Does Observability of Downgrade Risk Matter for Corporate Investment?

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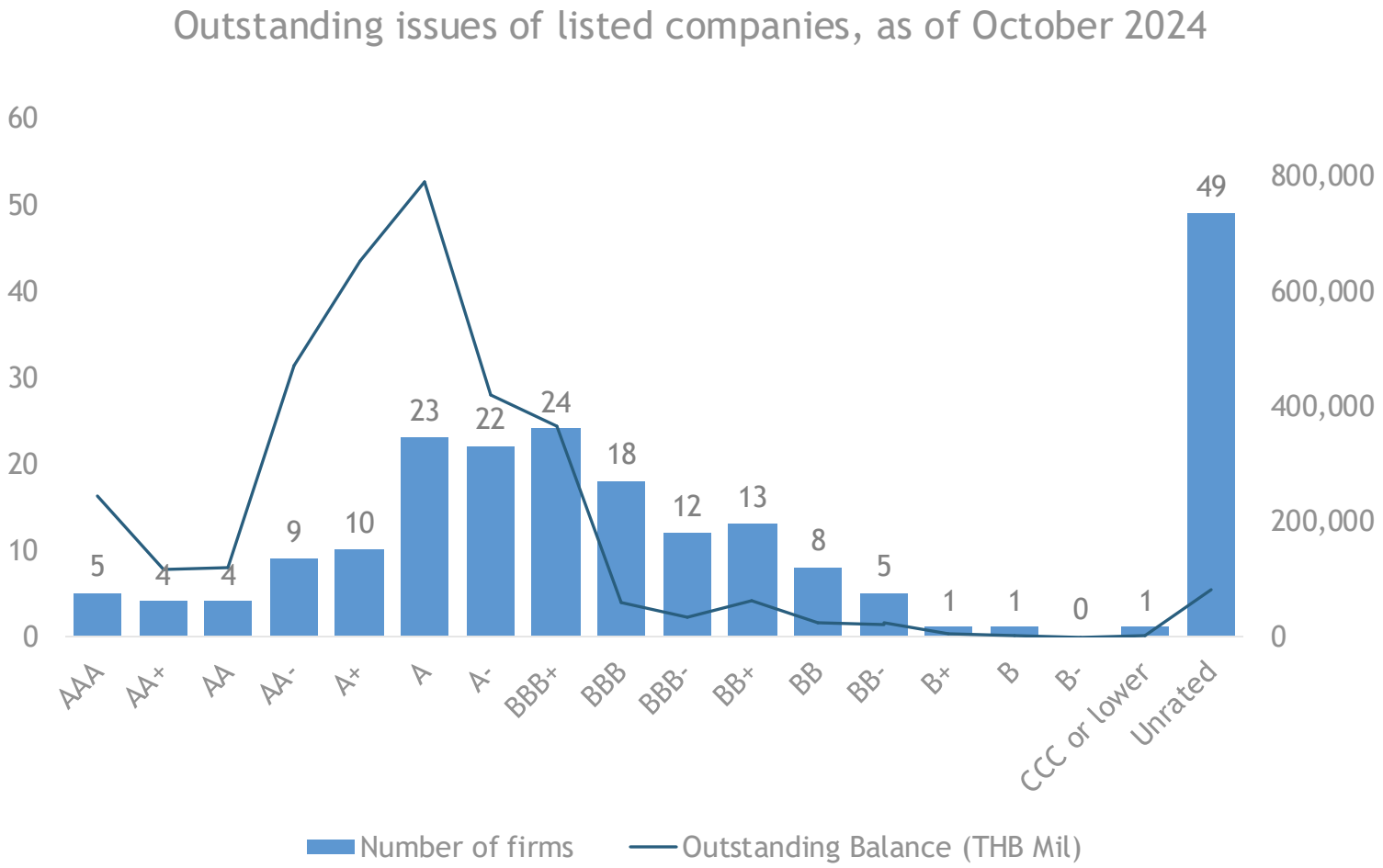
Corporate bonds are an important source of financing.



Credit rating	Number of firms	Outstanding (THB Mil)
AAA	5	243,500
AA	17	705,950
A	55	1,858,238
BBB	54	454,147
BB	26	108,457
B	2	4,940
CCC or lower	1	367
Unrated	49	80,187
Total	**209**	**3,455,786**

2 1 3

19% of GDP

Source: Thaibma

Credit ratings play an important role in the capital market.

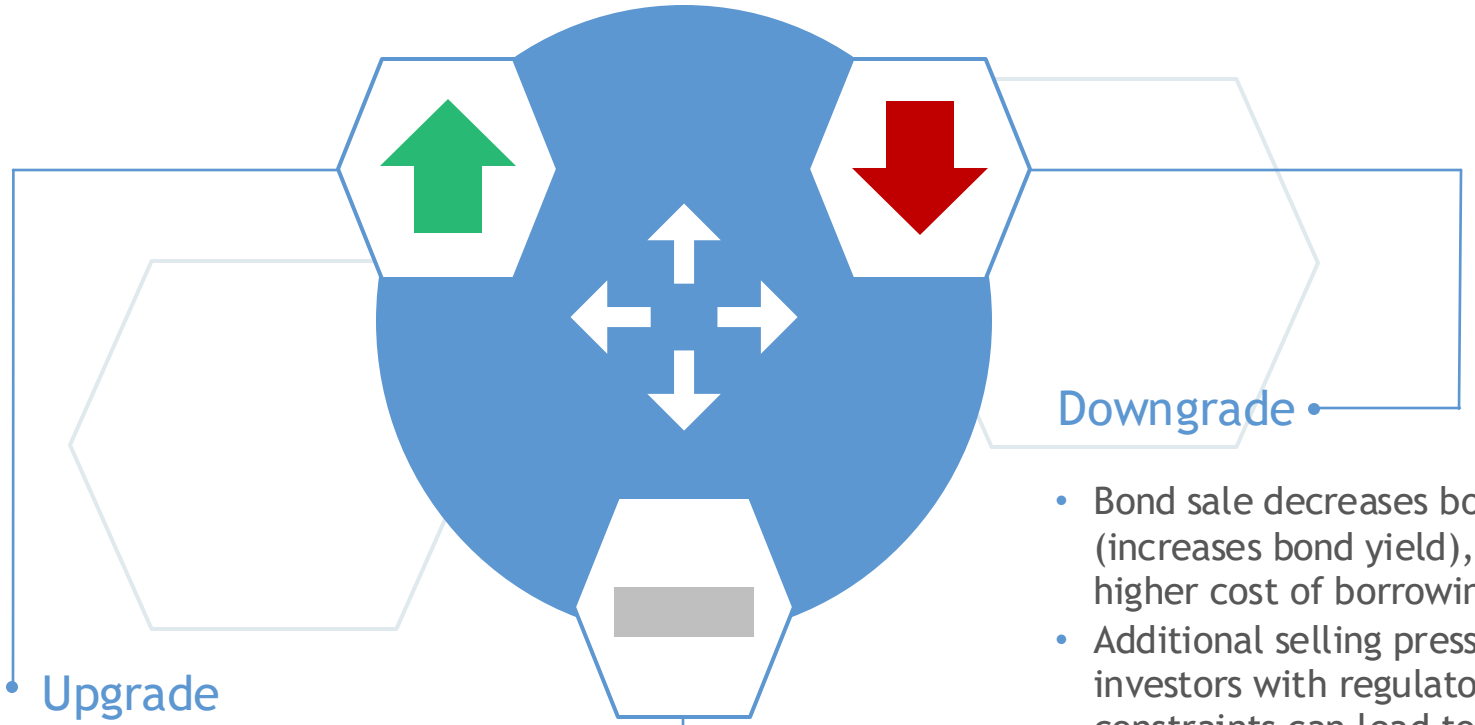
Credit Rating

- Proxy of credit risk
- Reduce information asymmetry between firms and investors
- Have more capability to assess bond market (more higher leverage)
- Have lower cost of debt

Rating	Meaning
AAA	Prime
AA+	High grade
AA	
AA-	
A+	Upper medium grade
A	
A-	
BBB+	Lower medium grade
BBB	
BBB-	
BB+	Non-investment grade speculative
BB	
BB-	
B+	Highly speculative
B	
B-	
CCC+	Substantial junk
CCC	Extremely speculative
CCC-	Default imminent with little prospect for
C	
D	In default

- Upgrade
- Affirm
- Downgrade

Rating changes can influence firm investment behavior.



Upgrade

- Lower cost of borrowing
- Greater access to capital market
- Enhance reputation and creditworthiness

Affirm

No effect

Downgrade

- Bond sale decreases bond price (increases bond yield), leading to higher cost of borrowing.
- Additional selling pressure by investors with regulatory constraints can lead to fire sale ("fallen angels").
- Firms with fallen angels can experience additional cost of borrowing and reduced access to capital market.

- Consequently, firms try to avoid downgrades.
- Firms that face downgrade risk may be less likely to invest to avoid downgrade.
- **But if they are not rated (no observable rating), will their investment behavior be influenced?**

This Paper

Does observability of downgrade risk matter for corporate investment?

- Step 1: do **firms** change their investment behavior when their **credit rating** can be downgraded beyond "investment grade" threshold?
- Step 2: generate synthetic credit rating for unrated firms
- Step 3: do **unrated firms** change their investment behavior when their **synthetic credit rating** can be downgraded beyond investment grade threshold?

The rest of this presentation

- Hypotheses development
- Data and methodology
- Results
- Conclusion

The Tobin's q Theory of Investment can help explain why downgrade risk can influence investment decision.

Conceptual framework

Firm's rating level

Rated firms
- Upgrade
- Affirm
- Downgrade

Kim et al. (2023) found that near-BBB rated firms makes conservative investment due to the fear of downgrade

Unrated firms → Research gap

Cost of debt

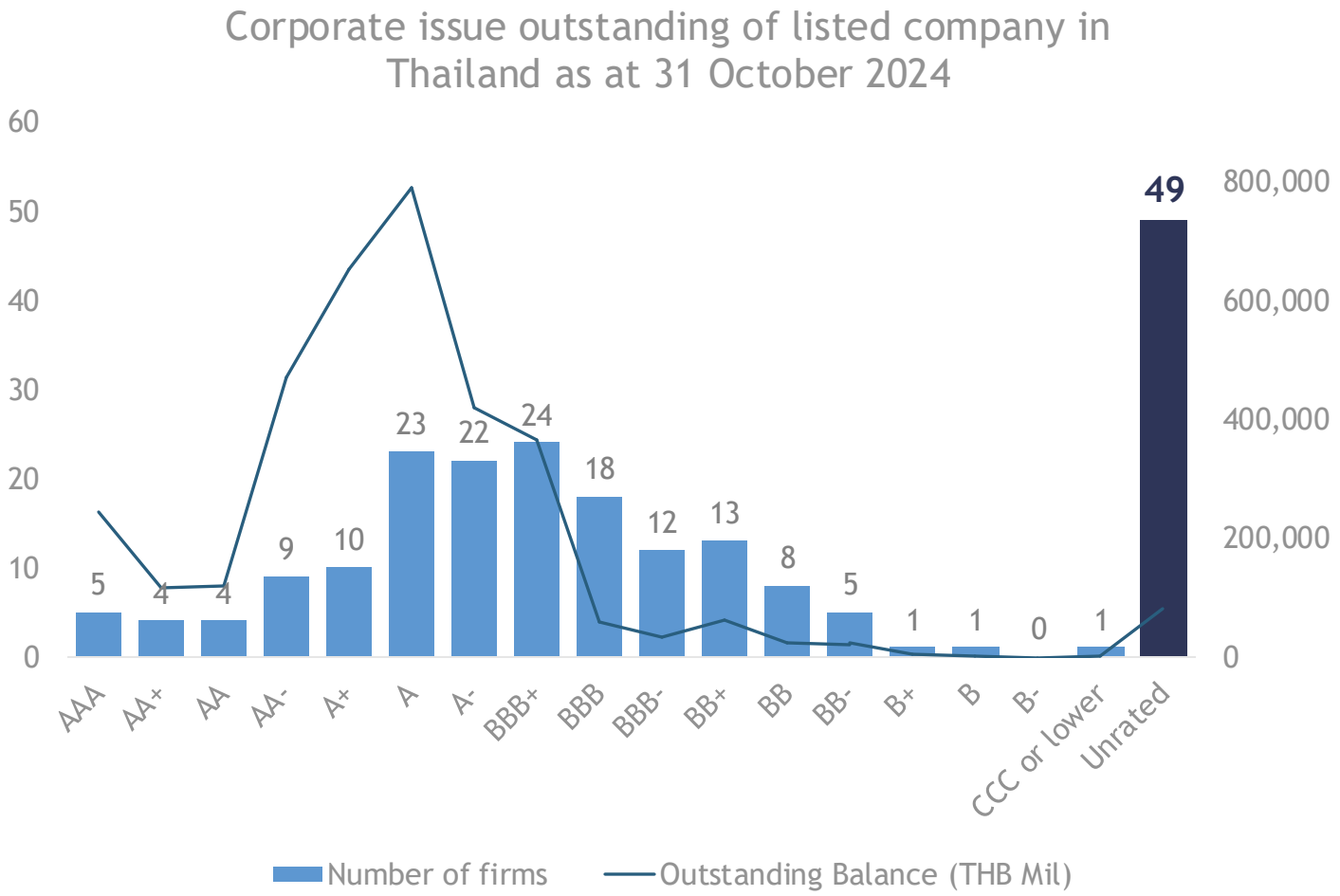
Firms with higher credit ratings have lower borrowing costs

Investment decision

Higher cost of debt increases the marginal cost of capital, which, in turn, affects the incentive for firms to invest in new capital.

$$q = \frac{Enterprise\ Value}{Replacement\ Cost}$$

We focus on UNRATED firms (both issuers and non-issuers).



Source: Thaibma

23% of firms that issue corporate bonds do not receive assessment from credit rating agencies.

- As of October 2024, 49 of 209 issuers are unrated, and their bonds account for 2.3% of total issues. However, there are many more listed firms who do not issue bonds at all, and thus do not receive credit rating assessment.
- Credit rating is required for public offering. For other types of issues (II, UHNW, HUW), rating is voluntary.
- Credit rating is typically assessed based on the industry and firm characteristics, as well as existing leverage. Consequently, we can use a **statistical model** to assign a **synthetic rating** to unrated firms, even for **non-issuers**.

Hypotheses Development

1 **Rated Firms and Investment Decision**

Credit ratings thresholds can influence investment decision of rated firms, particularly around the A and BBB rating levels (“investment grade” threshold).

2 **MAIN CONTRIBUTION**

UNRATED Firms and Investment Decision

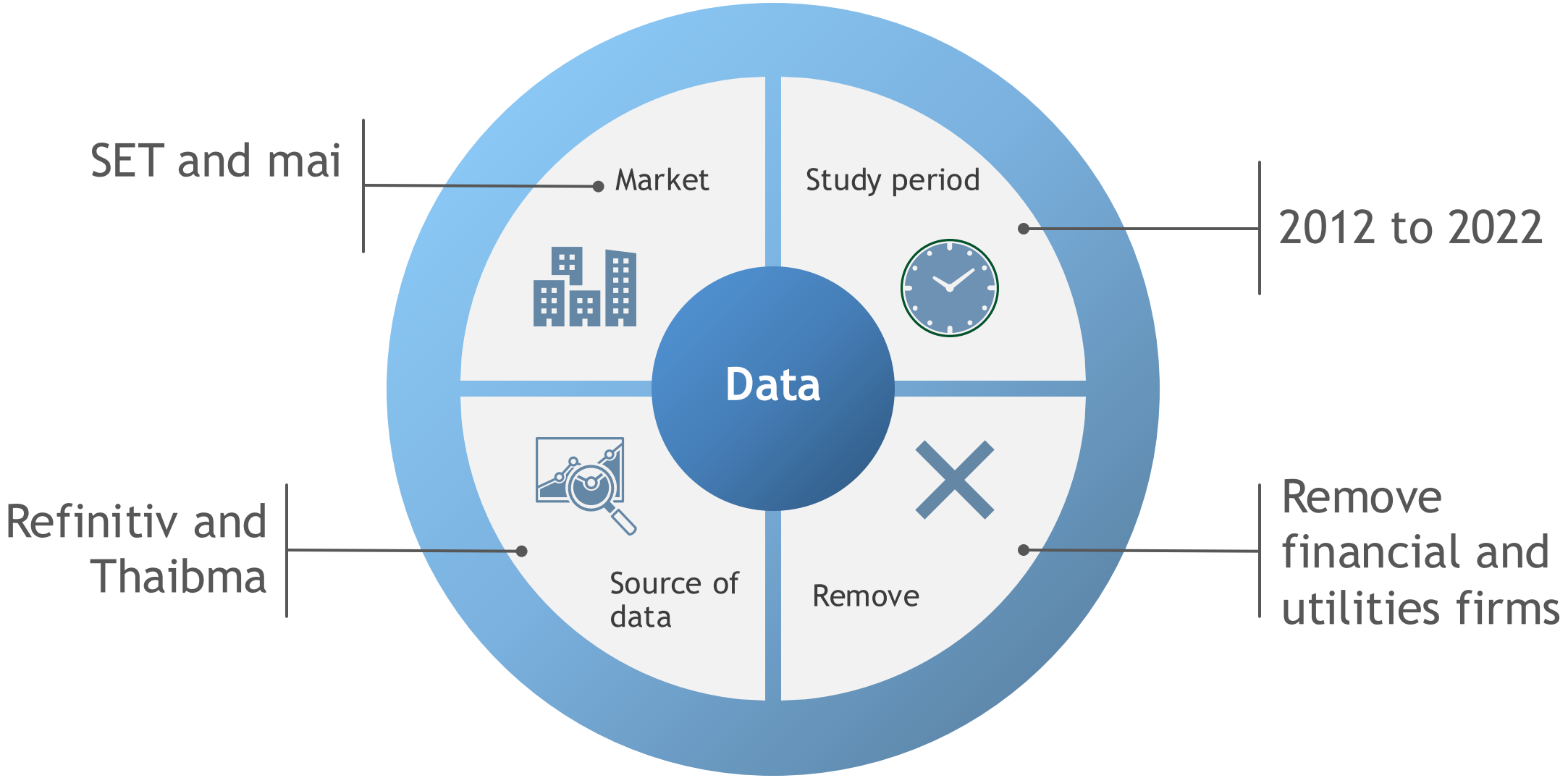
Synthetic ratings thresholds can influence investment decision of rated firms, particularly around the A and BBB rating levels (investment grade threshold).

Theorical Framework

Limited Attention ›

Barber and Odean (2008) find that individuals have limited capacity to process information. Consequently, they tend to focus on the readily available information.

Data and Methodology



Step 1: do firms change their investment behavior when their credit rating can be downgraded to non-investment grade?

1 Investment regression model

1) Hypothesis I: Credit ratings thresholds can influence investment decision of rated firms, particularly around the A and BBB rating levels ("investment grade" threshold).

$$Invest_{i,t+1} = \beta_1 Rating_{it} + \beta_2 Interval_{it} + \beta_3 Rating_{it} \times Interval_{it} + \gamma X_{it} + \delta_i + \tau_t + \varepsilon_{it}$$

Variable	Description
Invest	Change in tangible assets (PPE + depreciation / lagged PPE)
Rating	Scalar value, where AAA rating takes value of 21 and the D rating takes value of 1
Interval	A dummy variable takes 1 where the rating belongs to specific range, otherwise zero
X	Control variables including change in cash, size, KZ index, MTB ratio, ROA, leverage, sales growth dividend ratio. Industry and year fixed effects also included.

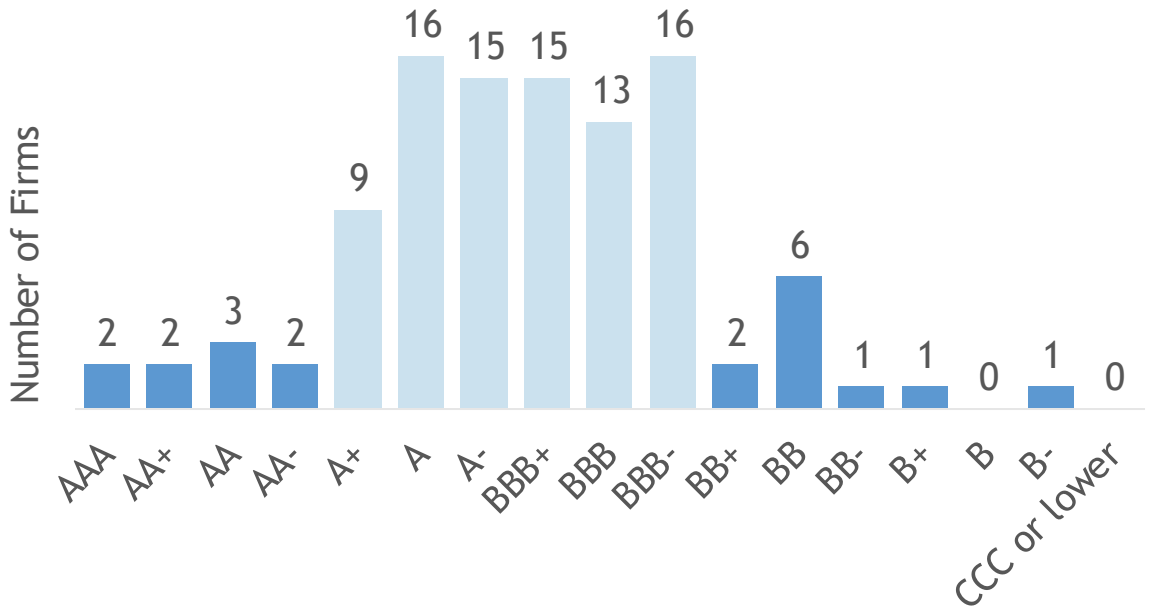
2) Hypothesis II: *Synthetic ratings* thresholds can influence investment decision of rated firms, particularly around the A and BBB rating levels (investment grade threshold).

- Use the synthetic credit rating with the same investment regression model.

Why we focus on near-A and near-BBB threshold

We focus on the ratings near the **A-to-BBB threshold** because investors with regulatory constraints prefer “investment grade” bonds.

In Thailand, many institutional investors sell bonds once they are downgraded below the **A threshold**, a stricter definition of “investment grade” than commonly defined.



We study both two-sided and one-sided intervals.

1	Two-sided interval: A+ to BBB-	6 notches
2	One-sided interval: A+ to A-	3 notches
3	One-sided interval: BBB+ to BBB-	3 notches

Investment grade Non-investment grade

Result: Hypothesis I – rated firms

Hypothesis I: Credit ratings thresholds can influence investment decision of rated firms, particularly around the A and BBB rating levels (investment grade threshold).

$$Invest_{i,t+1} = \beta_1 Rating_{it} + \beta_2 Interval_{it} + \beta_3 Rating_{it} \times Interval_{it} + \gamma X_{it} + \delta_i + \tau_t + \varepsilon_{it}$$

- In column 2, β_3 is statistically insignificant. Either there is no relationship, or the relationship is non-monotonic.
- In column 3, β_3 is positive and statistically significant at 5% level. Firms tend to cut investments as their ratings approach A-, the lower bound of rating for Thai institutional investors to hold bonds.
- In column 4, β_3 is negative and statistically significant at 5% level shows that firms increase their investments as rating declines. This may be related to risk shifting, where firms take on riskier investment when they are at risk of default, leading to increased investment.
- Our results show that both the A and BBB threshold can influence to Thai firms' behaviors.

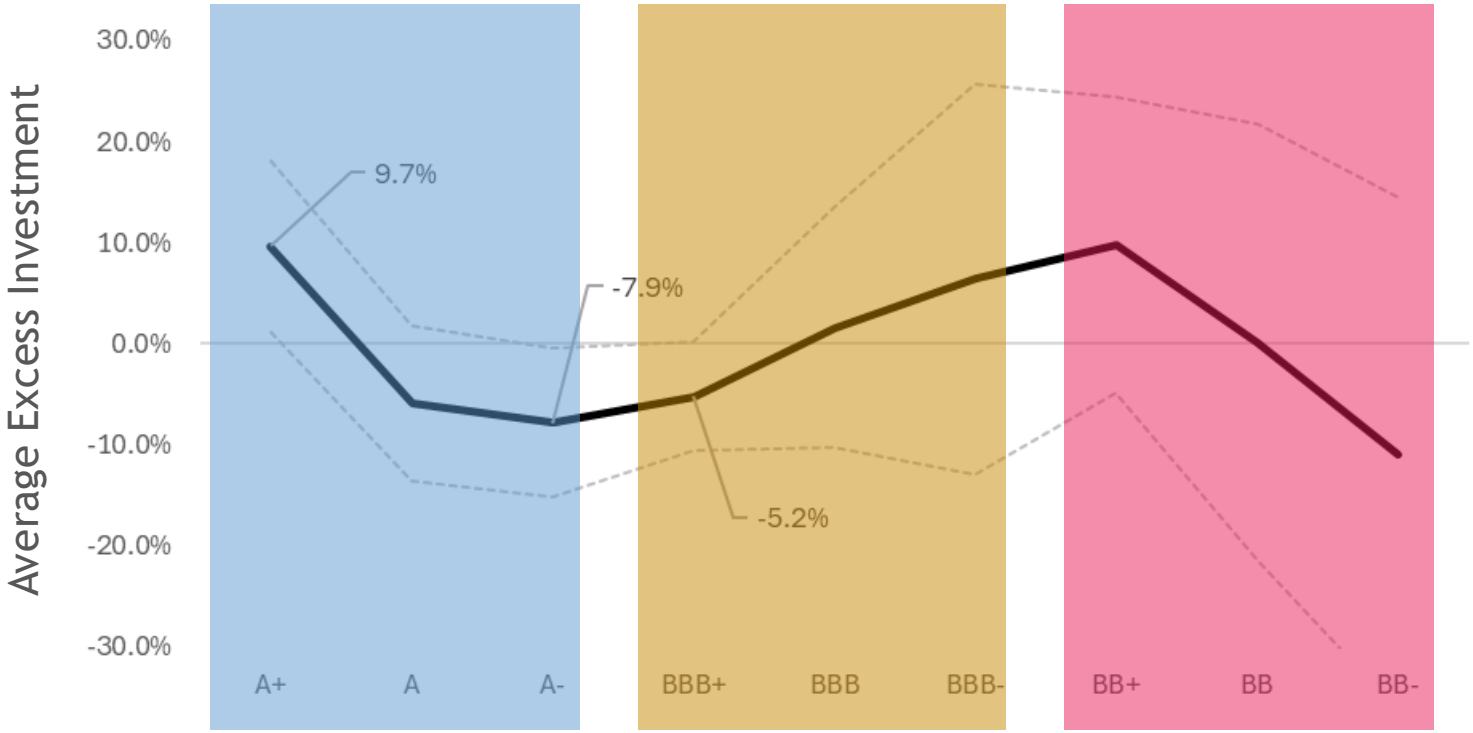
	(1)	(2)	(3)	(4)
	None	Two-sided A+ BBB-	One-sided A+ A-	One-sided BBB+ BBB-
Rating	-0.00249	0.000488	-0.00217	0.00368
	(0.0207)	(0.0185)	(0.0189)	(0.0191)
Interval		0.131	-1.563**	0.986**
		(0.320)	(0.625)	(0.456)
Rating * Interval		-0.0130	0.0950**	-0.0738**
		(0.0218)	(0.0384)	(0.0328)
Change in Cash	1.764*	1.744*	1.805*	1.765*
	(1.050)	(1.052)	(1.061)	(1.060)
Size	-0.0358	-0.0341	-0.0383	-0.0330
	(0.0312)	(0.0329)	(0.0318)	(0.0333)
Kaplan-Zingales Index	-0.00949***	-0.00969***	-0.00990***	-0.00944***
	(0.00202)	(0.00207)	(0.00214)	(0.00201)
Market-to-Book Ratio	0.0505**	0.0478**	0.0510**	0.0470*
	(0.0239)	(0.0241)	(0.0241)	(0.0242)
Return on Assets	-0.438	-0.333	-0.400	-0.450
	(0.754)	(0.774)	(0.774)	(0.764)
Leverage	-0.0659	-0.0308	-0.0664	-0.0452
	(0.239)	(0.228)	(0.233)	(0.238)
Sales Growth	-0.116	-0.119	-0.123	-0.107
	(0.188)	(0.190)	(0.191)	(0.190)
Dividend Ratio	-0.0137	-0.0114	-0.0102	-0.00749
	(0.0305)	(0.0288)	(0.0297)	(0.0228)
Industry Fixed Effects	Y	Y	Y	Y
Year Fixed Effects	Y	Y	Y	Y
Observations	870	870	870	870
Adjusted R-squared	0.139	0.183	0.187	0.140

The residual plot shows a non-monotonic relationship.

Investment Caution
Decrease investment to avoid A- to BBB+ downgrade
$\beta_3 > 0$

Risk Shifting?
May increase investment to avoid BBB- to BB+ downgrade
$\beta_3 > 0$

Unclear
No systematic pattern
β_3 statistically insignificant



Note: the dotted lines are the 95% confidence interval around the mean

$$Invest_{i,t+1} = \gamma X_{it} + \delta_i + \tau_t + \boldsymbol{\varepsilon_{it}}$$

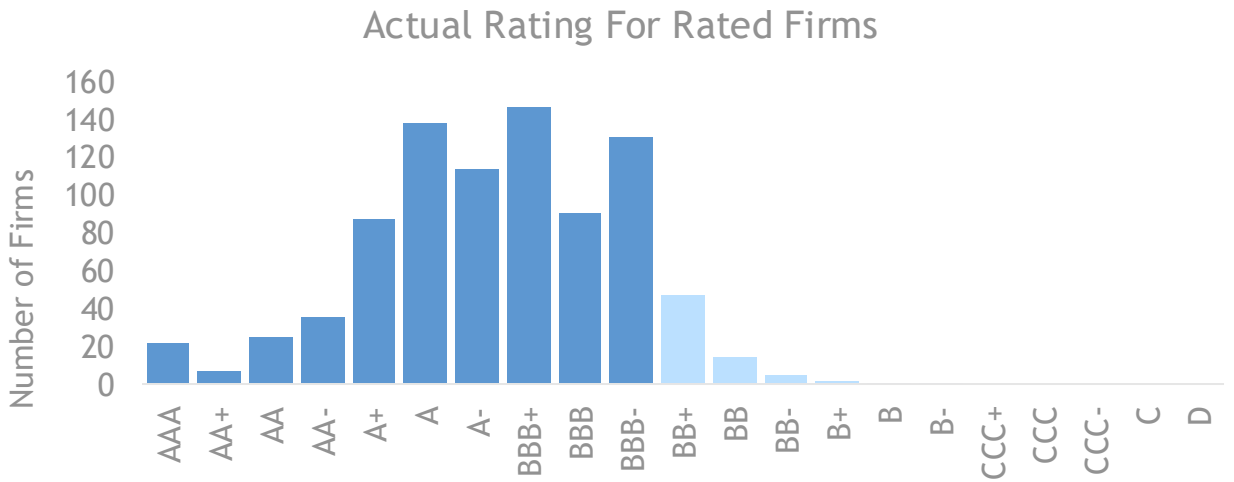
- We analyze the residuals ε_{it} from column 1 around the key rating ranges. The residuals can be thought of as the **excess investment** unexplained by the independent variables and fixed effects.
- For ratings A+ to A-, the average excess investment is declining, consistent with the positive β_3. Firms tend to cut investments as their ratings approach A-, the lower bound of rating for Thai institutional investors to hold bonds.
- For ratings BBB+ to BBB-, the average excess investment is increasing, consistent with the negative β_3. Firms tend to increase investment to avoid downgrade.
- For ratings BB+ to BB- (in the appendix), the variations in average excess investment is idiosyncratic, consistent with a statistically insignificant β_3.

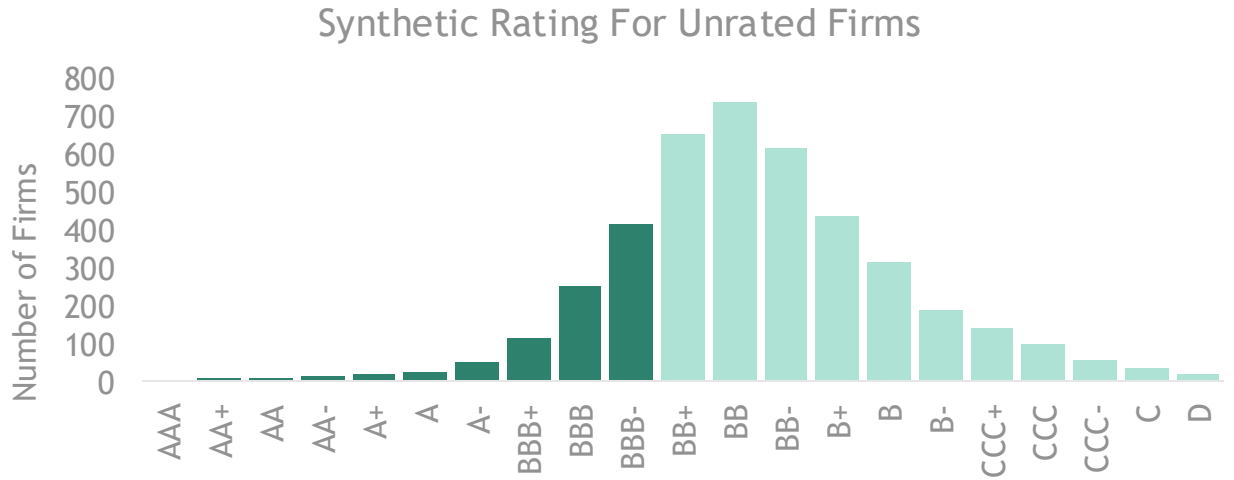
Step 2: generate synthetic credit rating for unrated firms.

2 Synthetic rating model

- Employ six new variables, defined in alignment with S&P rating criteria (Standard and Poor's, 2008), which are size, interest coverage ratio (ICR), total debt leverage, dividend payer, operating margin, and market to book value of equity.
- Cross-sectional regression for each year.
- Use the estimated coefficient to predict the synthetic credit ratings for unrated firms.

- Unrated firms tend to have lower ratings compared to rated firms.
- The distribution of synthetic ratings is more symmetrical because of the nature of the statistical model.
- Note: synthetic rating is assigned to **BOTH** issuers and non-issuers.





MAIN RESULT: Hypothesis II – unrated firms

Hypothesis II: Synthetic ratings thresholds can influence investment decision of rated firms, particularly around the A and BBB rating levels (investment grade threshold).

$$Invest_{i,t+1} = \beta_1 Rating_{it} + \beta_2 Interval_{it} + \beta_3 Rating_{it} \times Interval_{it} + \gamma X_{it} + \delta_i + \tau_t + \varepsilon_{it}$$

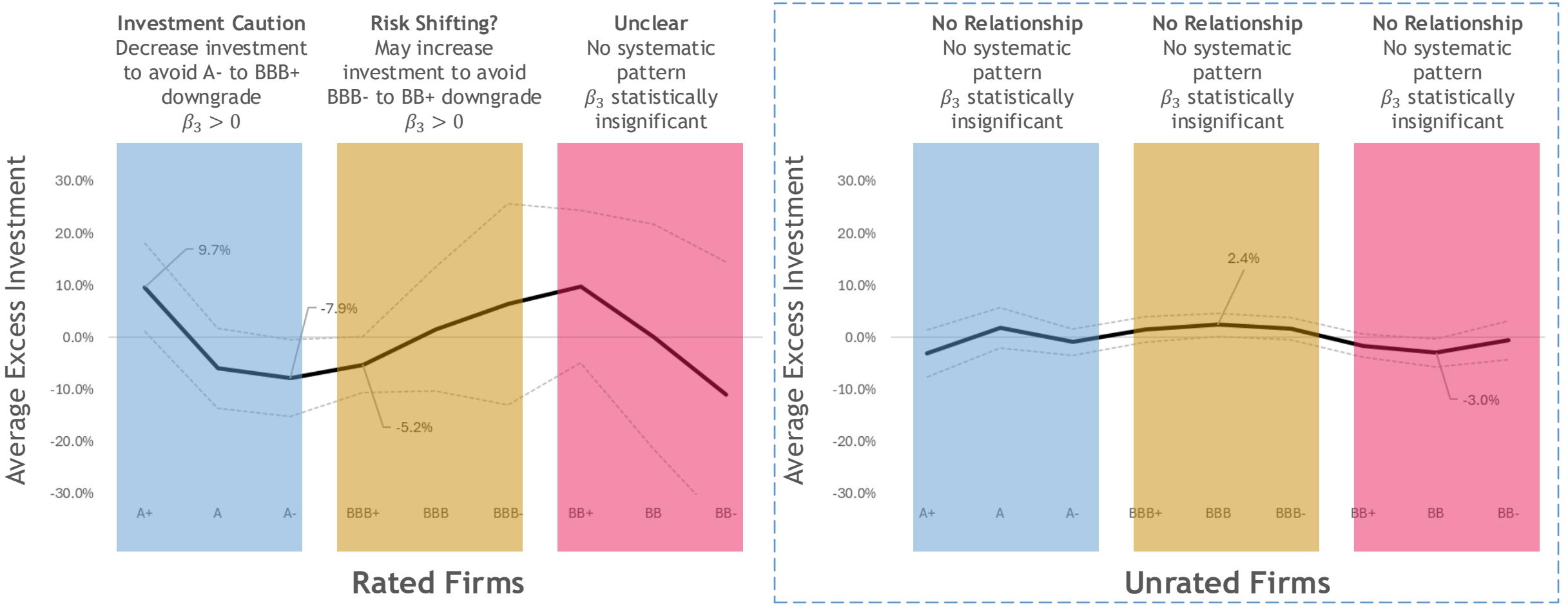
- β_3 is statistically insignificant for columns 2, 3 and 4, contrary to the prediction of Hypothesis II.
- "Unobservable downgrade" risk from A- to BBB+ **does not influence firms' investment decisions.**
- The analyses are also repeated for unrated issuers and unrated non-issuers. The results are robust: firms do not respond to unobservable downgrade risk.

	(1)	(2)	(3)	(4)
	None	Two-sided A+ BBB-	One-sided A+ A-	One-sided BBB+ BBB-
Synthetic Rating	-0.000562	-0.00266	-0.00128	-0.00128
	(0.00274)	(0.00312)	(0.00295)	(0.00283)
Interval		0.00500	0.201	0.179
		(0.0888)	(0.294)	(0.154)
Synthetic Rating * Interval		-0.00503	-0.0378	-0.0222
		(0.00922)	(0.0457)	(0.0159)
Change in Cash	0.533***	0.530***	0.533***	0.531***
	(0.104)	(0.104)	(0.104)	(0.104)
Size	-0.0128*	-0.0165**	-0.0126*	-0.0160**
	(0.00663)	(0.00671)	(0.00674)	(0.00672)
Kaplan-Zingales Index	-0.00516***	-0.00522***	-0.00516***	-0.00521***
	(0.000726)	(0.000720)	(0.000725)	(0.000723)
Market-to-Book Ratio	0.0282***	0.0295***	0.0284***	0.0288***
	(0.00449)	(0.00454)	(0.00449)	(0.00455)
Return on Assets	-0.0939	-0.108	-0.0943	-0.0999
	(0.103)	(0.00454)	(0.102)	(0.103)
Leverage	-0.0777**	-0.0757**	-0.0792**	-0.0734**
	(0.0363)	(0.0364)	(0.0368)	(0.0363)
Sales Growth	0.0512**	0.0509**	0.0511**	0.0513**
	(0.0234)	(0.0234)	(0.0235)	(0.0234)
Dividend Ratio	-0.0121*	-0.0121*	-0.0118*	-0.0124*
	(0.00688)	(0.00686)	(0.00686)	(0.00687)
Industry Fixed Effects	Y	Y	Y	Y
Year Fixed Effects	Y	Y	Y	Y
Observations	4235	4235	4235	4235
Adjusted R-squared	0.139	0.141	0.140	0.141

The residual plot for unrated firms also confirm the result.

$$Invest_{i,t+1} = \gamma X_{it} + \delta_i + \tau_t + \boldsymbol{\varepsilon_{it}}$$

- We analyze the residuals ε_{it} from column 1 around the key rating ranges. The residuals can be thought of as the **excess investment** unexplained by the independent variables and fixed effects.



Note: the dotted lines are the 95% confidence interval around the mean

Conclusion

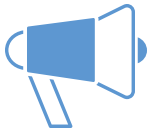
Rated Firms

- Rated firms, particularly those near A ratings tend to reduce investment because Thai institutional investors are forced to sell bonds once they are downgraded to B ratings.
- This is consistent with Korean firms in Kim et al. (2023), but meaningful threshold in Thailand is A-, not BBB-

Average leverage in our sample:
- Rated firms with corporate debt **41.4%**
- Unrated firms with corporate debt **43.4%**
- Unrated firms without corporate debt **23.5%**

Unrated Firms

- "Out of sight, out of mind." Without ratings, unrated firms cannot be downgraded, and thus are not pressured by the risk.
- Without the pressure of maintaining a publicly observable credit rating, these firms enjoy greater flexibility in their investment decisions (Diamond, 1991), but they can also pursue investments more aggressively.
- Note: non-issuers have less access to credit as evident in lower leverage, so the debt capital market is important for fundraising (Faulkender and Petersen, 2006).



Policymakers

- Credit ratings act as both a disciplining tool and a signaling mechanism, shaping firm behavior to preserve financial stability.
- Transparency in credit risk plays a crucial role in shaping financial strategies, with unrated firms potentially using their lack of transparency to bypass the restraints imposed by observable downgrade risks.
- **Credit ratings are useful and should be encouraged.** Policymakers may wish to pay more attention to unrated issuers.