Stock market reaction to capital raise announcements:

Evidence from Tehran Stock Exchange

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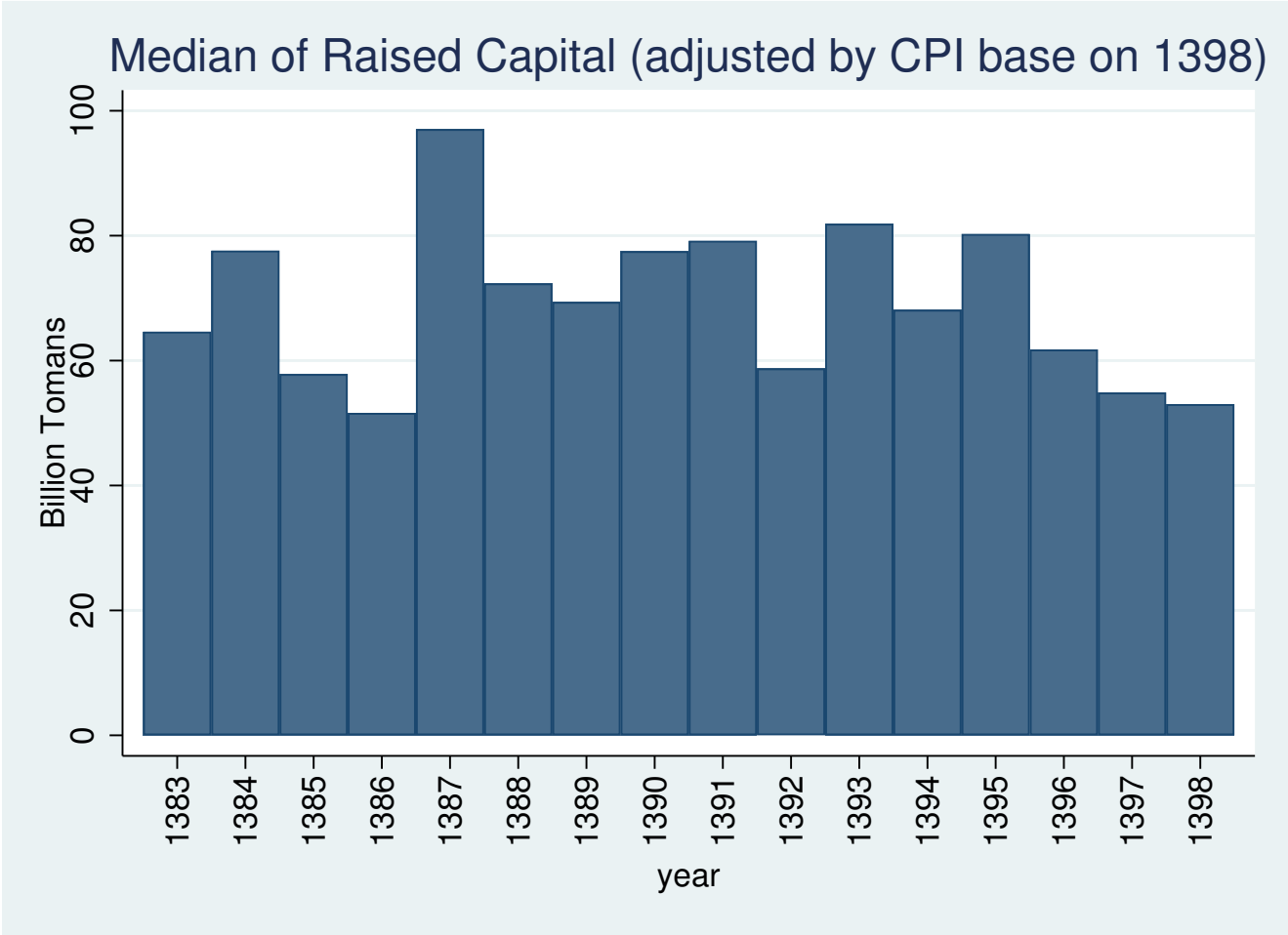
Data

- 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

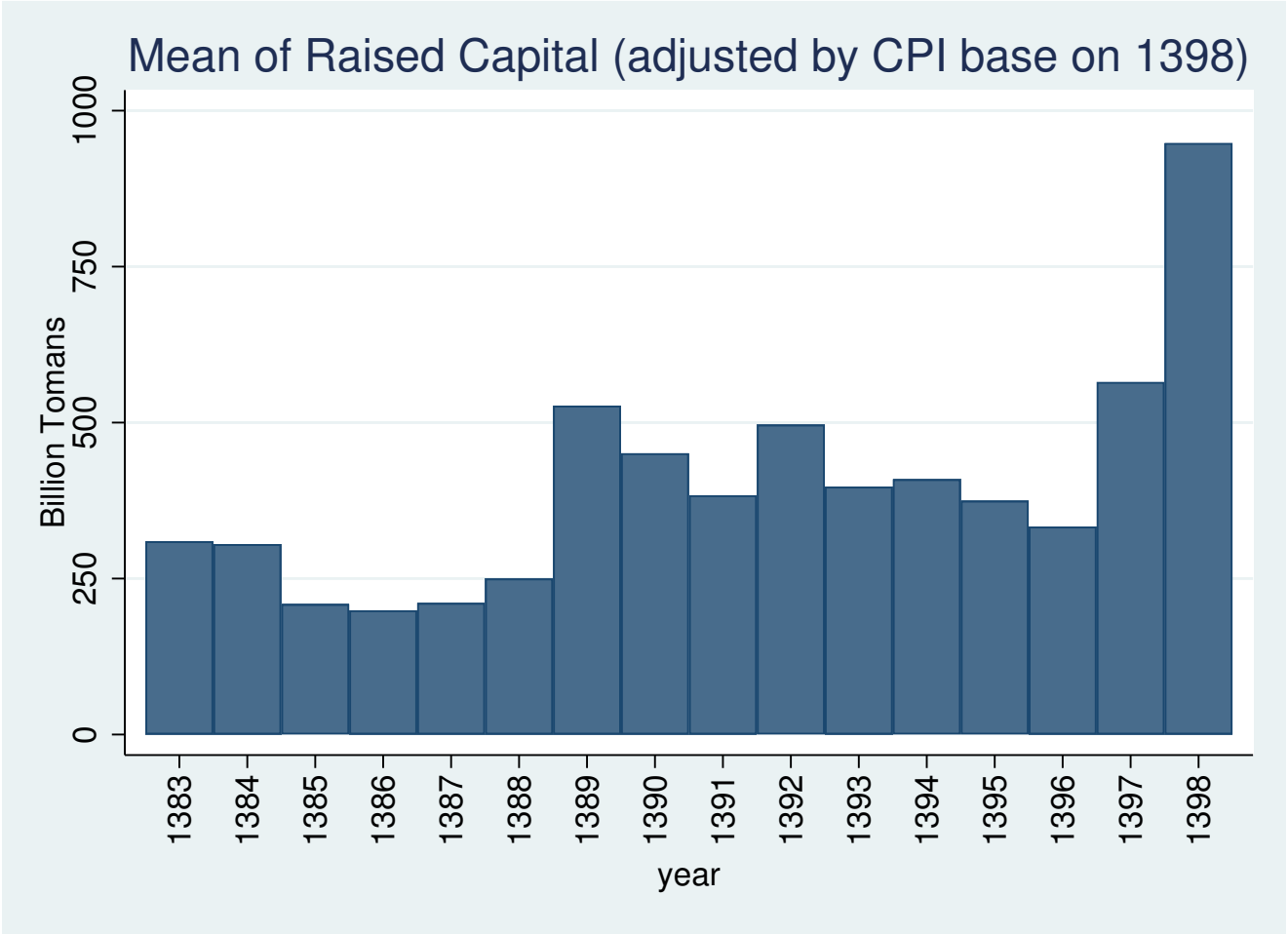
Data Summary

Raised Capital for each Firm



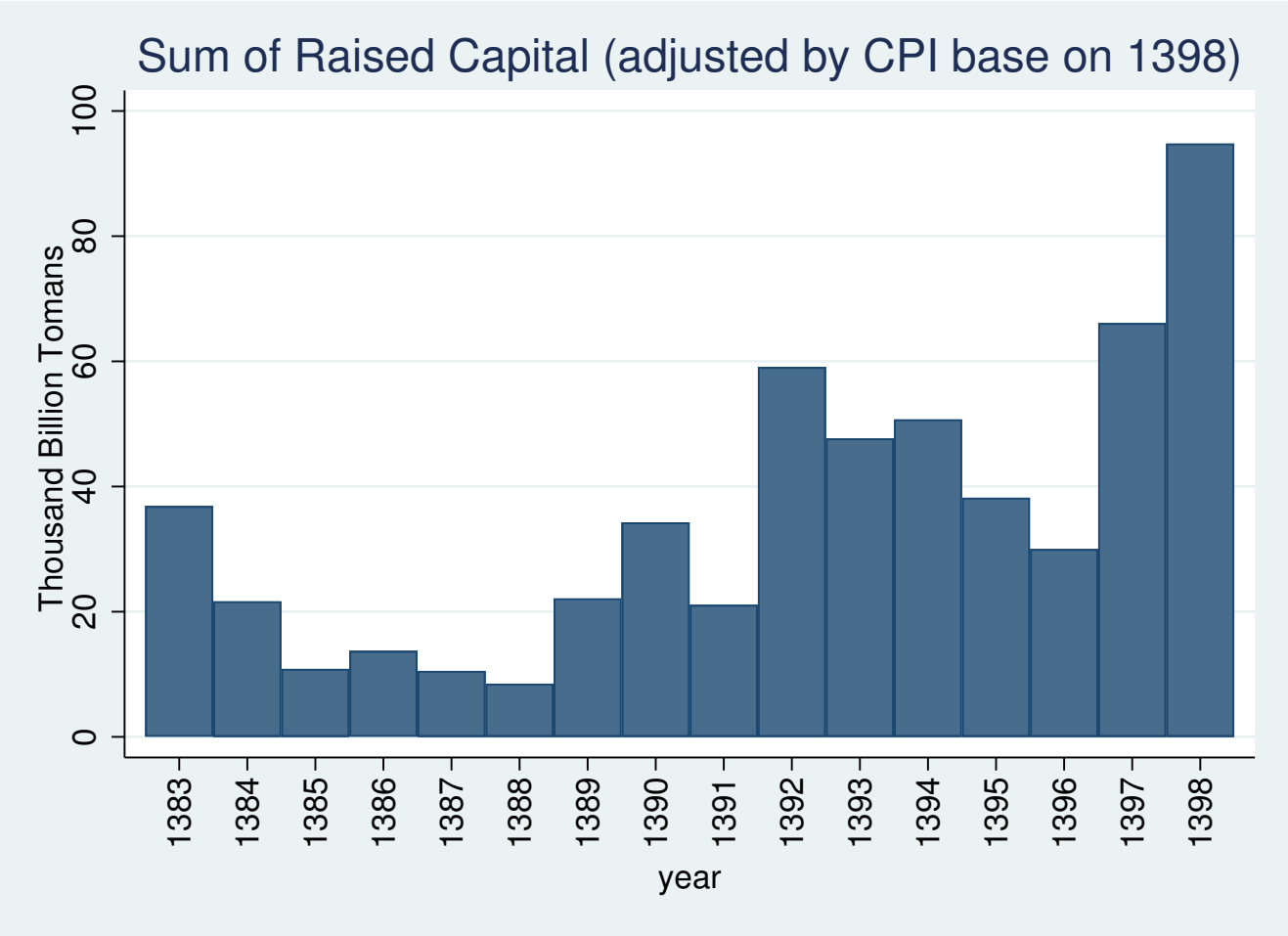
Data Summary

Raised Capital for each Firm



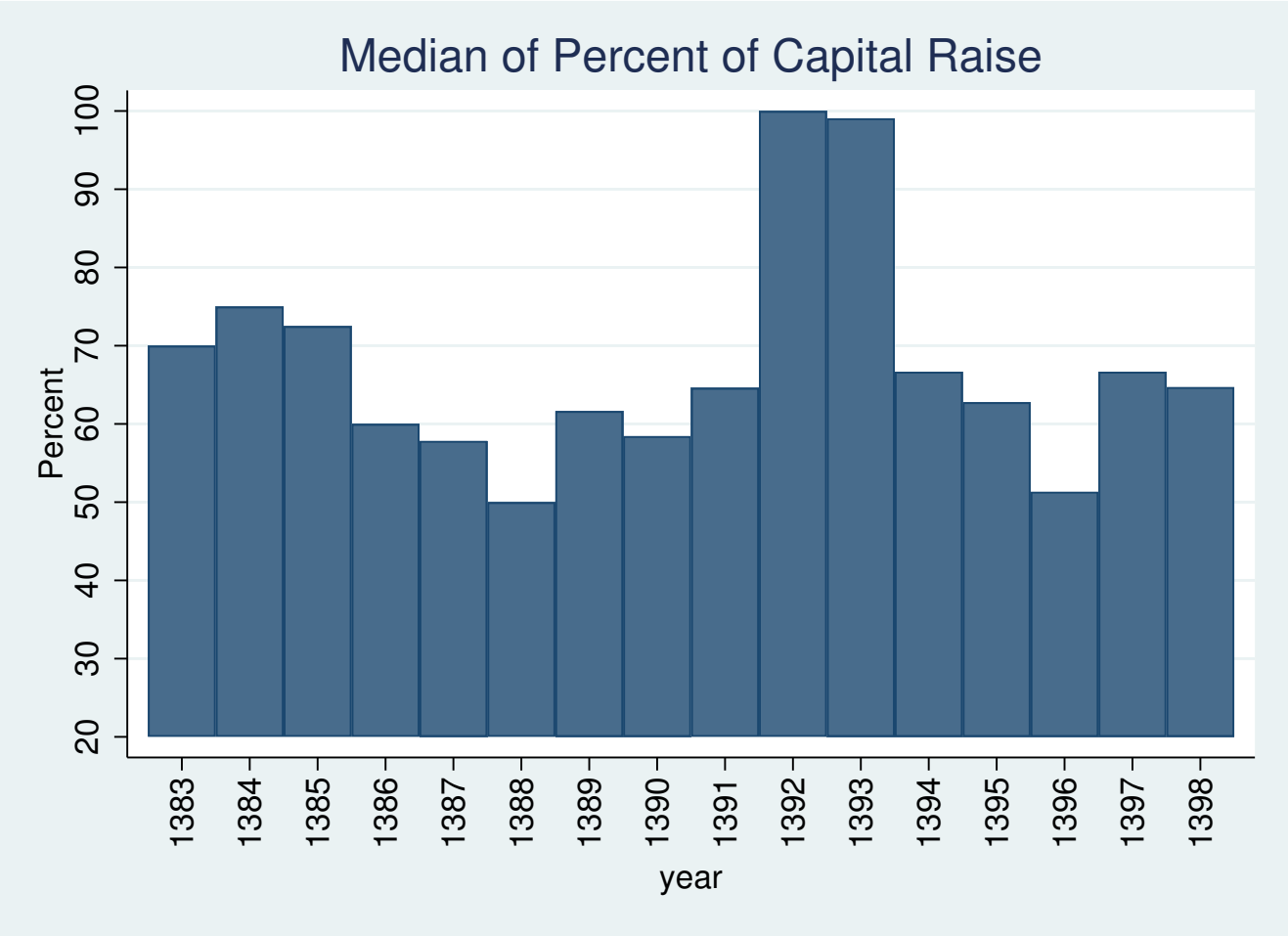
Data Summary

Adjusted Value of Raised Capital in market



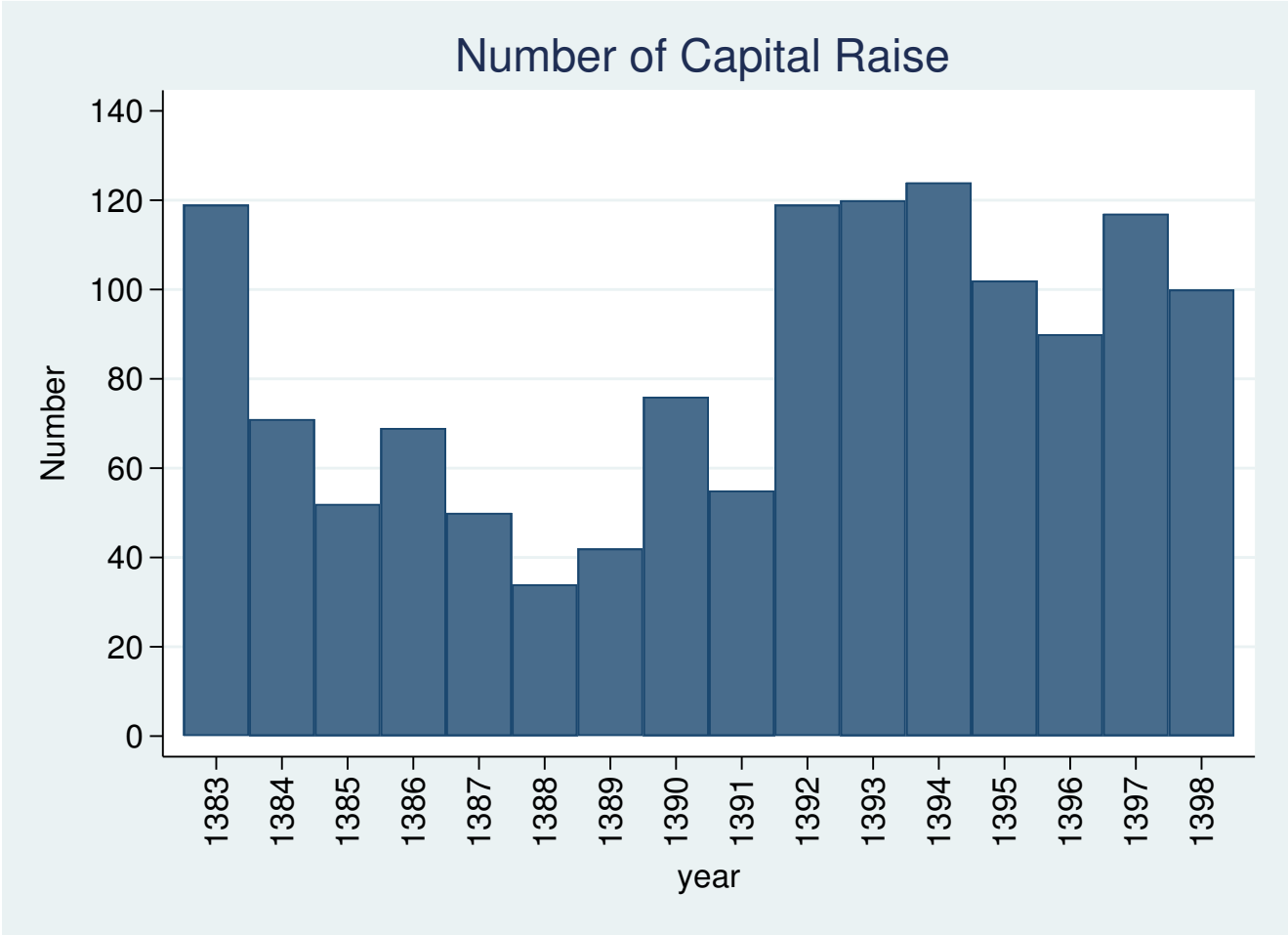
Data Summary

Percent of Raised Capital for each Firm



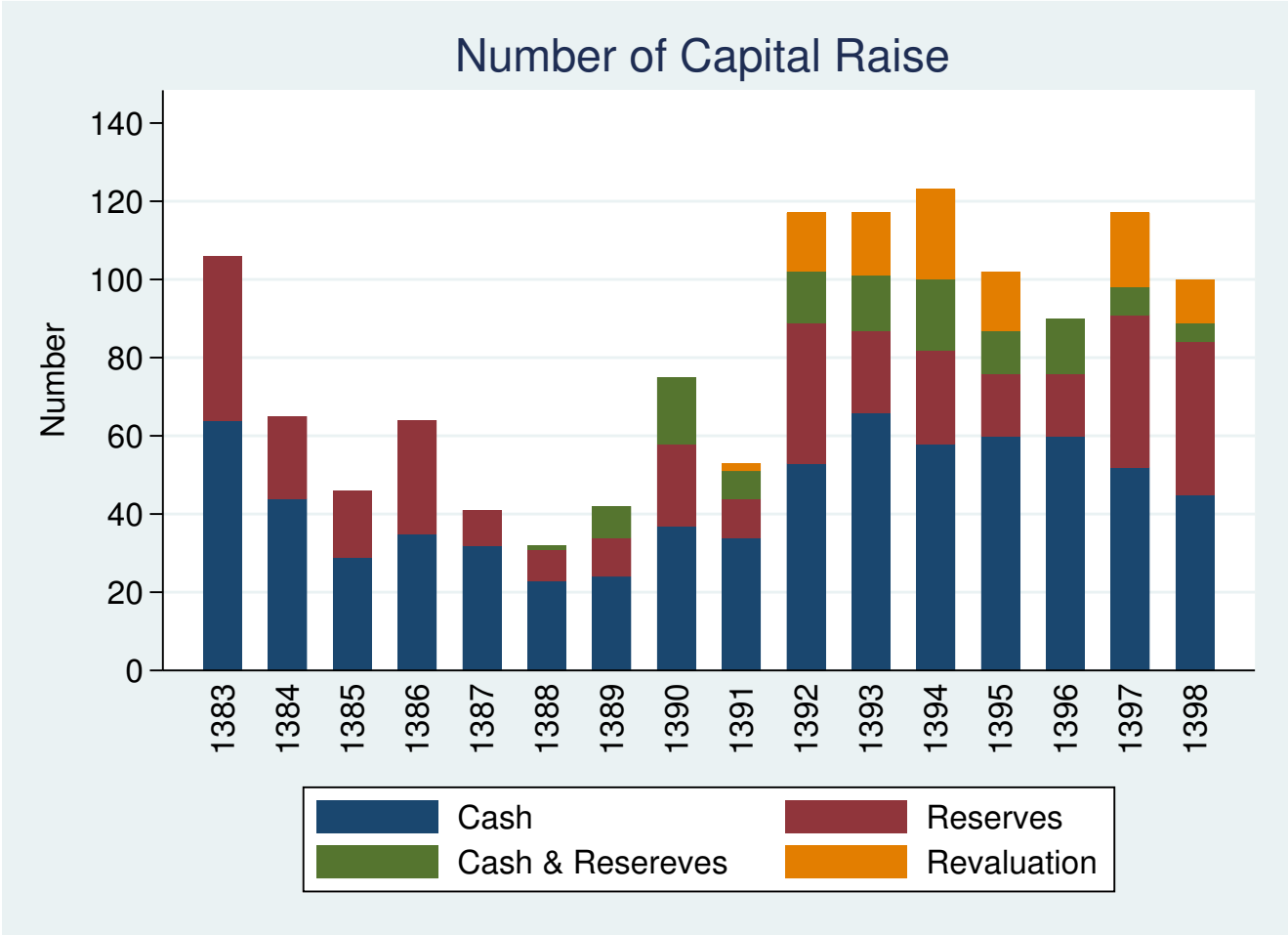
Data Summary

Number of Capital Raise



Data Summary

Number of Capital Raise



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Abnormal Return

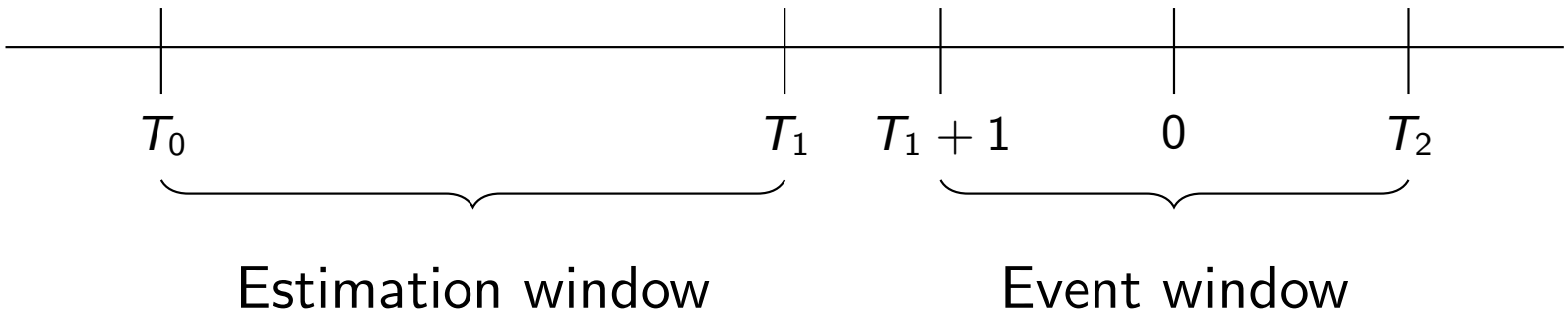
- Abnormal return is the difference between the observed return and the predicted return

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

- 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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Information Asymmetric

- Myers and Majluf (1984), Dierkens (1991)
  - Potential buyers of securities have less information about the firms' prospects than managers, who are likely to issue securities when the market price is higher than their value
  - The greater the level of information asymmetry between insiders and investors, the greater the negative price reaction
  - If new investment opportunities are profitable enough, there is no adverse selection problem and, hence, no negative stock price reaction
- **Signaling Theory**: There is asymmetric information between corporate insiders and the market for both assets-in-place and growth opportunities. As a result, firms issue new equities only when their stocks are overpriced, causing market to react negatively to SEO. [Myers and Majluf (1984),Ambarish et al. (1987)]
- **Agency conflicts** also play an important role in the process. Managers, having more information than outsiders, act in the best interest of existing shareholders at the expense of the new shareholders by issuing equity when it is overvalued. [Myers and Majluf (1984), Miller and Rock (1985),Jensen (1986)]

Capital Structure

- Modigliani and Miller (1958) showed that firm's financing behavior independent
- The **trade-off theory** said that firms finance with debt in order to balance the tax advantages of additional debt, or marginal tax exceptions, against the costs of possible financial distress. Theoretically, analyses predict that stock price reductions are associated with the source and magnitude of financing, i.e. cost of capital, rather than changes in corporate capital structure
- Higher debt ratio demands risk premium. This risk premium reflects the probability-weighted amount an investor expects to lose in case of the firm failing. In conjunction with the tax shield theory, the firm tries to achieve a static point where the capital structure is at a theoretical cost optimum
- Changes in leverage convey a message of insider information about expected changes in future firm performance a higher debt ratio is a binding constraint on the firm, and thus signals positive expectations for future cash flows. [Ross (1977) , Downes and Heinkel (1982)]
- Changes in expected cash flows are positively correlated with changes in optimal leverage levels. Therefore, a decrease in leverage is a negative signal to firm value [DeAngelo and Masulis (1980),Modigliani and Miller (1963)]
- Firm's capital structure is one of the factors determining the stock price reaction to external financing [Dierkens (1991), Raymar (1993)] Cronqvist and Nilsson (2005) demonstrated statistically that the debt level or risk impacts to SEO choice. The empirical results revealed that there is a negative relationship between leverage and stock price drop after the seasoned equity offerings. [Quyhn-Nhu (2009)]
- The marginal increase in the level of information asymmetry will be greater for the high-levered firm than the low-levered firms

Other Theories

- Adverse selection:
  - Myers and Majluf (1984) the first to recognize that equity issues to outside investors are associated with an adverse selection problem
  - Eckbo and Masulis (1992a) built on that a rights offering with anticipated current shareholder participation (take-up) of less than 100% is subject to an adverse selection problem
- Downward Sloping Demand Curve and Price Pressure Effect
- Pecking Order Theory:
  - Managers finance the needed capital with respect to the order:
    1. use internally generated cash,
    2. issue debt
    3. issue hybrid securities
    4. issue equity
- Certification Hypothesis:
  - Low discounts imply a high offer price, resulting in a high announcement return. It predicts a negative relationship between the announcement return and the offer price's discount below the market price

Empirical Solutions

- Loderer and Zimmermann (1988) states that rights offering cannot alone solve the information asymmetry problem

  unless the rights offering is fully subscribed Two additional requirements for eliminating the information asymmetry

  problem:

  - The life of the information asymmetry is shorter than the period of time between announcement and issue date
  - the offer price is set on the announcement date

- Corporations that issue seasoned equity offerings are likely to have potential increases in future earnings in order to at

  least maintain or increase their cash dividends. [Lasfer (1997)]

  - Due to unstable dividend policy, the signaling power of a potential increase in future earnings does not exist or is minimal for corporations trading in the ISE. [Adaoglu (2006)]

- When shareholders approve issuances, average announcement returns are positive. The closer the vote is to the issuance or the greater is the required plurality, the higher are the returns for public offers, rights offers, and private placements. When shareholder approval is required, rights offers predominate. These findings suggest that agency problems affect equity issuances and challenge existing adverse selection, market timing, and signaling explanations. [Holderness (2018)]

SEOs and Ownership Structure

- Firms with concentrated share ownership, on the average level of control more than 61%, will choose rights issues. when the degree of current-shareholder take-up in the issue is high, firms will prefer rights offerings; vice versa, firms are more likely to issue public offerings. [Hansen and Pinkerton (1982),Eckbo and Masulis (1992b)]
- Rational investors consider managers' fractional stock ownership to be a credible signal of firm value. Leland and Pyle (1977) discovered that a decrease in managers' fractional shareholding is a negative signal about firm value. Firms with a high insider ownership concentration tend to perform better than firms with a low insider ownership concentration. [Limpaphayom and Ngamwutikul (2004)]
- Most publicly traded companies in Thailand are under the control of founding families and management. With this highly concentrated ownership structure, the agency costs of external equity is quite significant

- In particular, while institutions are viewed as informed investors, individuals are believed to have psychological biases and are often thought of as the proverbial noise traders in the sense of Kyle (1985) or Black (1986).

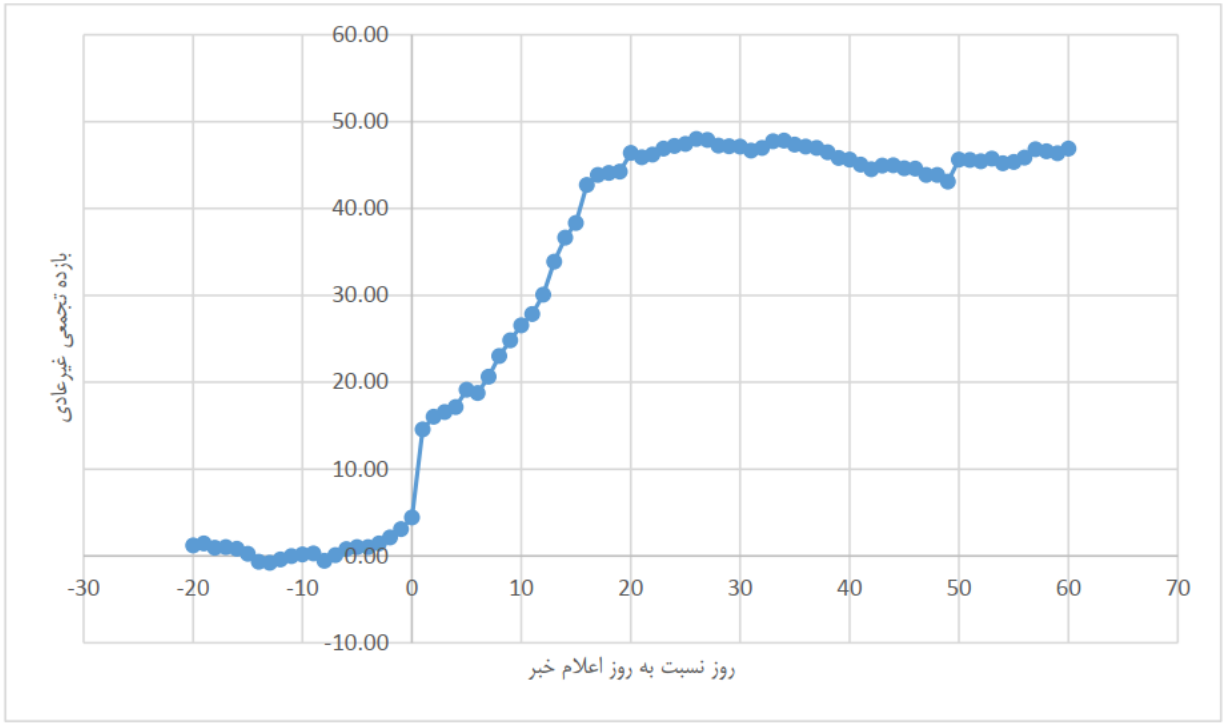
- How the behavior of different investor clienteles or their interaction in the market affects returns?

  - Cohen et al. (2002):
    - Institutions buy shares from (sell shares to) individuals in response to positive (negative) cash-flow news, thus exploiting the underreaction phenomenon
    - When price goes up (down) in the absence of any cash-flow news, institutions sell shares to (buy shares from) individuals
  - Based on the previous day's stock return, the top performing decile of securities is 23.9% more likely to be bought in net by institutions (and sold by individuals) than those in the bottom performance decile. Griffin et al. (2003)
  - Individuals tend to buy stocks following declines in the previous month and sell following price increases. Kaniel et al. (2008)
  - Individual stocks with net buying by retail investors outperform stocks with negative imbalances by approximately 10 bps over the following week. Boehmer et al. (2021)

- Kaniel et al. (2012) :
  - Intense aggregate individual investor buying (selling) predicts large positive (negative) abnormal returns on and after earnings announcement dates
  - Abnormal returns following the event decomposed into information and liquidity provision components, and show that about half of the returns can be attributed to private information
- Nguyen et al. (2017):
  - There is a evidence consistent with illegal insider trading, particularly in firms that were vulnerable to insider manipulation and, therefore, more likely to split their stocks. When vulnerable firms' stocks did split, they provided significant excess short-term returns
- Constantinides and Grundy (1989) security issues are used to finance investments and do not necessarily provide signals to the market. On the other hand, repurchases do signal information in equilibrium in which part of the issue proceeds are used to repurchase
- Bond and Zhong (2016) undervalued firms that would avoid issuing equity to finance positive NPV projects due to SEO underpricing can signal their valuation to the market using repurchases. As a result, some firms use repurchases for purposes of information signaling and (larger) subsequent SEOs for financing of investment opportunities

1. Decompose abnormal return to liquidity and information
2. Trading behavior around each type of SEO (Individual buy or sell, herding)
3. Examine variation in decomposed elements of abnormal return
4. Insider trading around event for vulnerable firms and invulnerable.

Iran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70
بازده تجمعی غیرعادی
روز نسبت به روز اعلام خبر

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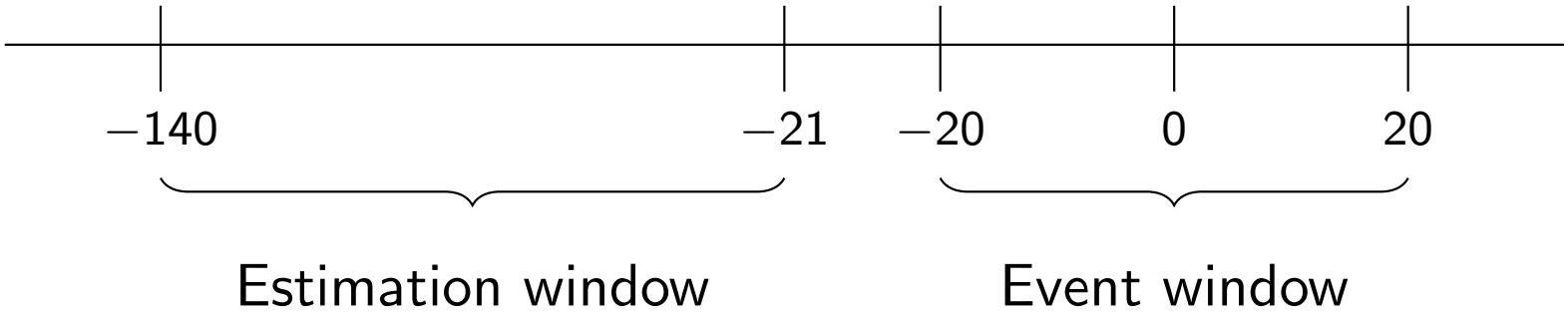
Abnormal Return

- 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:

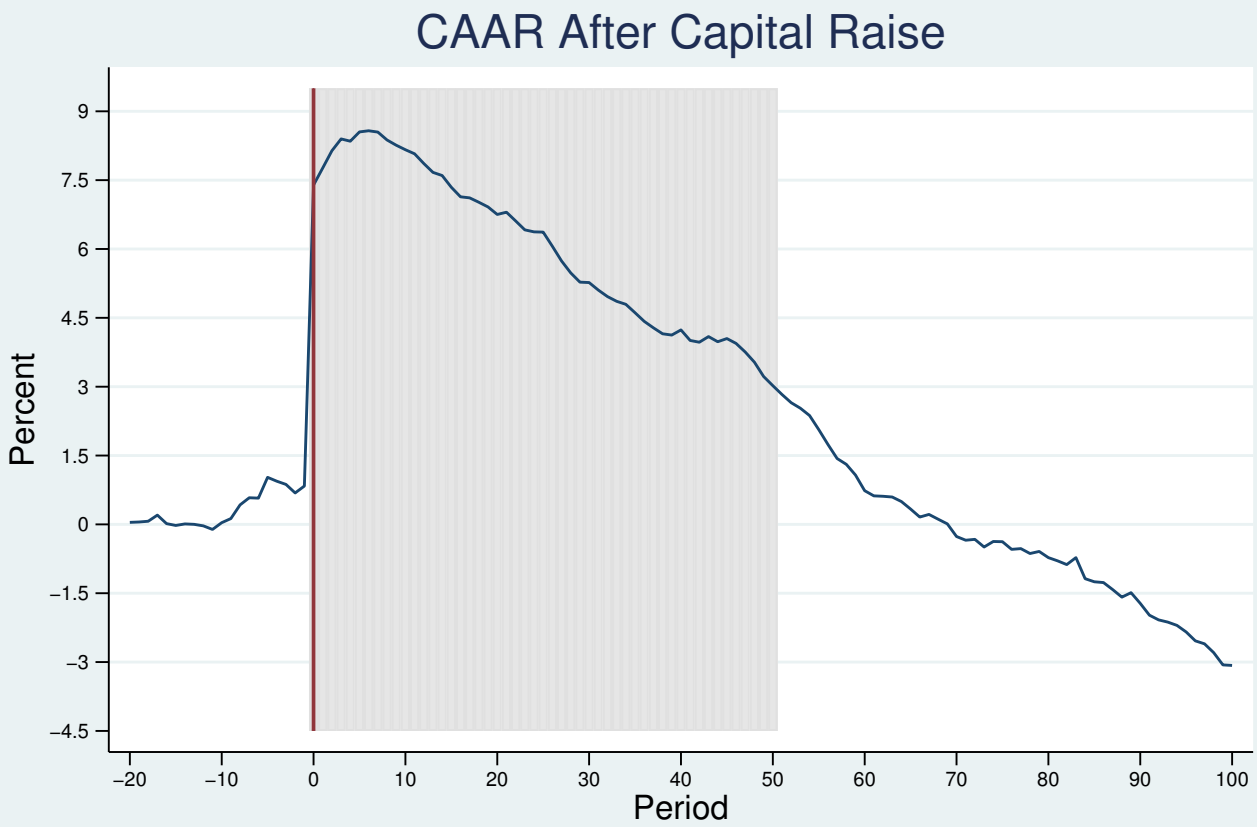


- We test whether $CAAR = 0$ or not

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



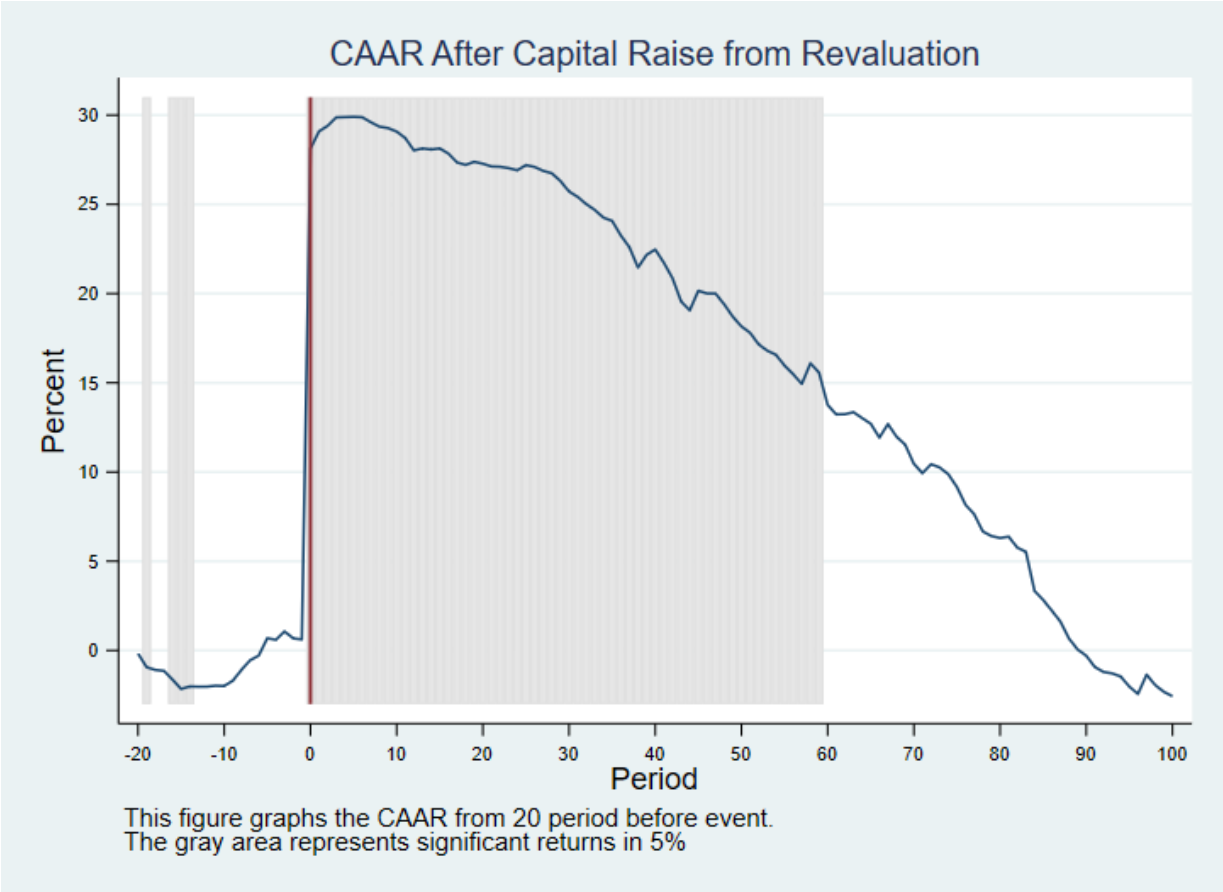
This figure graphs the CAAR from 20 period before event.
The gray area represents significant returns in 5%

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

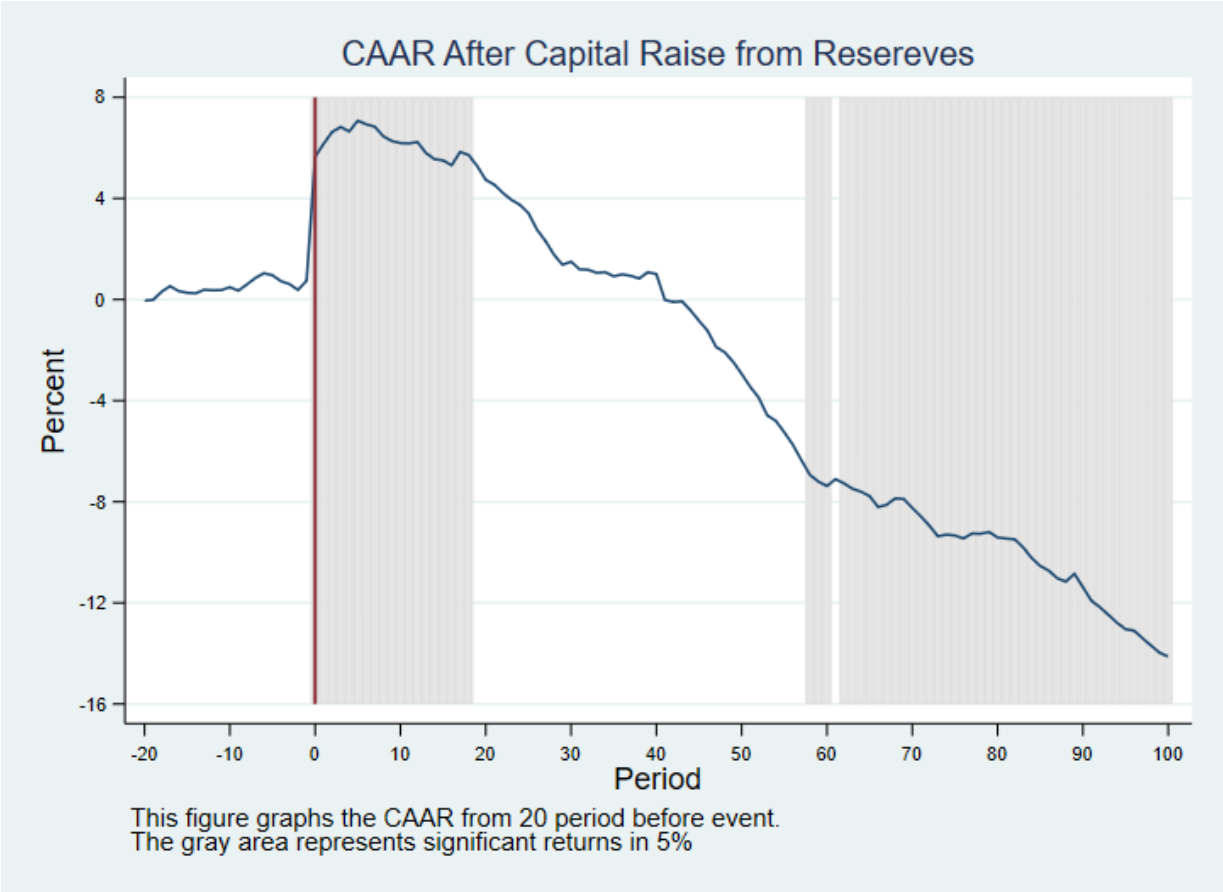


Analysis of abnormal return in days surrounding the Revaluation announcements

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

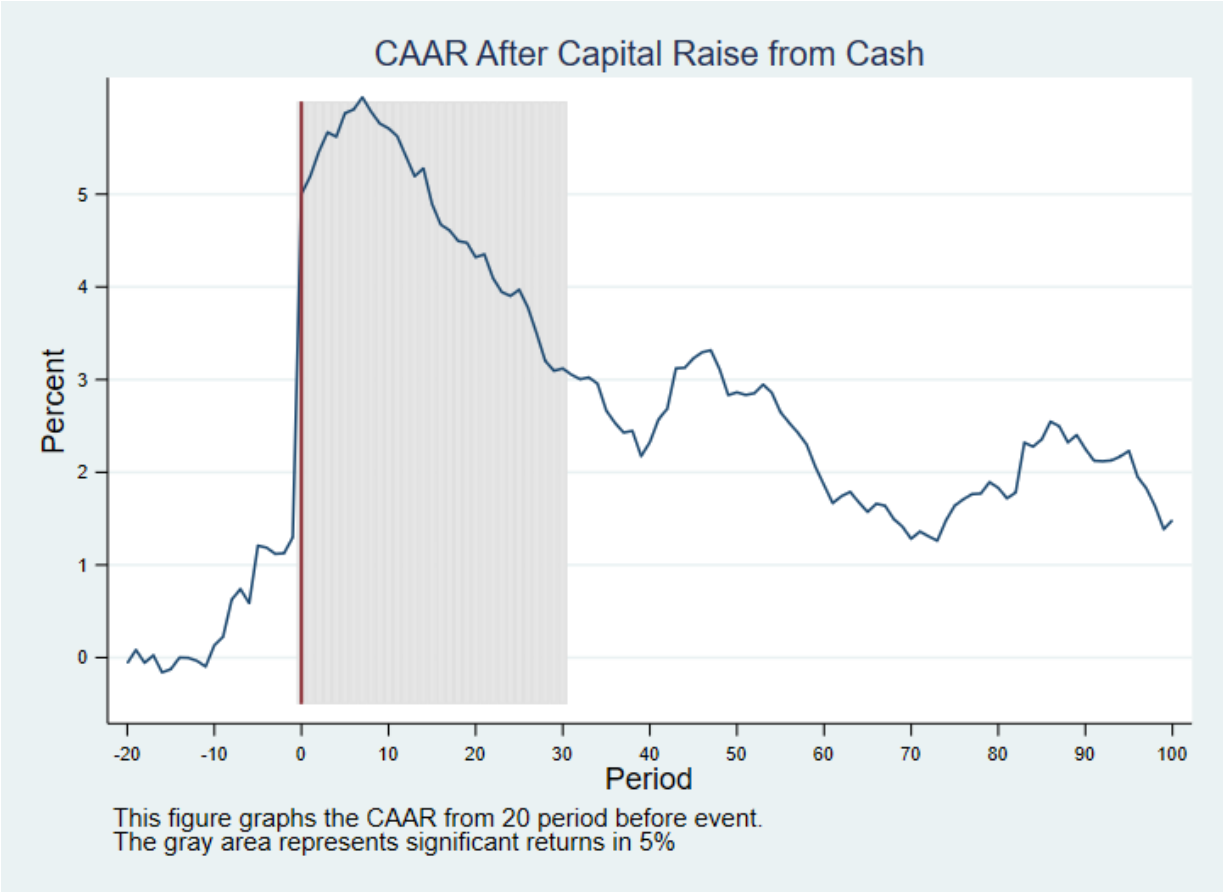
Abnormal Return

Abnormal return of raised capital from Reserves



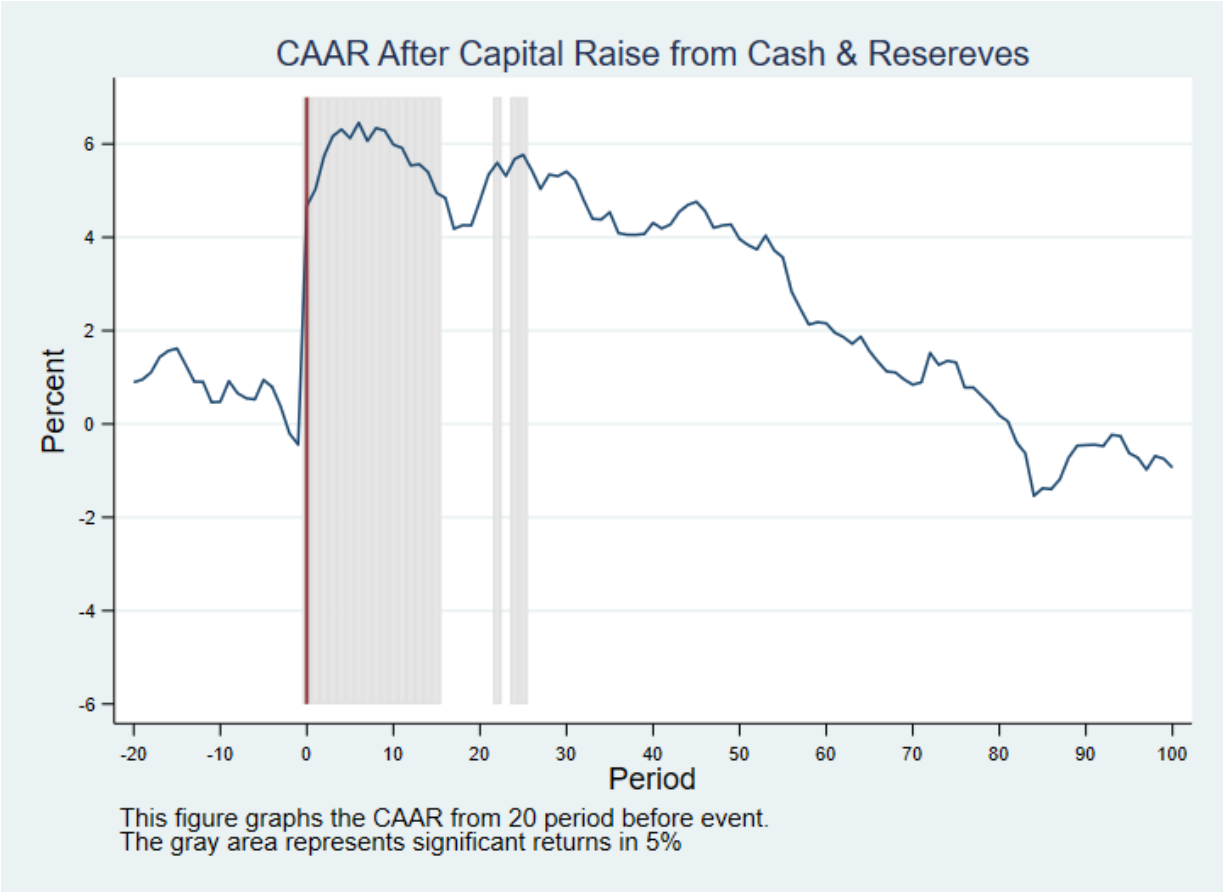
Abnormal Return

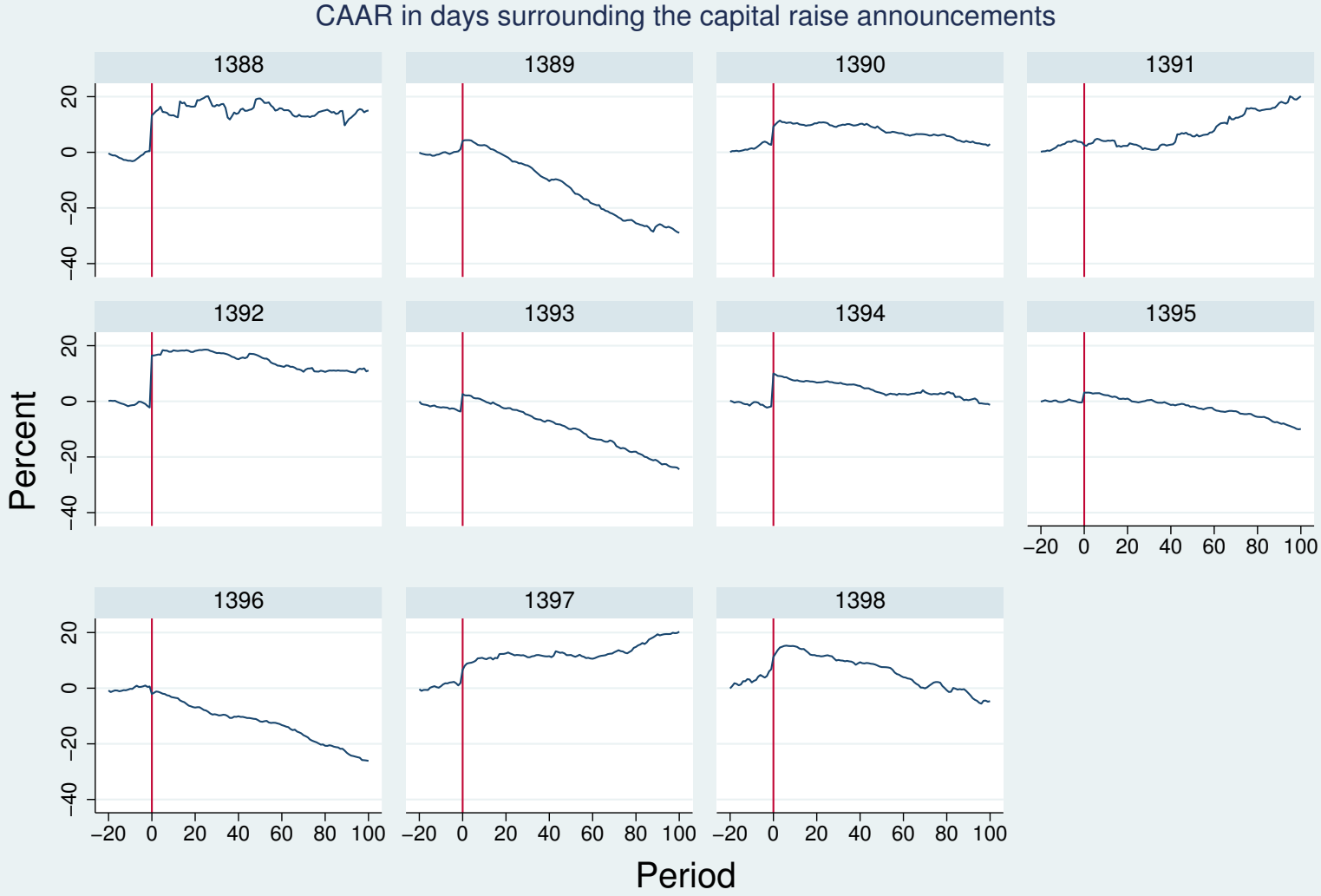
Abnormal return of raised capital from Cash

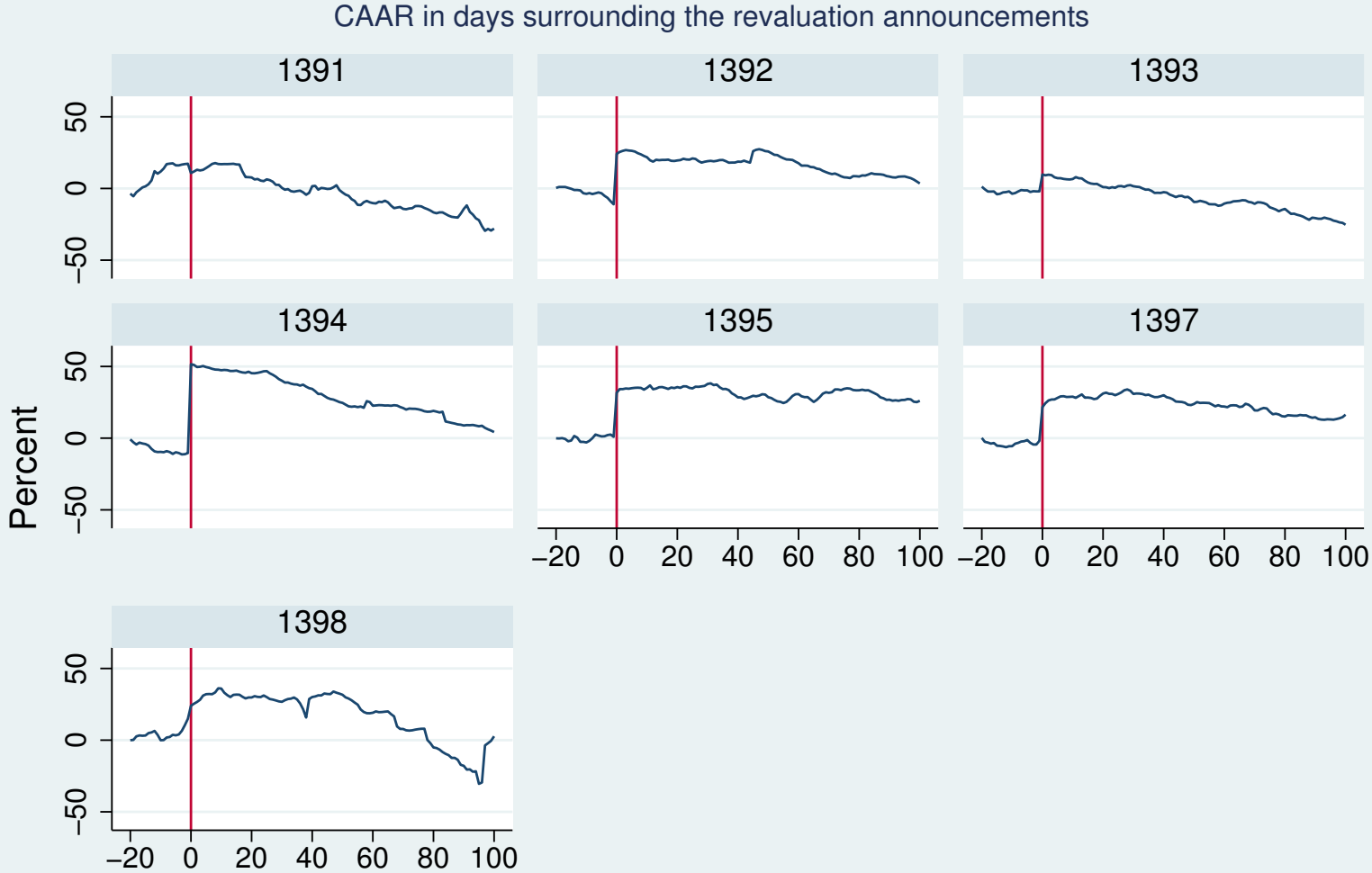


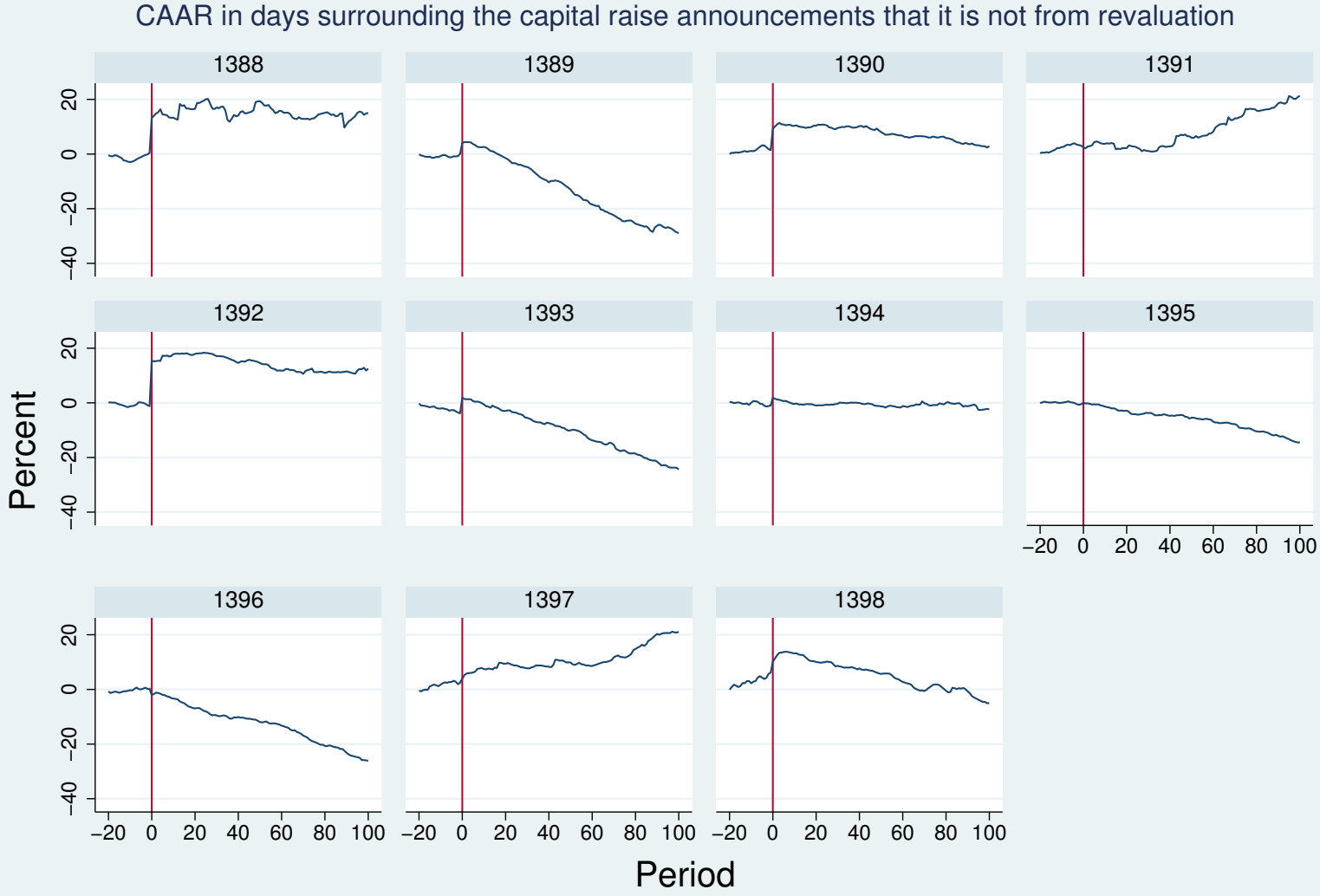
Abnormal Return

Abnormal return of raised capital from Cash & Reserves

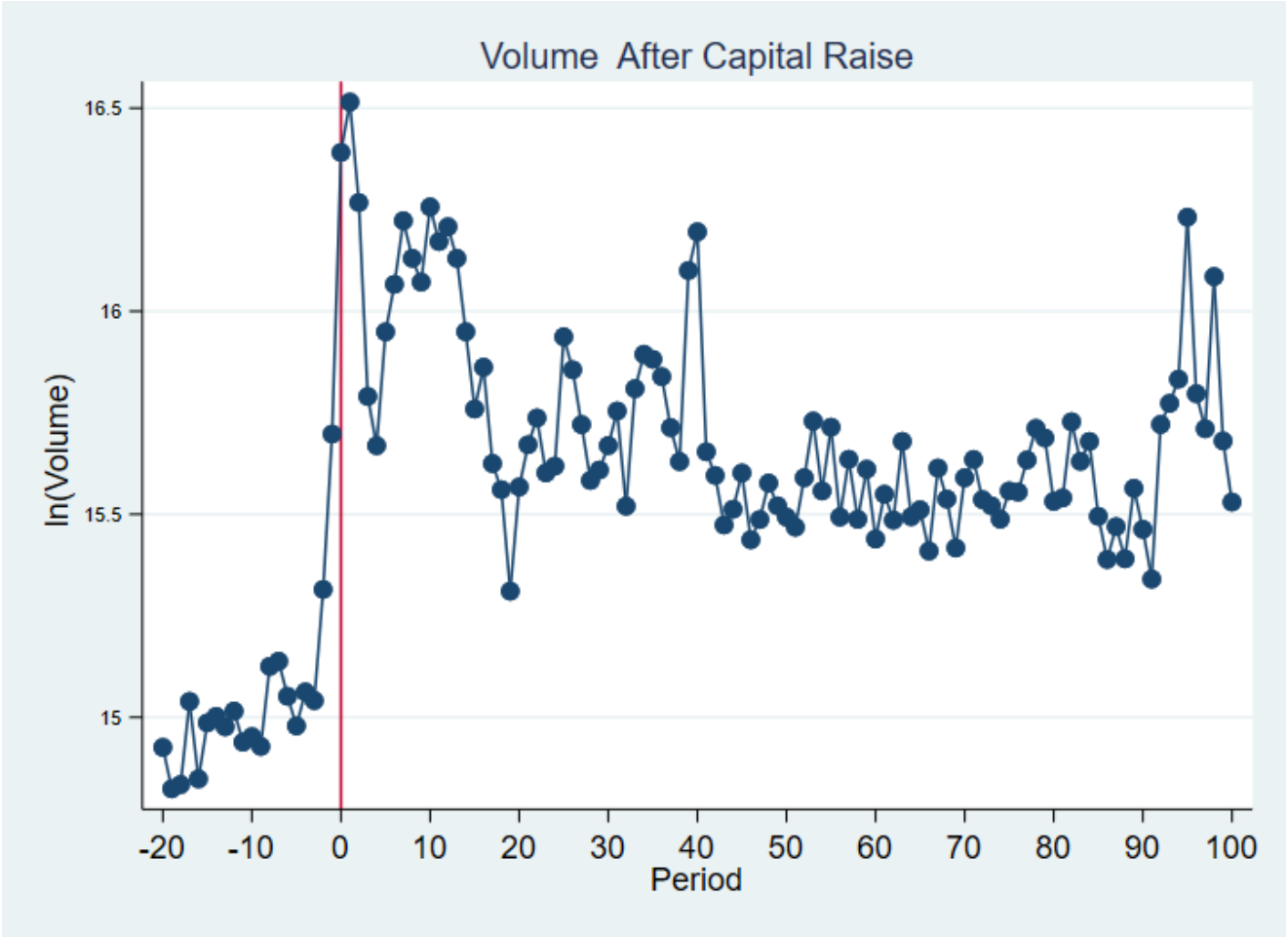



CAAR in days surrounding the capital raise announcements
1388
1389
1390
1391
1392
1393
1394
1395
1396
1397
1398
Percent
−40
−20
0
20
−20
0
20
40
60
80
100
Period
Graphs by year


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

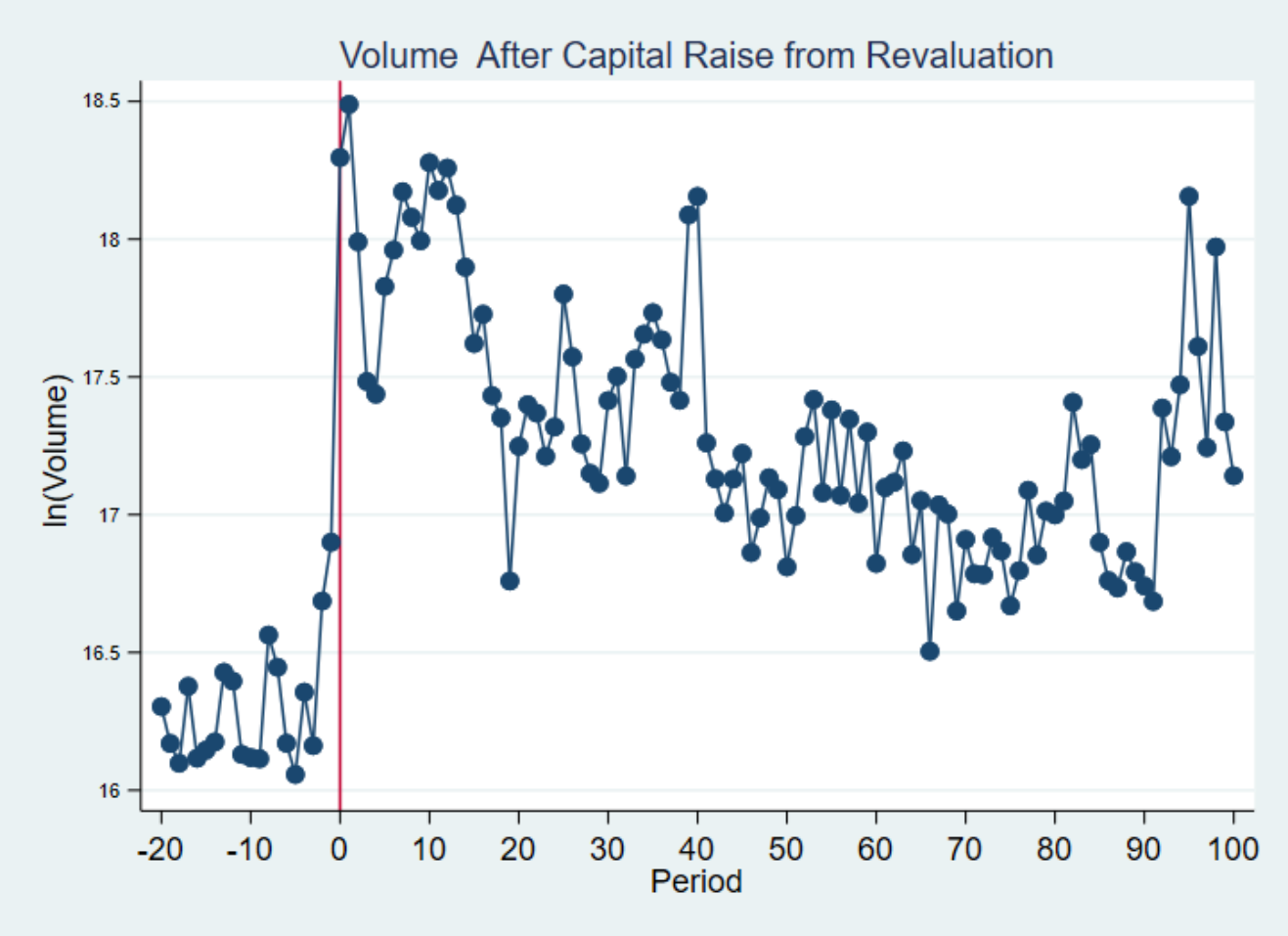

CAAR in days surrounding the capital raise announcements that it is not from revaluation
1388
1389
1390
1391
1392
1393
1394
1395
1396
1397
1398
Percent
20
0
−20
−40
−20
0
20
40
60
80
100
Period
Graphs by year

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

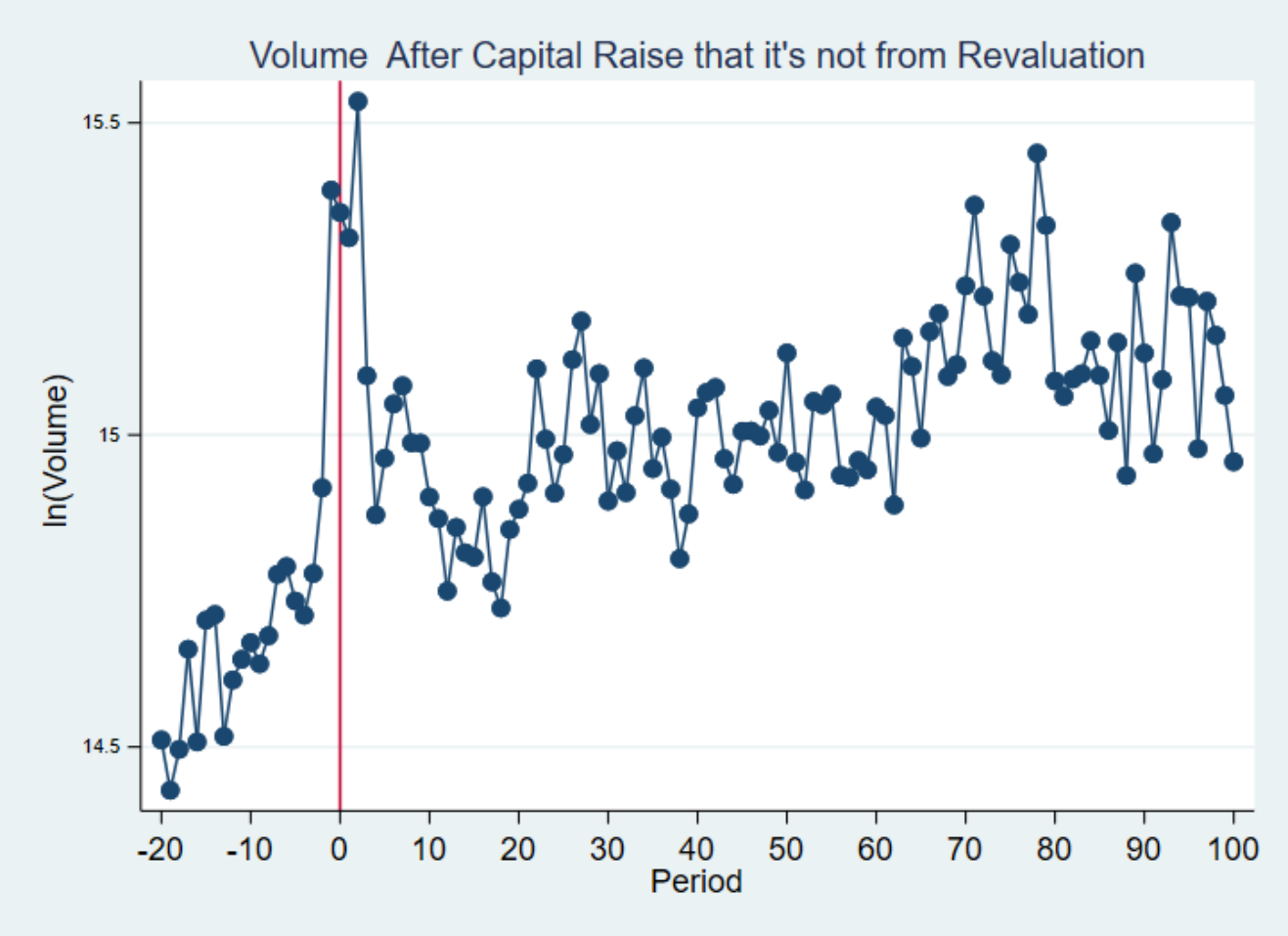
Volume

Volume of raised capital from Revaluation

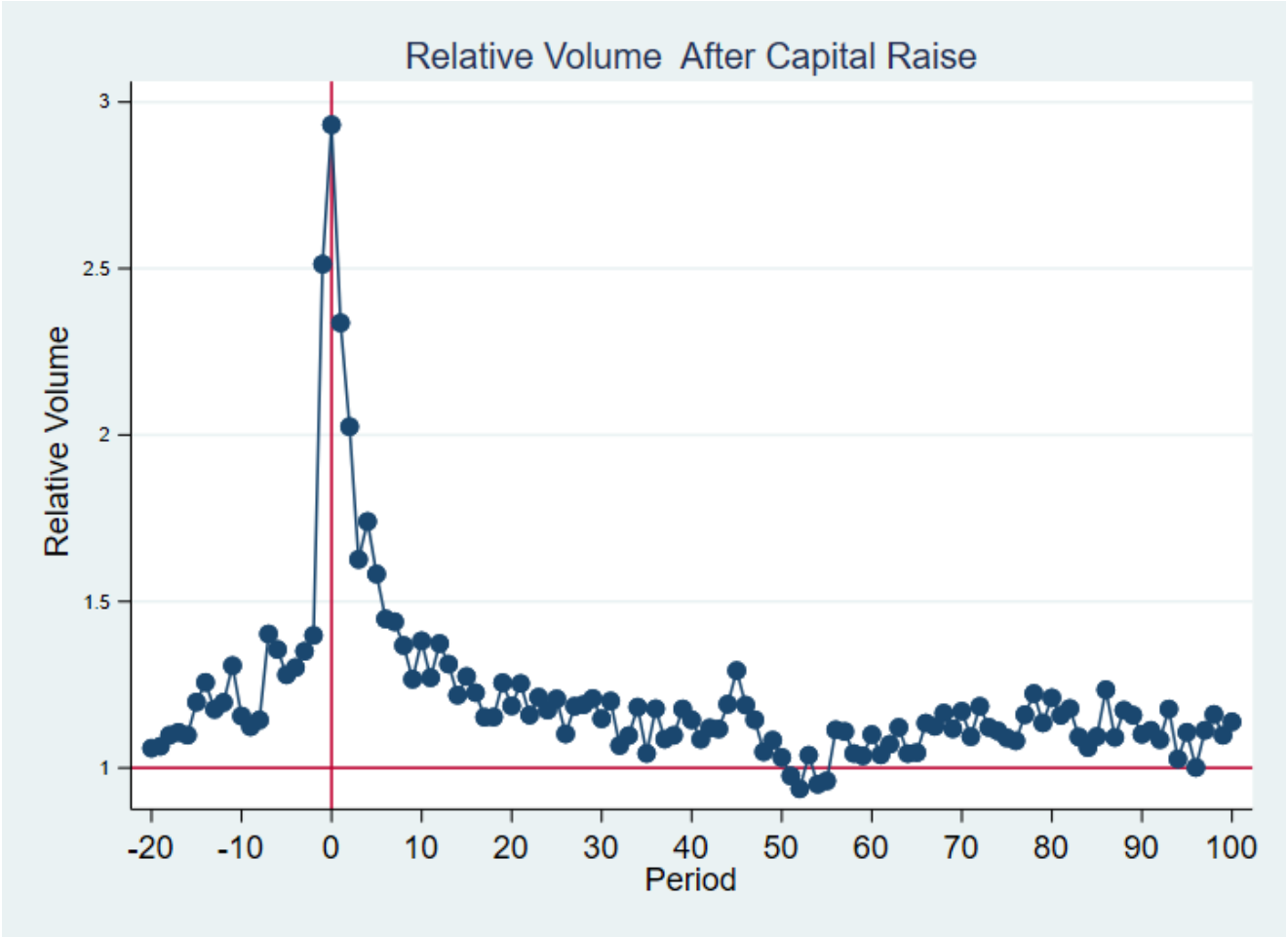


Volume

Volume of raised capital that it's not from Revaluation

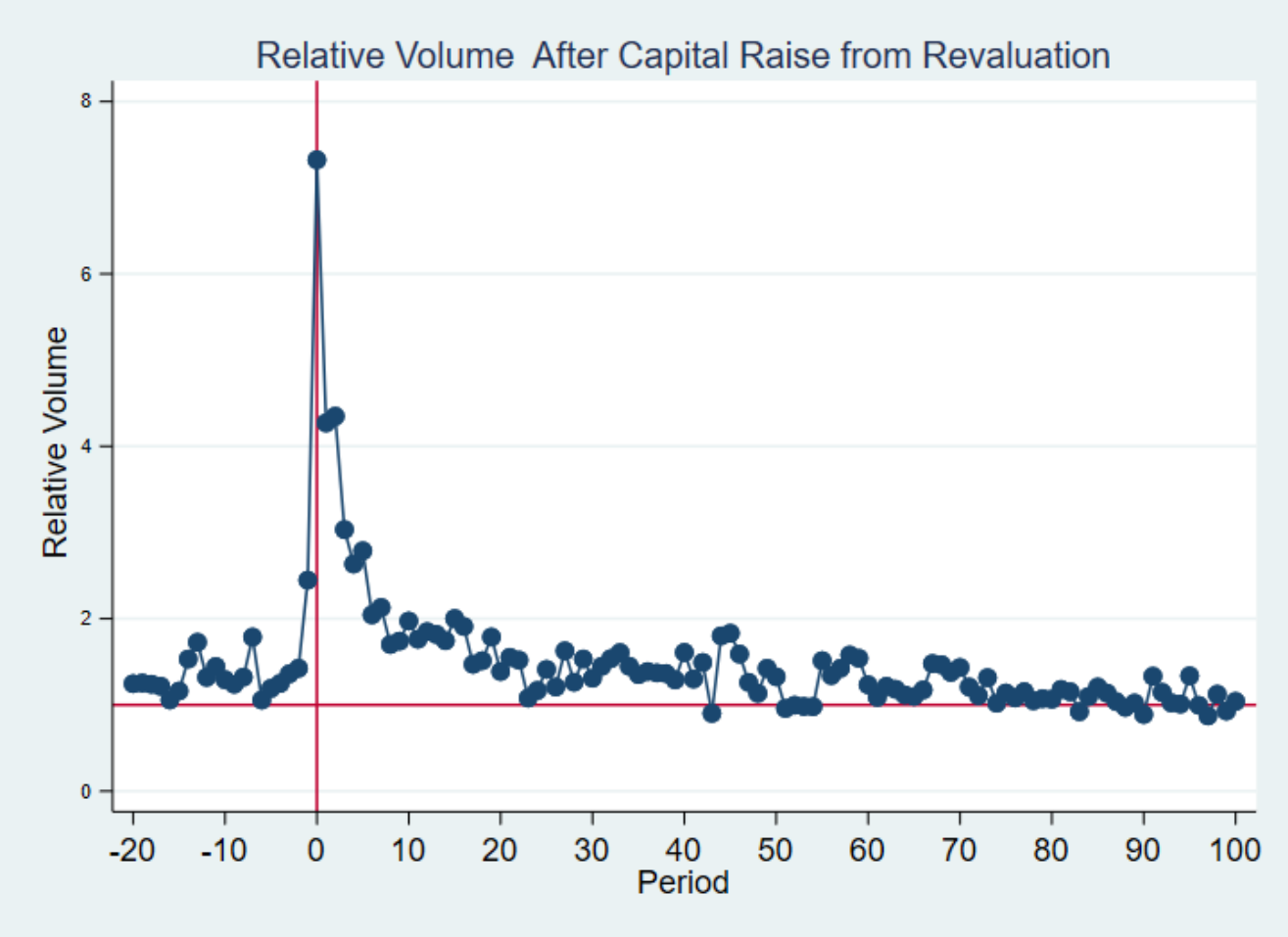


Relative volume



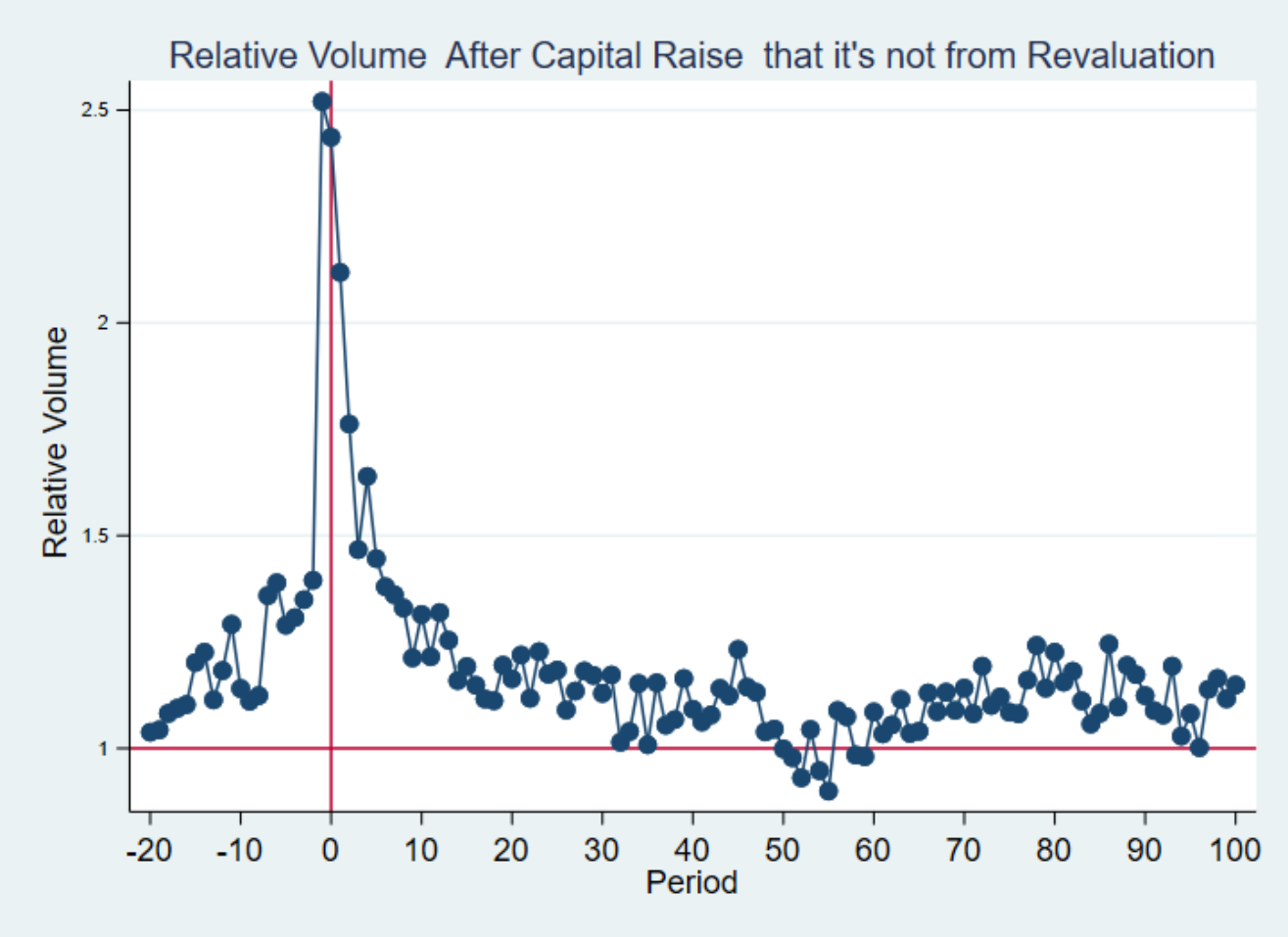
Relative volume

Relative Volume of raised capital from Revaluation

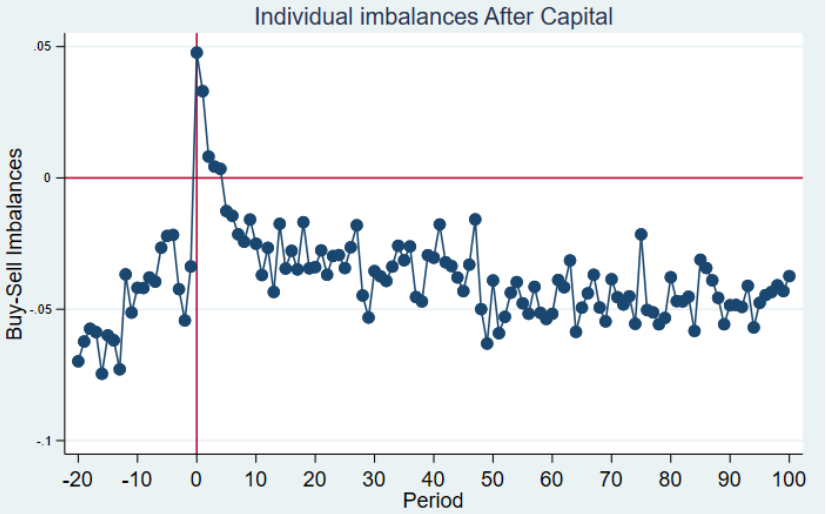


Relative volume

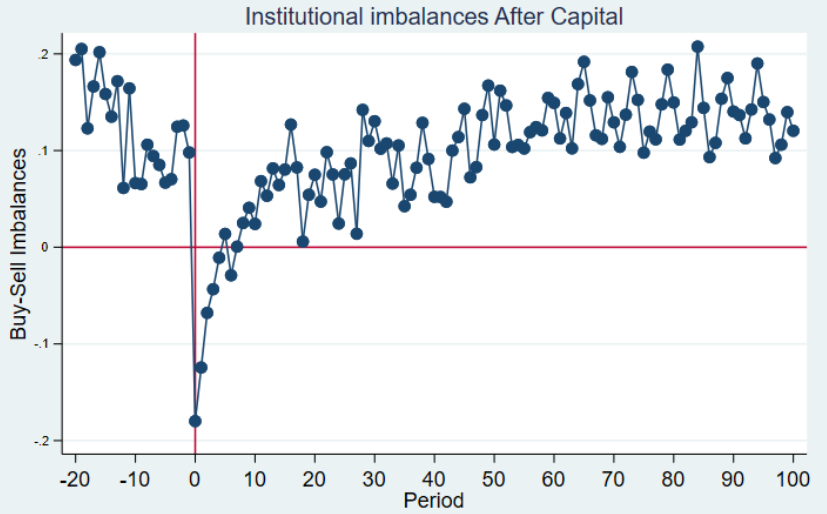
Relative Volume of raised capital that it's not from Revaluation



Buy-sell Imbalances



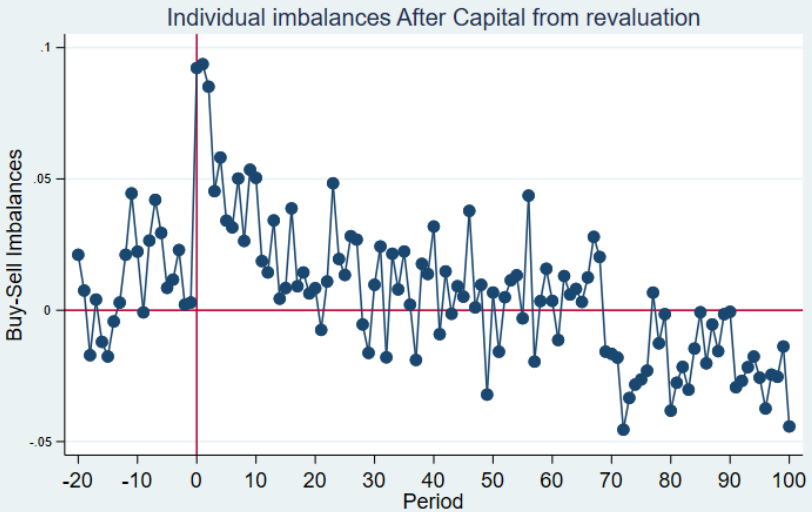
This figure graphs the buy-sell imbalances.
It is defined as the net buying ratio of stock k on date t by a particular type to the amounts bought and sold by that type.

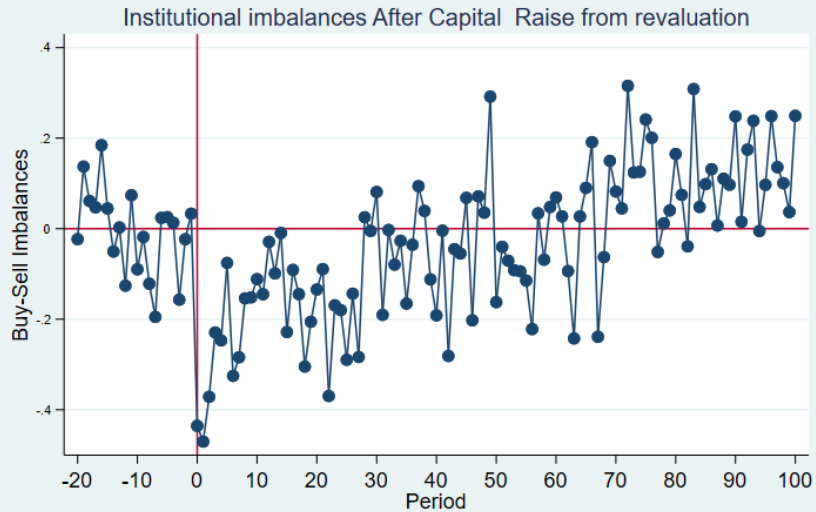


This figure graphs the buy-sell imbalances.
It is defined as the net buying ratio of stock k on date t by a particular type to the amounts bought and sold by that type.

Buy-sell Imbalances

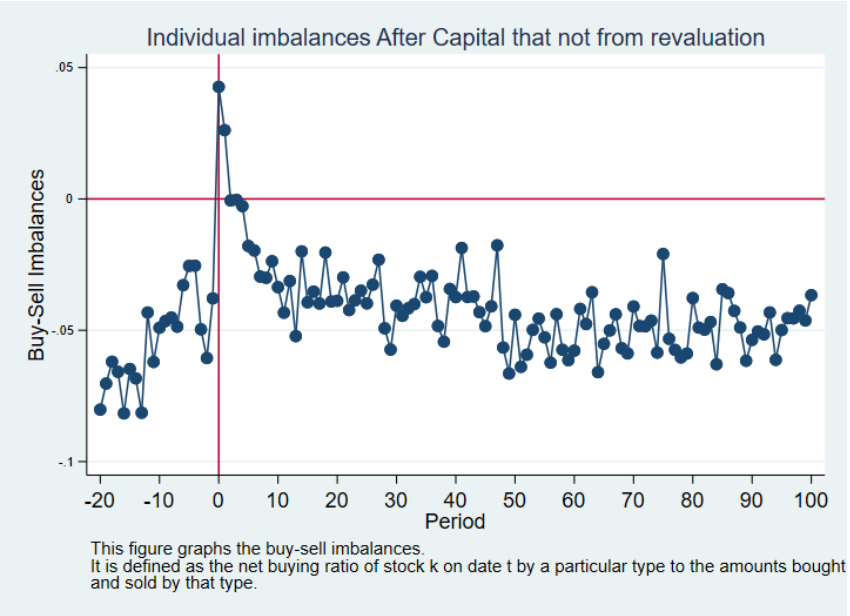
Buy-sell Imbalances of raised capital from Revaluation

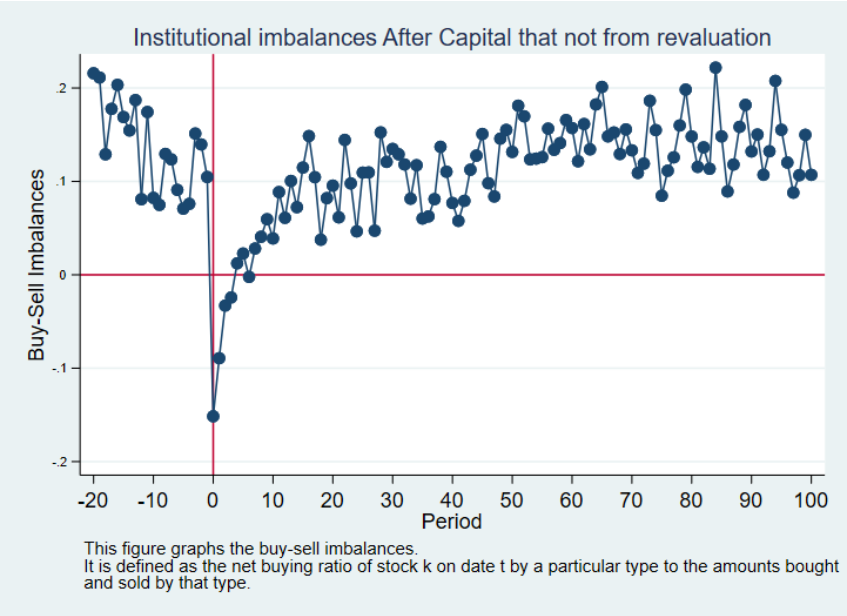




Buy-sell Imbalances

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

	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

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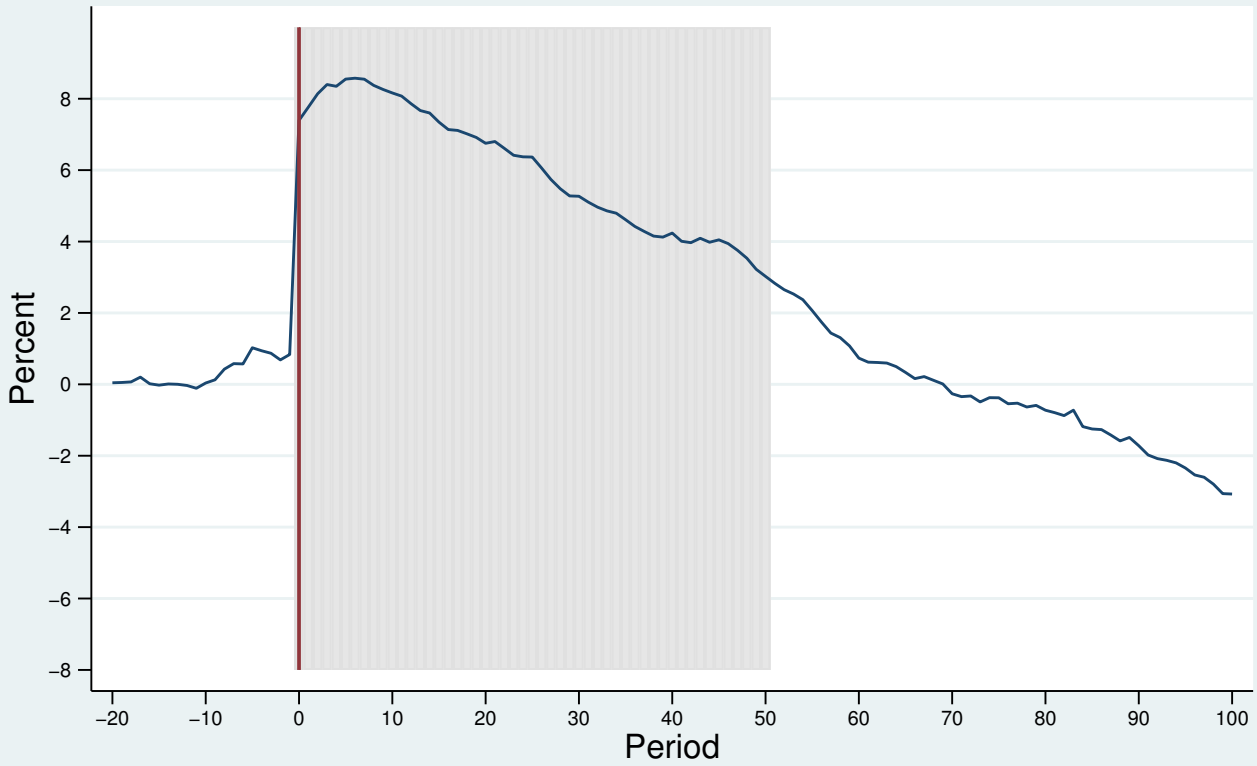
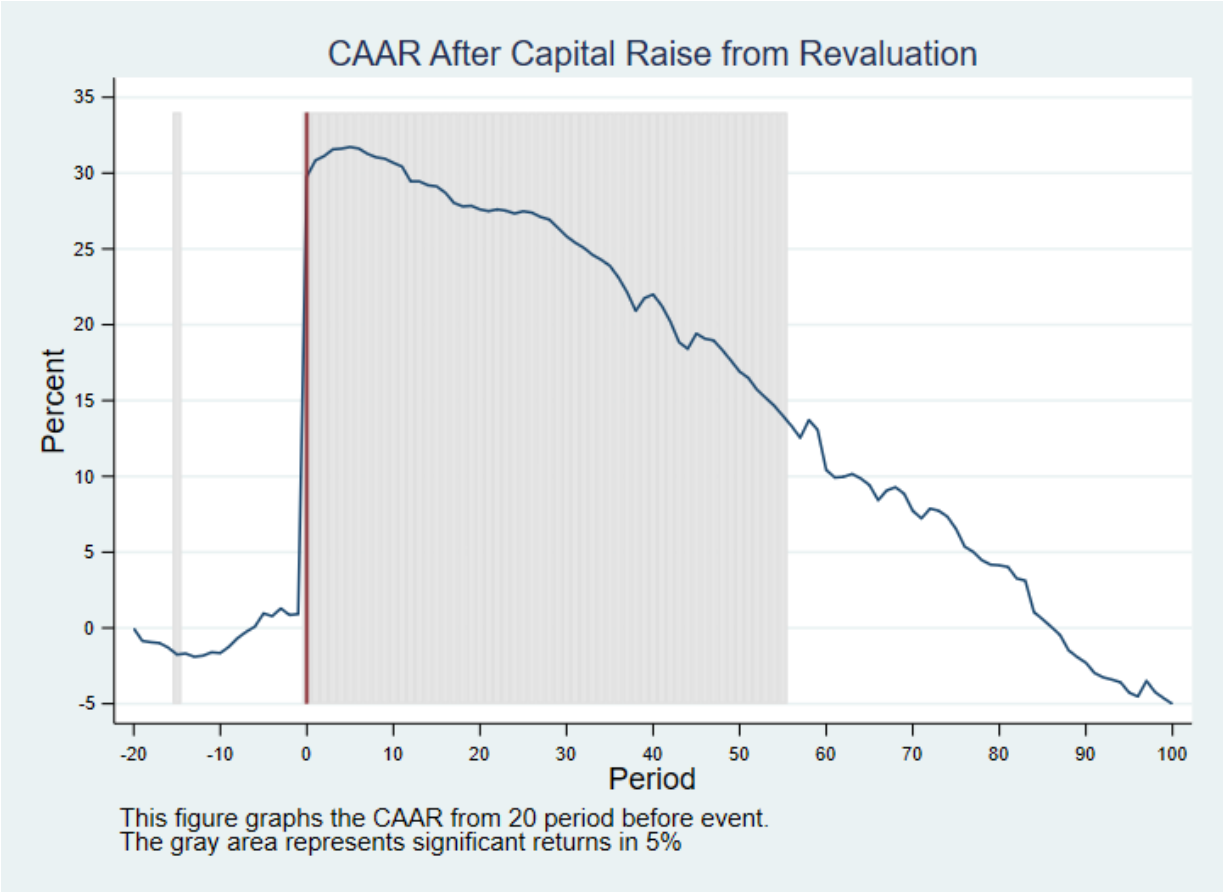
Abnormal Return



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

Abnormal Return

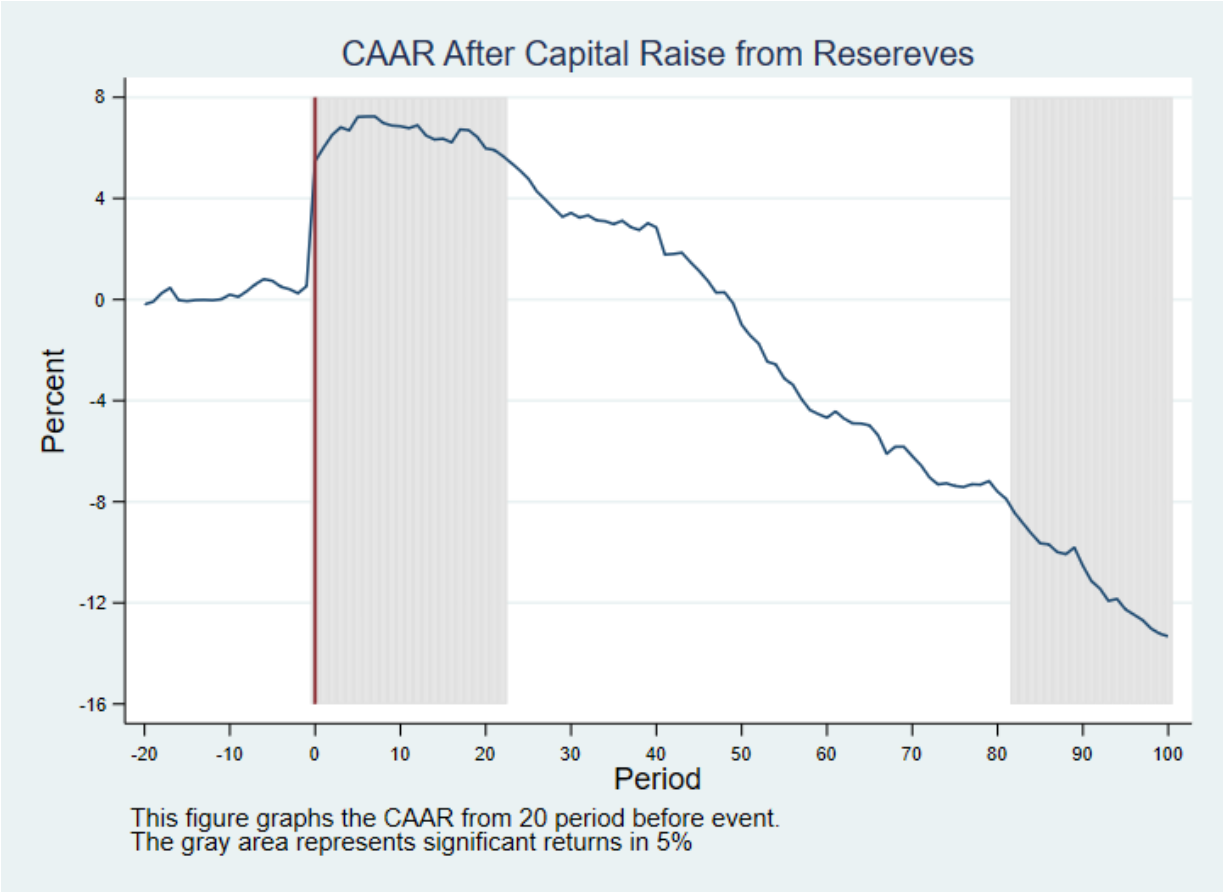
Abnormal return of raised capital from Revaluation



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

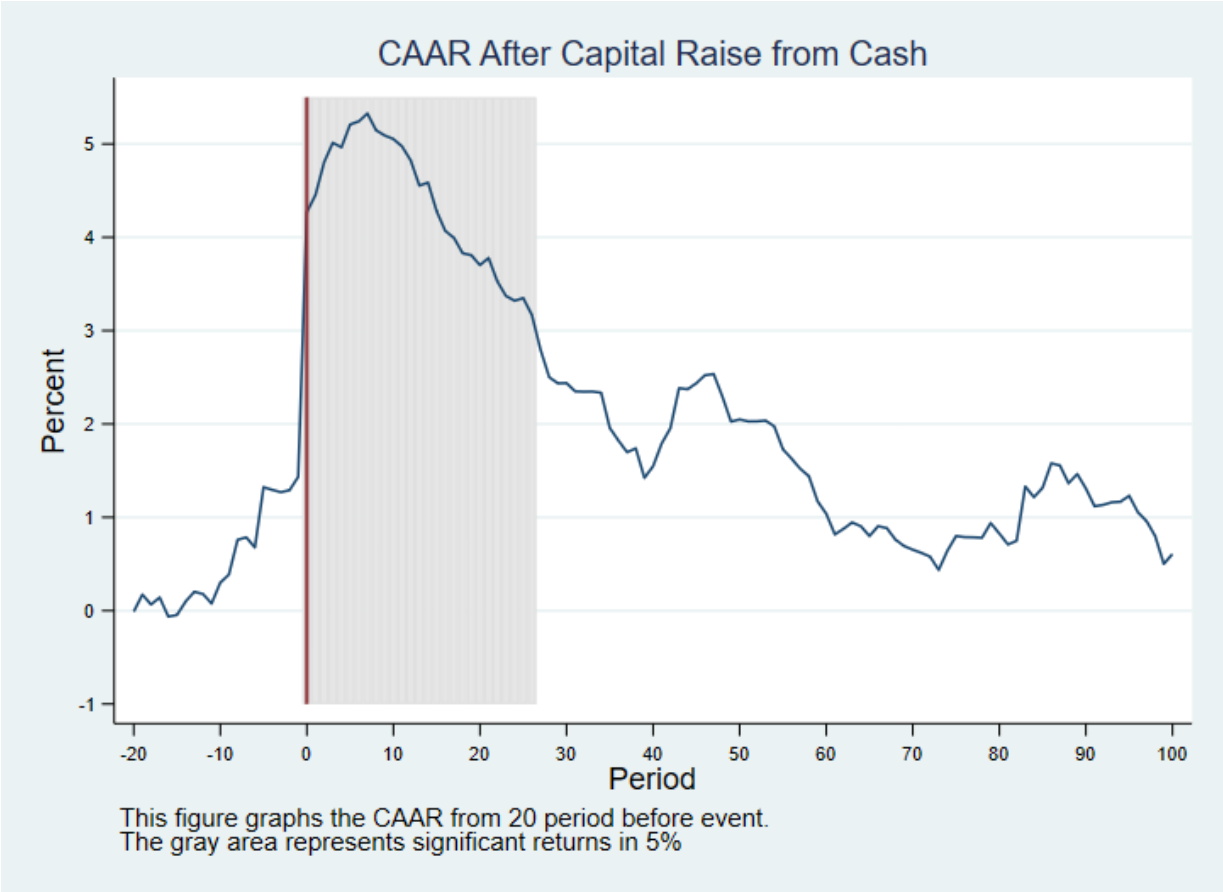
Abnormal Return

Abnormal return of raised capital from Reserves



Abnormal Return

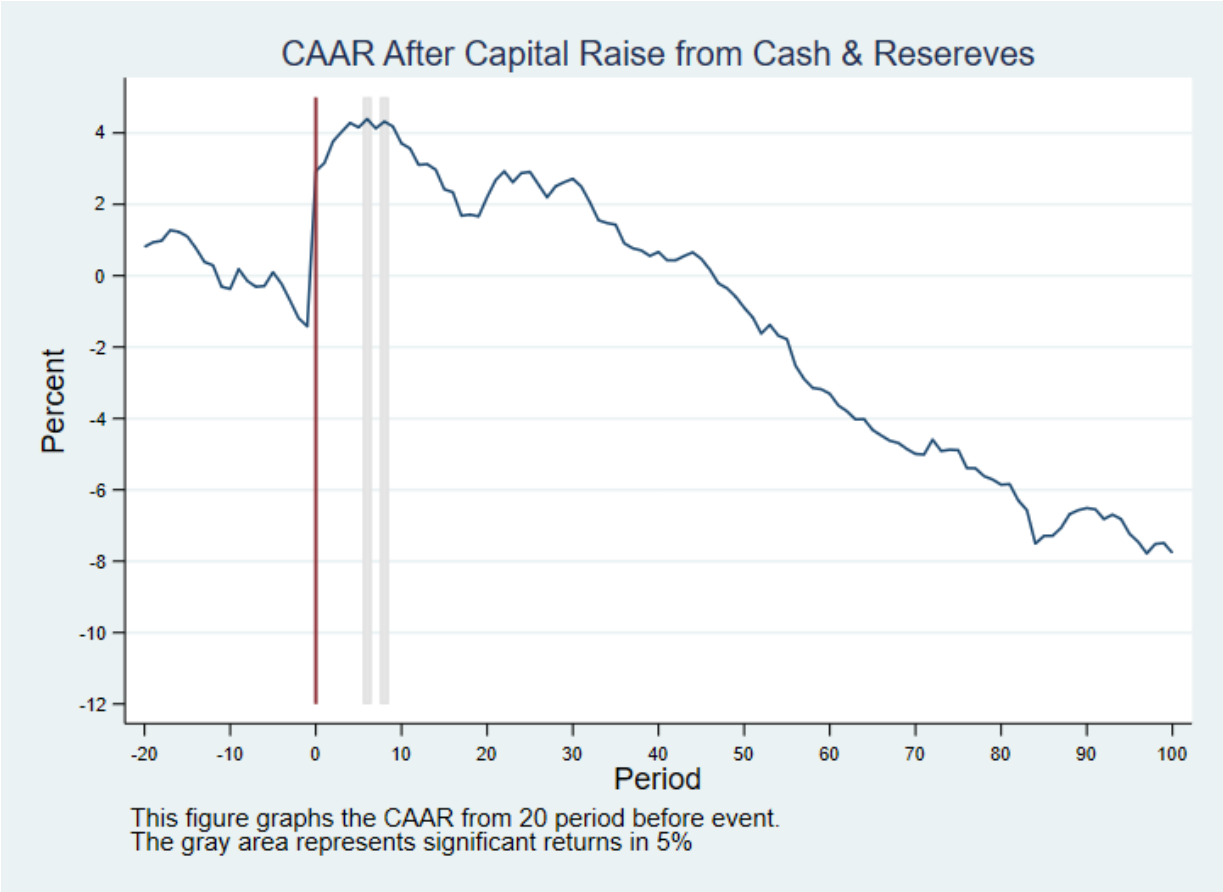
Abnormal return of raised capital from Cash



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 Cash & Reserves



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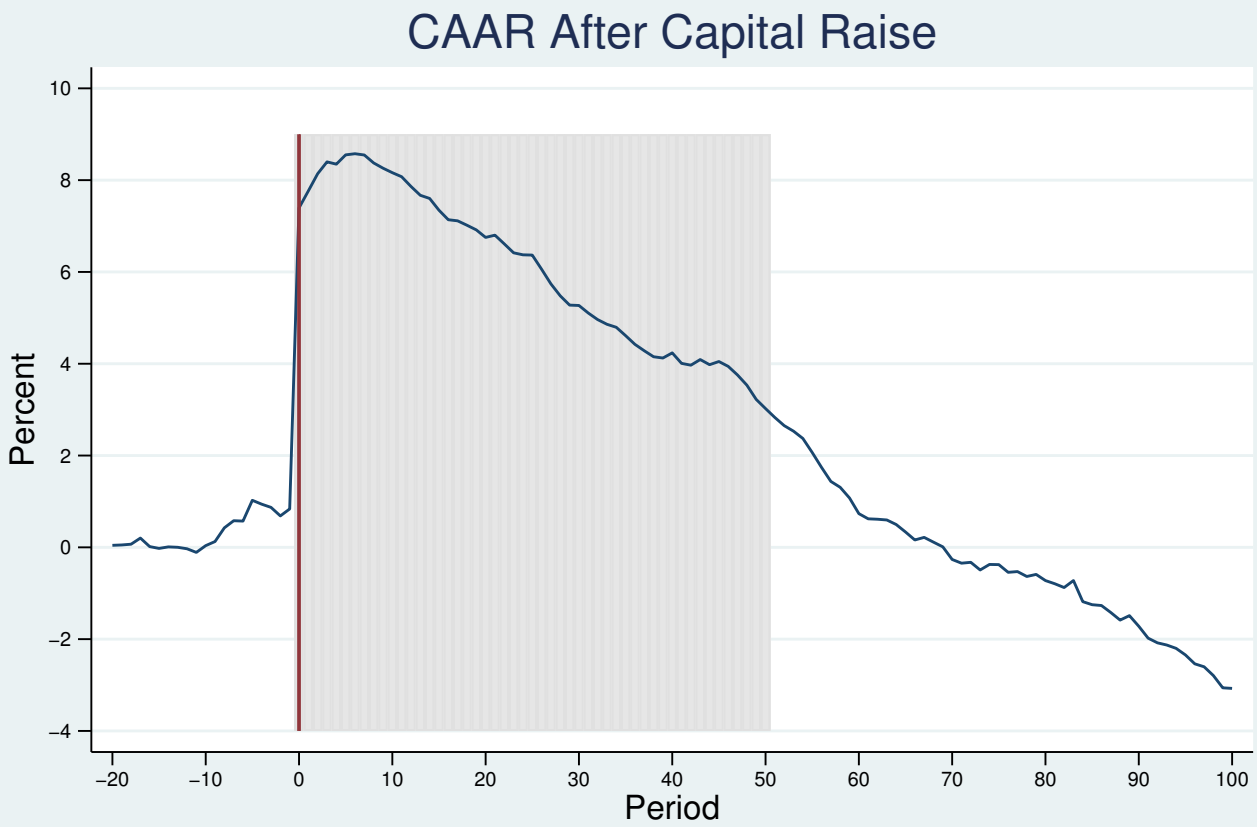
An interesting question is whether the expected return should incorporate the α from the estimation period in addition to β multiplied by the market return. Most applications of event studies include this, and indeed the original study by Fama et al. (1969) includes an alpha.

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



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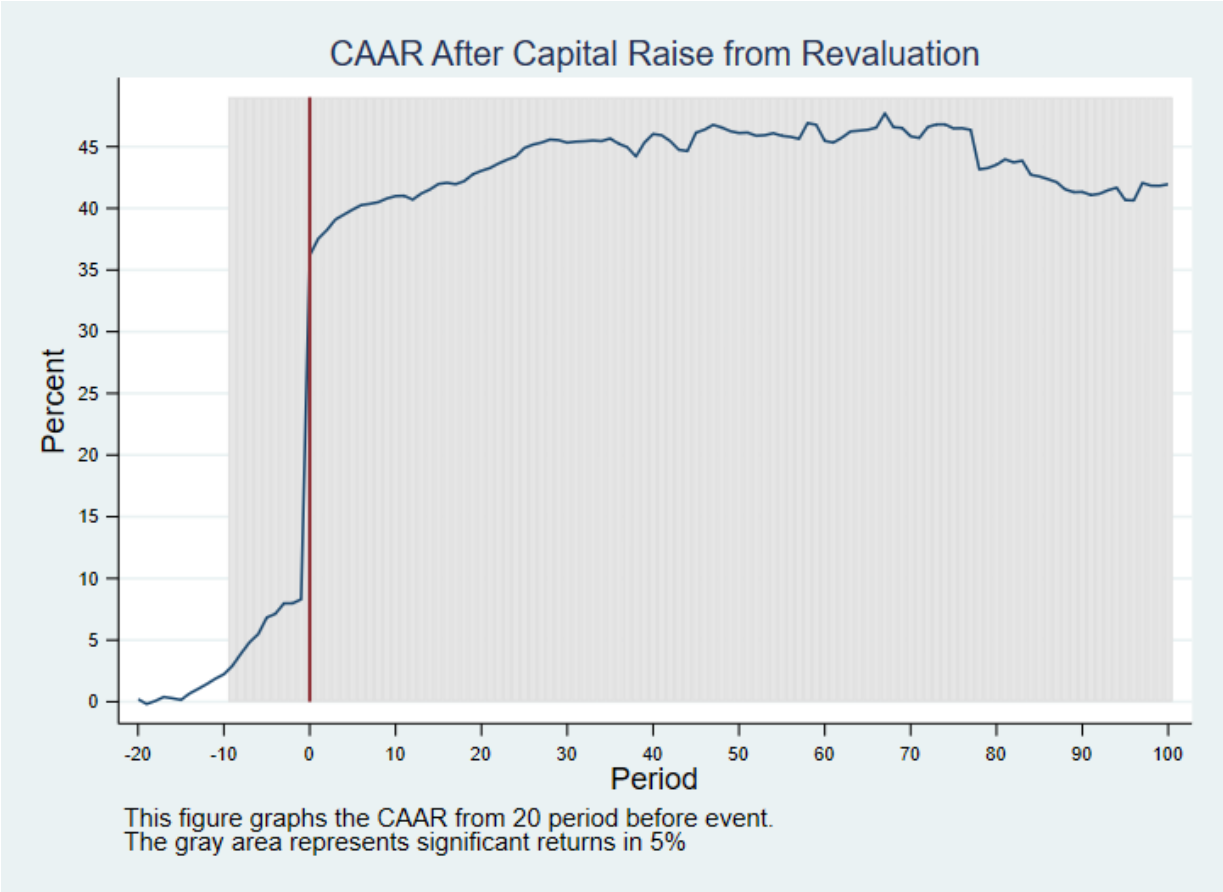
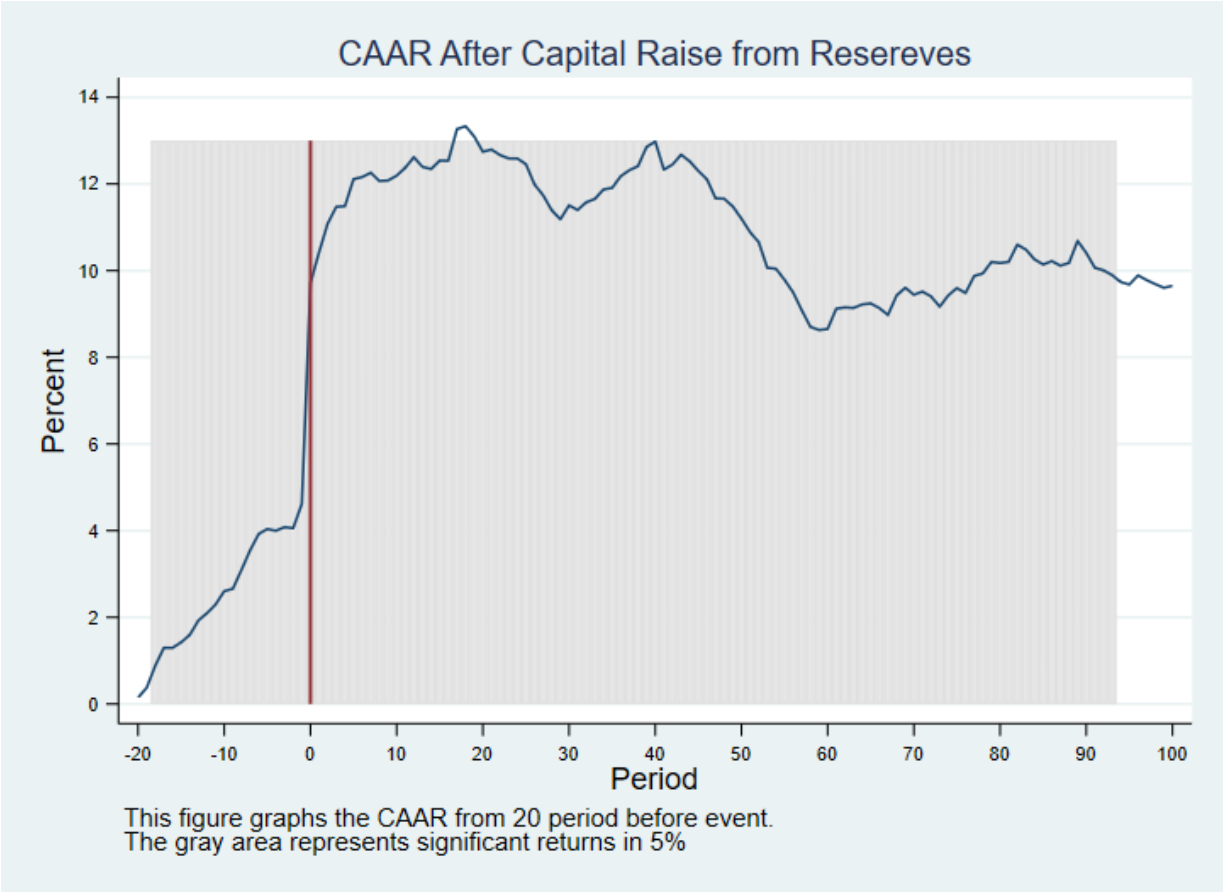
Abnormal Return

Abnormal return of raised capital from Revaluation



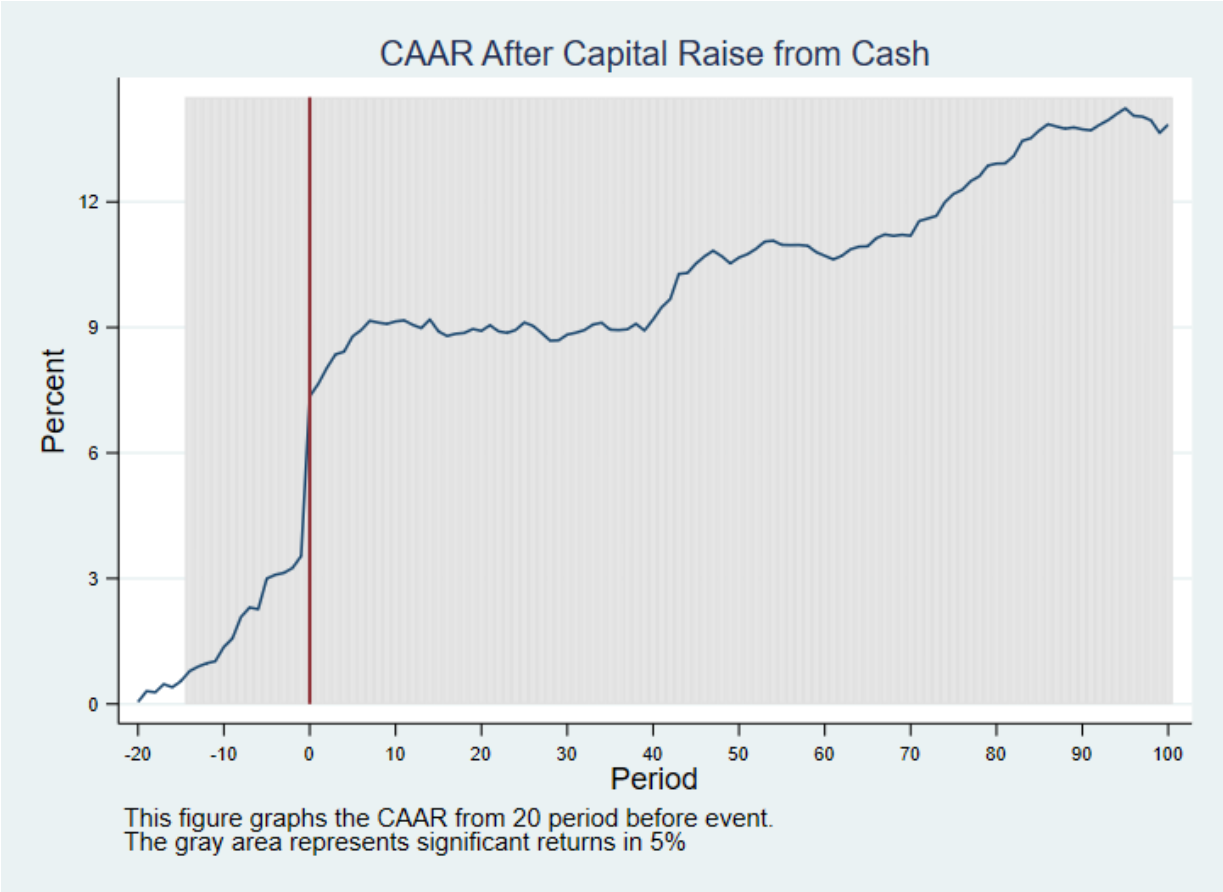
Abnormal Return

Abnormal return of raised capital from Reserves



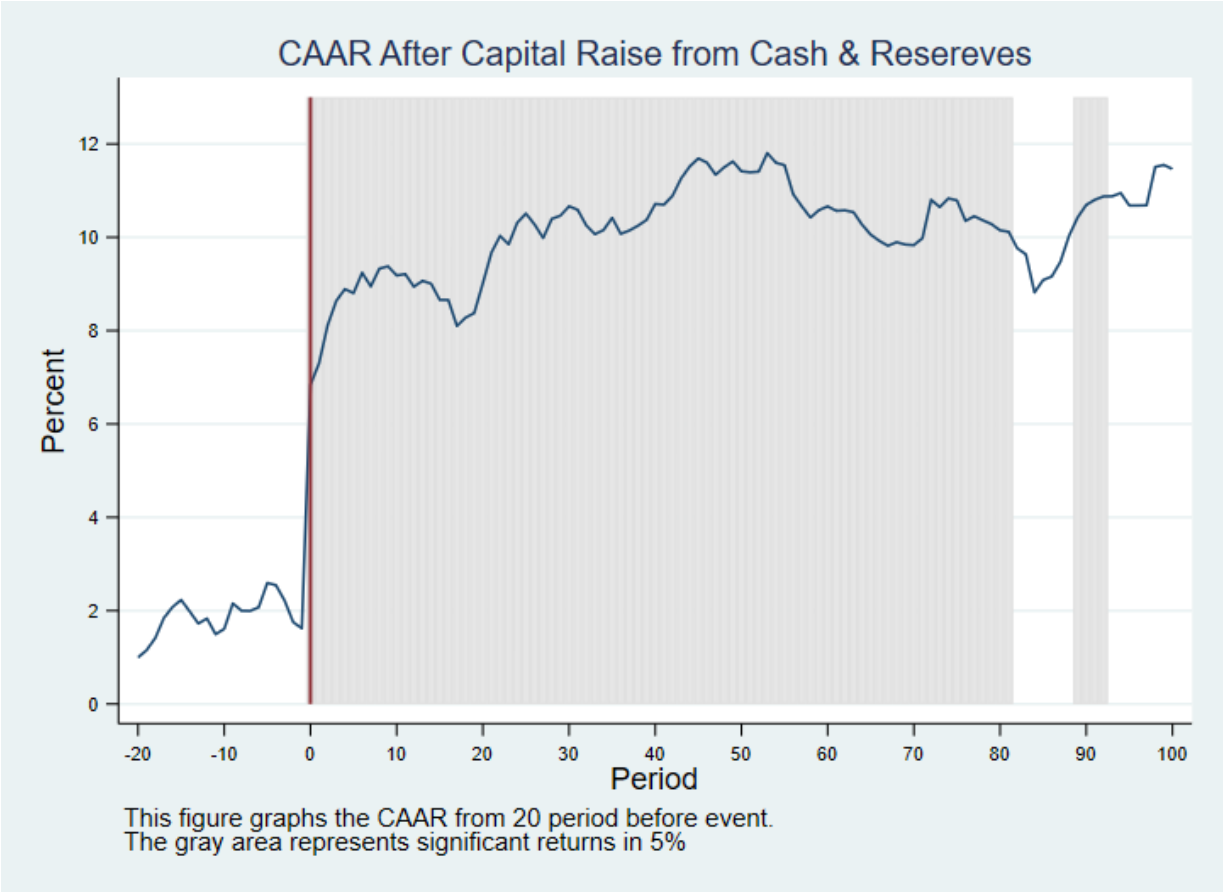
Abnormal Return

Abnormal return of raised capital from Cash



Abnormal Return

Abnormal return of raised capital from Cash & Reserves



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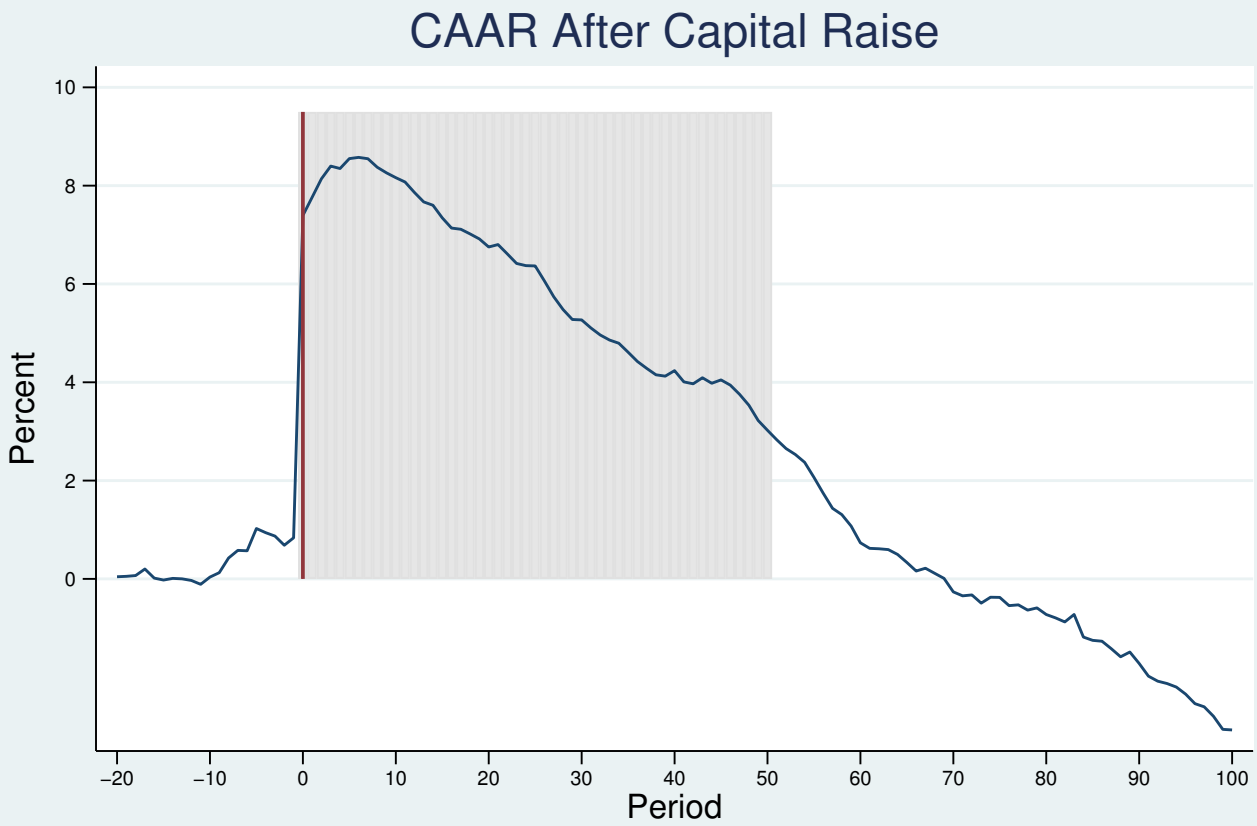
Abnormal Return



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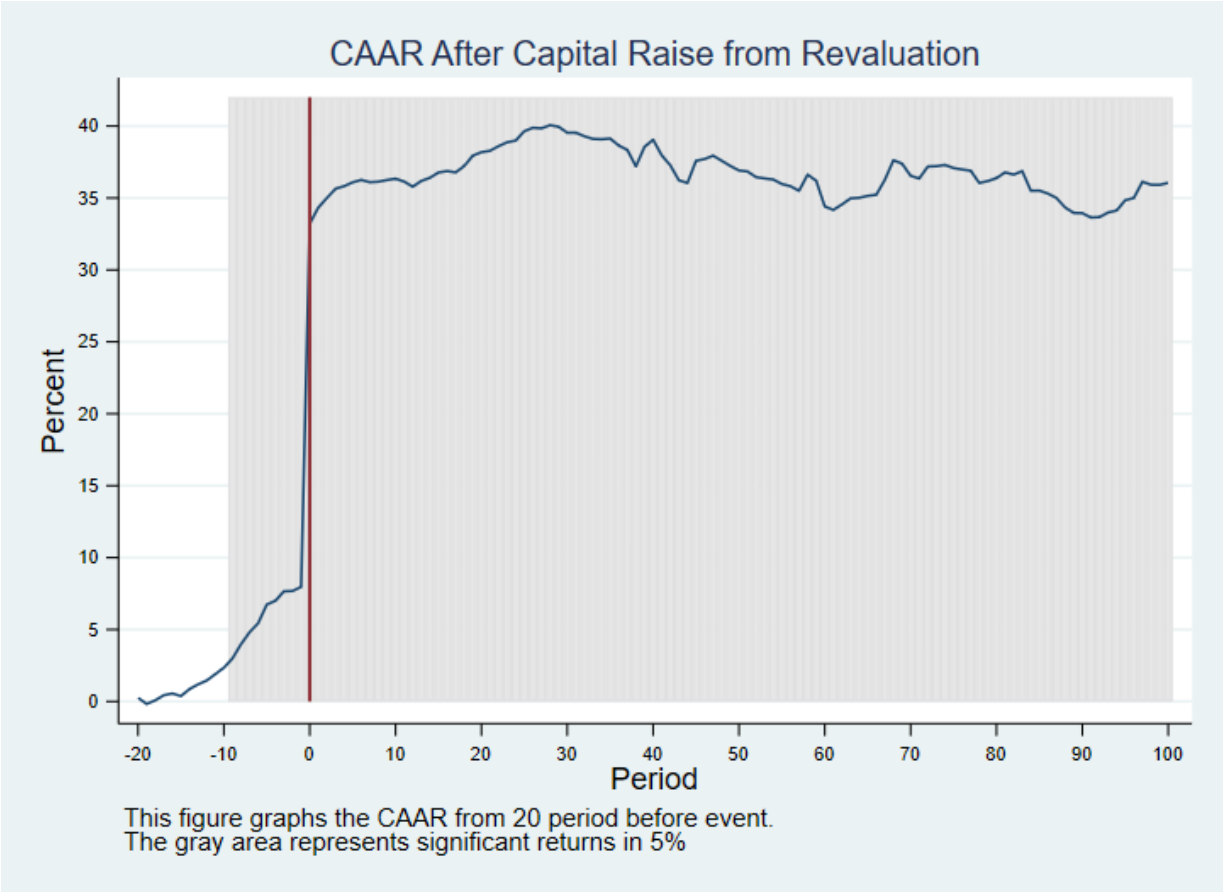
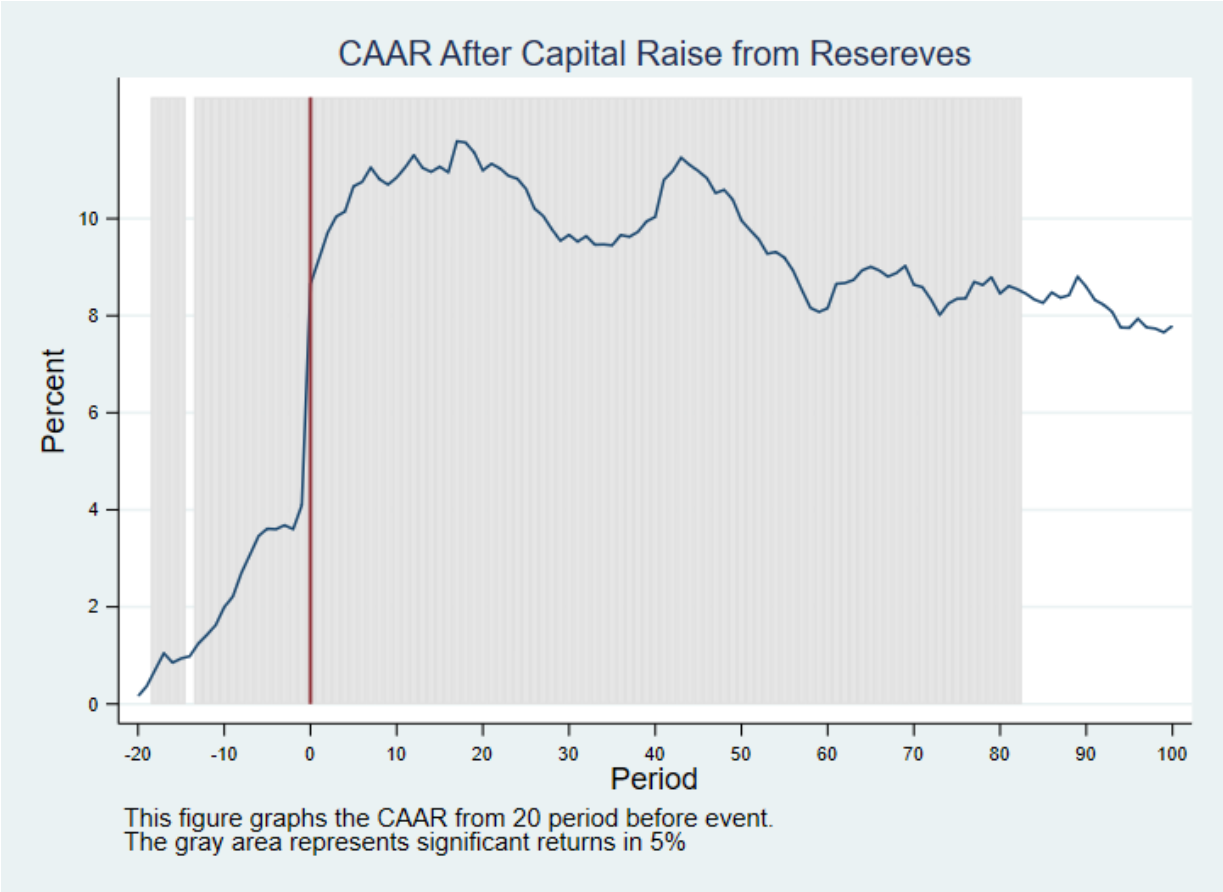
Abnormal Return

Abnormal return of raised capital from Revaluation



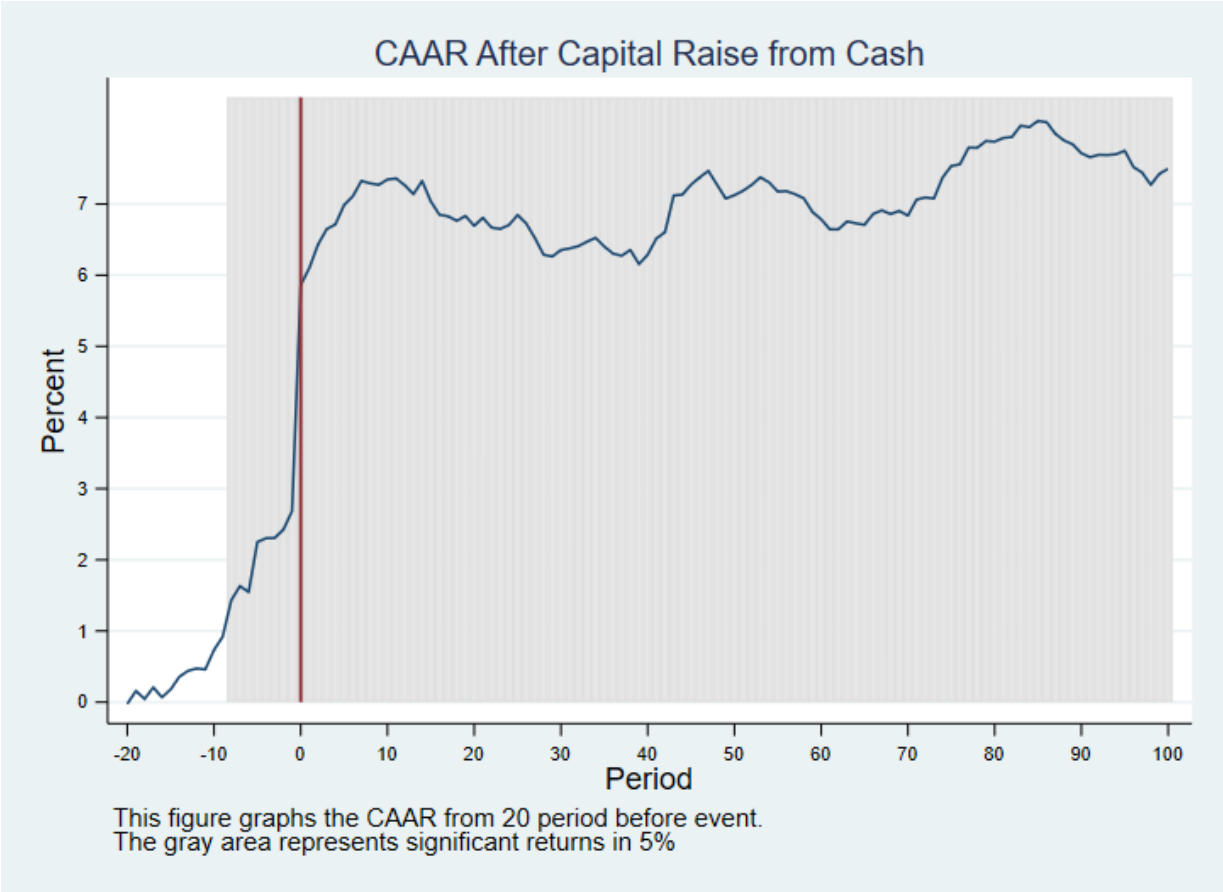
Abnormal Return

Abnormal return of raised capital from Reserves



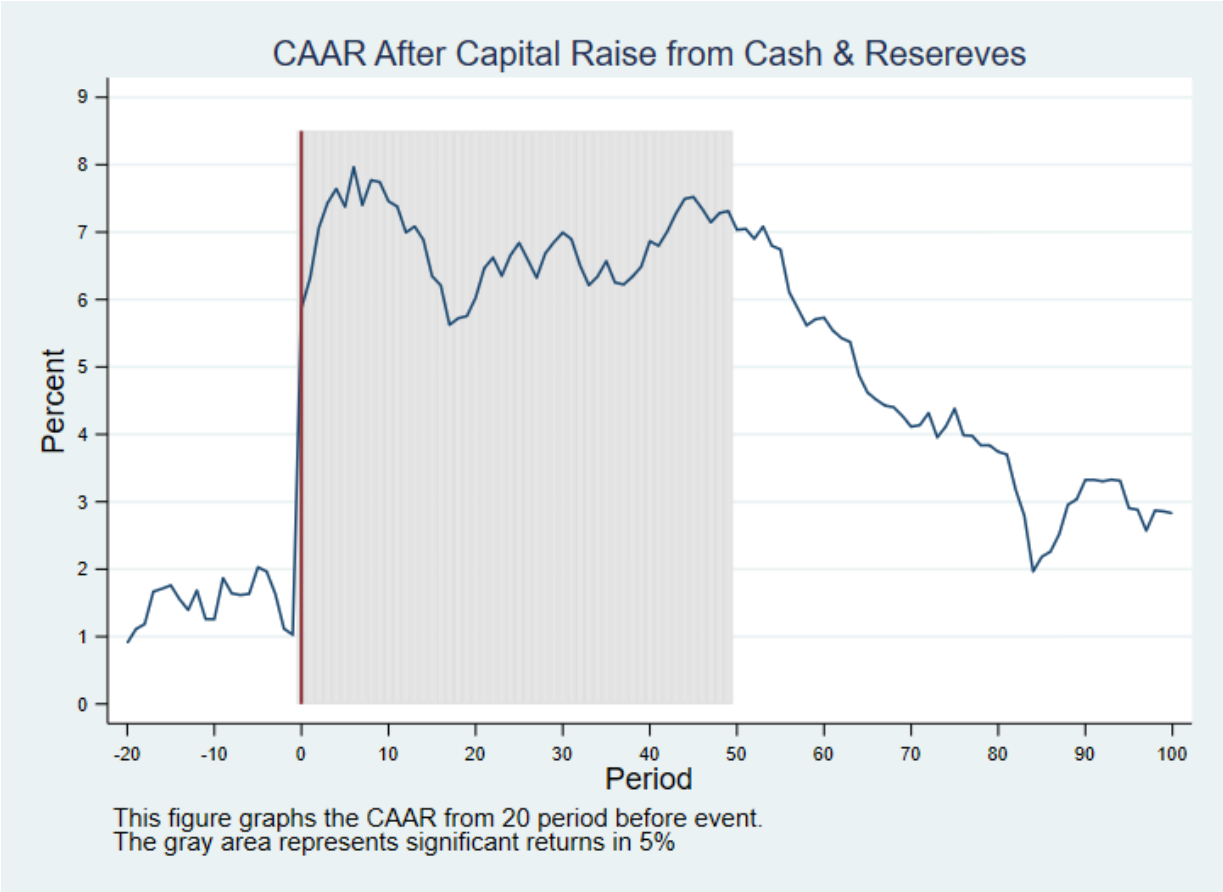
Abnormal Return

Abnormal return of raised capital from Cash



Abnormal Return

Abnormal return of raised capital from Cash & Reserves



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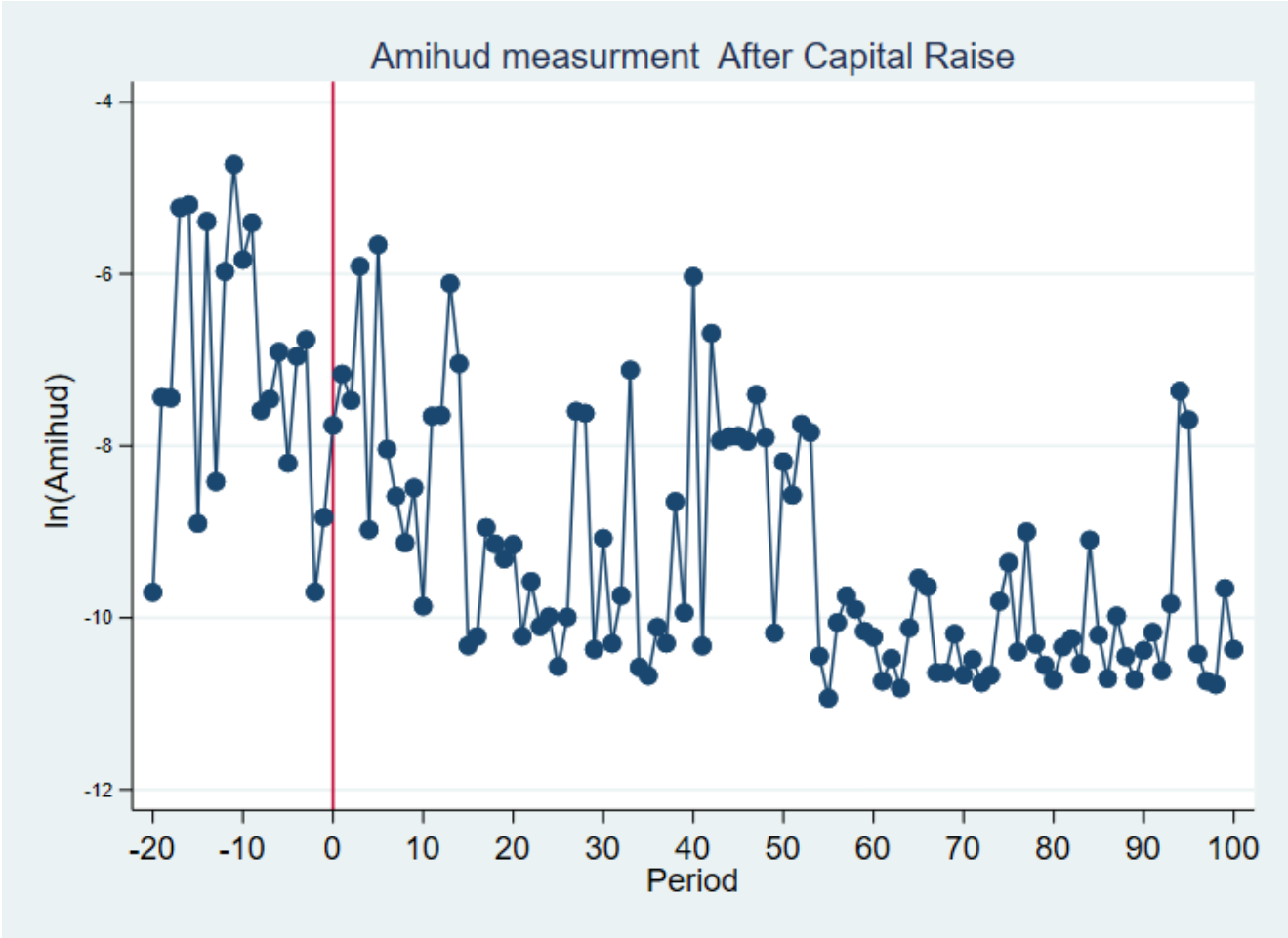
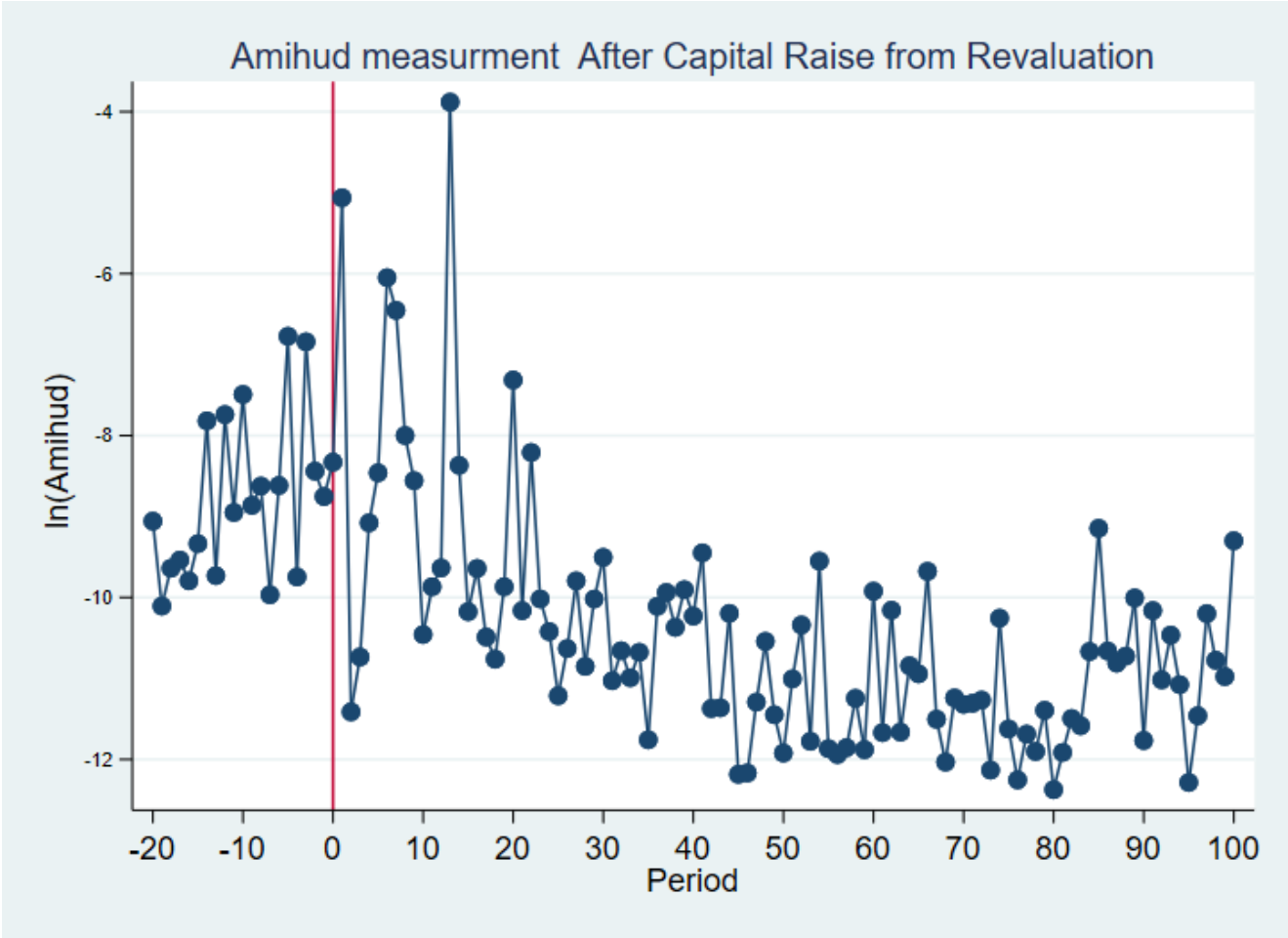
Amihud

Amihud of capital raise



Amihud

Amihud of raised capital from Revaluation



Amihud

Amihud of raised capital that it's not from Revaluation