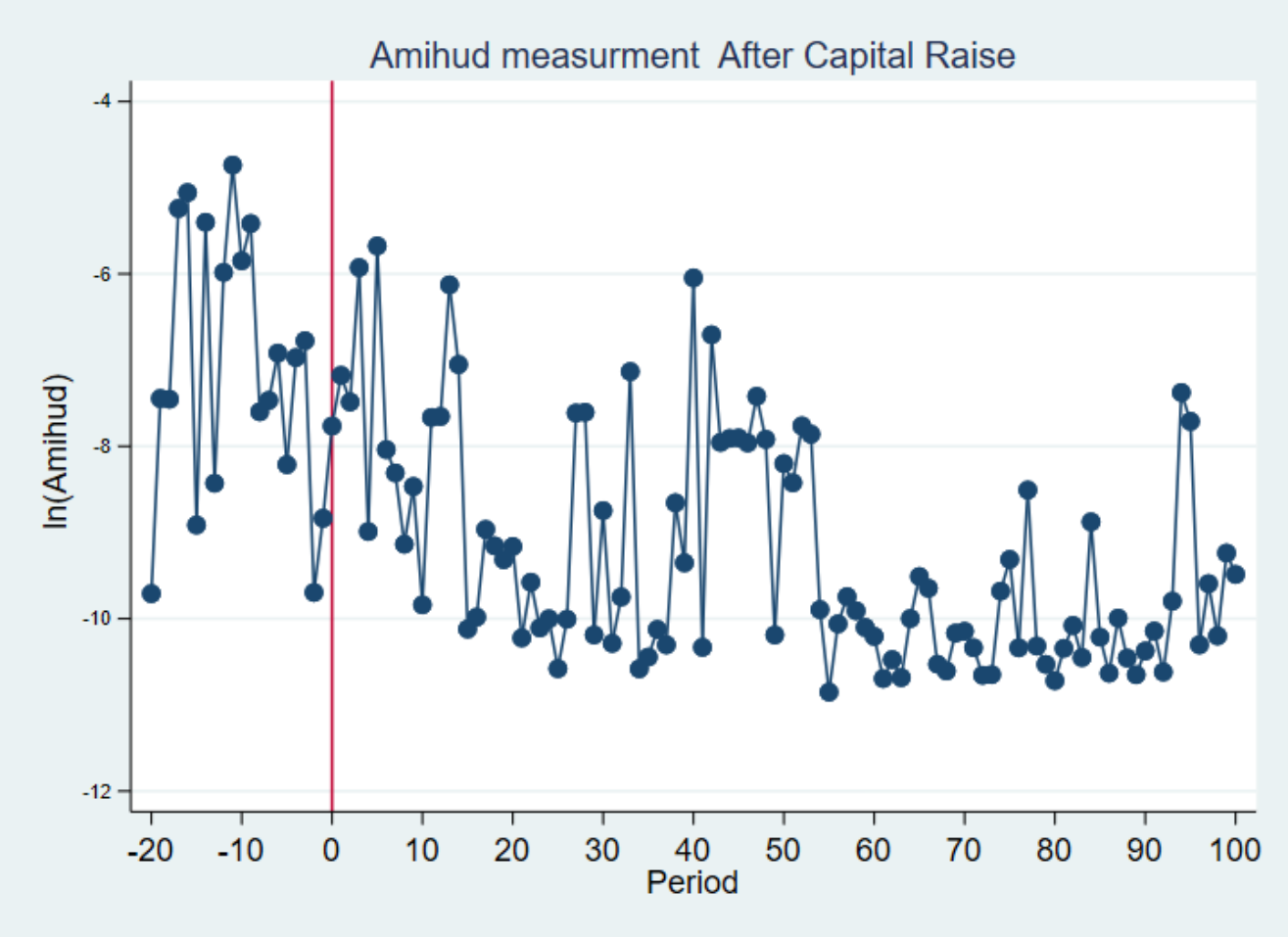
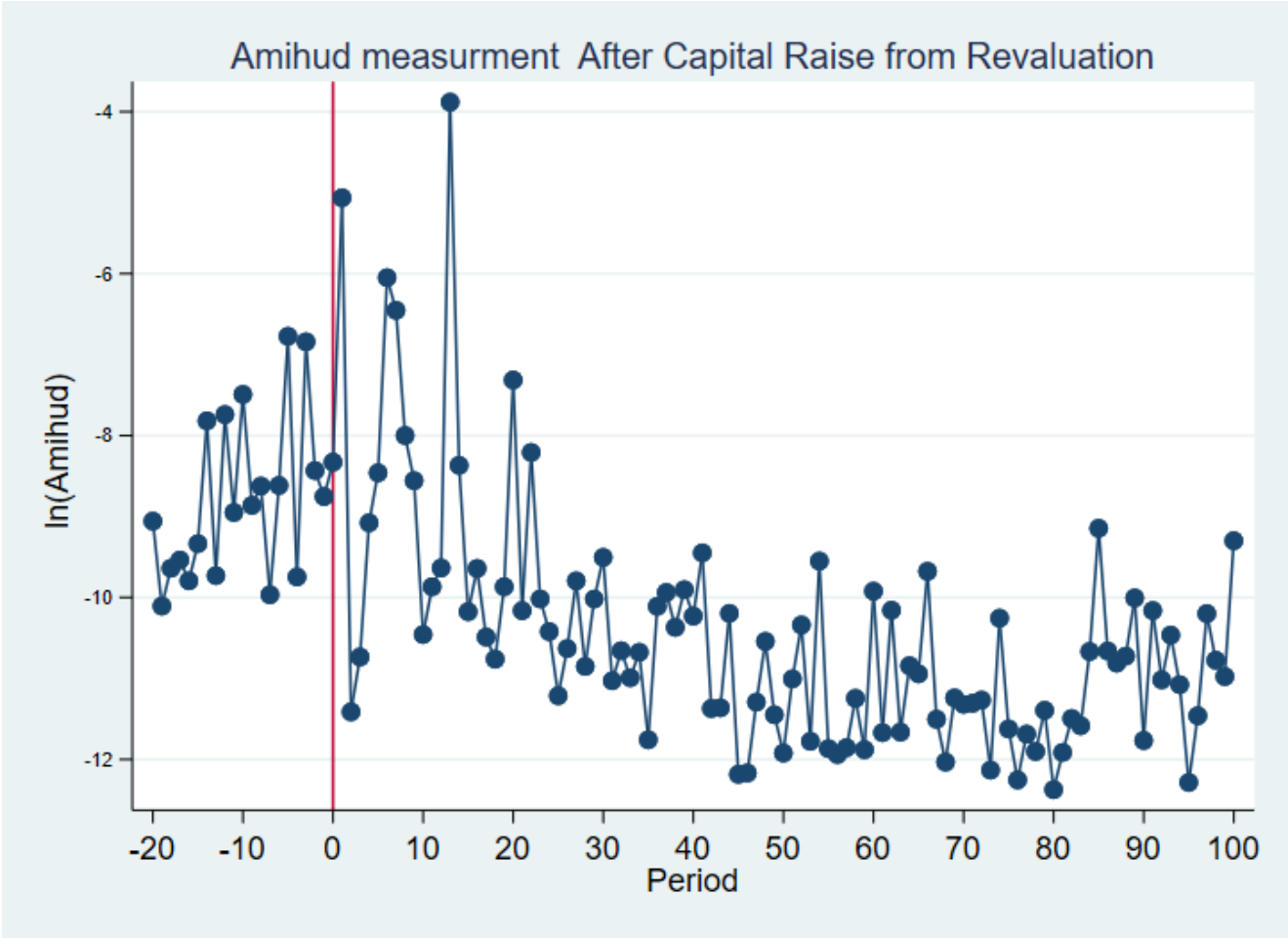
Amihud

Amihud of capital raise



Amihud

Amihud of raised capital from Revaluation



Amihud

Amihud of raised capital that it's not from Revaluation