DO INVESTMENT SUBSIDY AND ANALYST FOLLOWING IMPROVE UNDERINVESTMENT PROBLEMS?:

EVIDENCE FROM THAILAND

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I. INTRODUCTION

Imperfect capital market:

- **Agency Theory** –Principal vs. Agent Relationship–
  - E.g. managers vs. shareholders/ shareholders vs. debtholders/ among shareholders.
  - Existing "information asymmetry" problem and agency costs.

- **Conflicts in the contracts between** **Shareholders & bondholders**
  - From managers' views (acting on shareholders' behalf), creditors benefit more compared to the owners when the cash will flow from some potential investment to the creditors.
- **Resulting in ..**
  - ↙ Firms abandon/ reject a positive NPV project.
  - ↙ **"AN UNDERINVESTMENT PROCESS"** .
  - ↙ "Debt overhang" reduces investment levels by 1-2% for each percent increase in leverage ratios (Hennessy et al., 2007).

I. INTRODUCTION (CONT.)

Real economy:

- Market failure:
    - E.g. financial constraints, uncertainty, dynamic externality.
    - Then, ⬇ in capital investment (CAPEX), e.g. R&D expenditures (Choi & Lee, 2017).

- Economic stimulus—government subsidies—after the financial/pandemic crisis.
    - Corporate income tax deduction/exemption (via significant spending).
    - Import duty relief, etc.
    - Permission for experts/workers/foreigners.

- Pros: Revival of the economy.
- Cons: Unfair competition and possible corruption.

Advantages

GOVERNMENT SUBSIDIES

Disadvantages

Schwartz & Clements (1999)

- Overcome market imperfections.
- Capitalize on economies of scale.

Deng et al. (2021)

- Allowing lower-growth firms to:
  - Easily undertake unaffordable projects.
  - Gain competitive advantages.

Knetsch & Salzmann (2022)

- Firms in countries with a higher level of societal trust are less prone to underinvestment.

Datta-Chaudhuri (1990); Han et al. (2019)

- If government subsidies were misused (improper incentives & inaccurate) information.
  - Inefficient resource allocation.
  - Unfair market competition.
  - Corrupt practices.

ANALYST FOLLOWING

- He & Tian (2013): Analysts make a firm forego valuable long-term investments to meet short-term targets.

- Lee & Mo (2020): Earnings forecasts & stock recommendations by analysts affect investment decisions

- Bae et al. (2021): Analysts improve investment efficiency

- Jing et al. (2023): The monitoring role of analysts enhances environmental policies of pollution abatement investment.

ANALYTICAL SKILL AND PRIVATE KNOWLEDGE

"EXTERNAL MECHANISM"

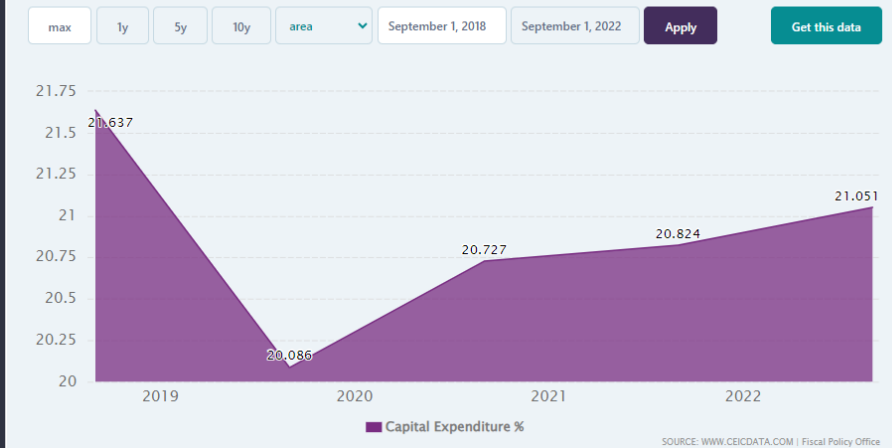**to correct Market failure (To et al. 2018)**

OBJECTIVES

To examine whether

(1) investment incentives(government subsidy) and (2) analyst following reduce underinvestment.

WHY THAILAND SHOULD BE STUDIED ?

1. The 4.0 new economic model -- escape from the middle-income trap

2. The BOI endeavors to promote direct investment and boost private investment over 50 years.

3. Recently, the SET shown its improved performance

4. Political unrest in Thailand

5. The two major financial crises

Incoherent & ineffective policies

View Thailand's Thailand Capital Expenditure % from 2018 to 2022 in the chart:

https://www.ceicdata.com/en/thailand/government-finance-fiscal-sustainability/capital-expenditure-

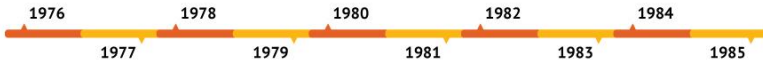Add a Footer

II. LITERATURE, HYPOTHESES & FRAMEWORK

INVESTMENT BACKGROUND AND PROMOTION

Growth rate 8%

1997 AFC

Recession

Declined private investment

Capital outflows

Falling exchange rate

1998-2000s Financial assistance/ revised policies

Upper middle-income nation

Low private investment

2015 Thailand 4.0 New Economic MODEL

The BOI

Investment promotion Act 1991, 2001, 2017

HIGH-SPEED TRAIN
DOUBLE TRACK RAILWAY INDUSTRAIL-PORT
MOTORWAY BANGKOK-PATTAYA-RAYONG

The Second Decade (1976 - 1985)
Export-Oriented Promotions Period

1976 | 1978 | 1980 | 1982 | 1984
1977 | 1979 | 1981 | 1983 | 1985

1977 : The Investment Promotion Act, B.E. 2520 was passed and came into force.

1978 : Revised the scope of the investment promotion zones. Areas with high potential for industrial development were selected as growth centers.

1983 : The Board's headquarters were relocated from Rajdamnern Avenue to Kasikornbank Building on Phaholyothin Road.

The Fifth Decade (2006 - 2015)
Value Creation Period

2006 | 2008 | 2010 | 2012 | 2014
2007 | 2009 | 2011 | 2013 | 2015

2009 : Established "the One Start One Stop Investment Center (OSOS)" at Chamchuri Square Building.

2013 : Established "Thai Overseas Investment Promotion Division".

2014 : The BOI was transferred back from the Ministry of Industry to the Prime Minister's Office (PMO).

THAILAND BOARD OF INVESTMENT — BOI in five decades

FUNDAMENTAL INCENTIVES

Technology- and activity-based incentives

E.g. businesses in advanced manufacturing, high-value services

ADDITIONAL INCENTIVES

(1) Merit-based incentives

E.g. for firms spending on value-creation activities

(2) Area-based incentives

E.g. for firms located in the specified areas

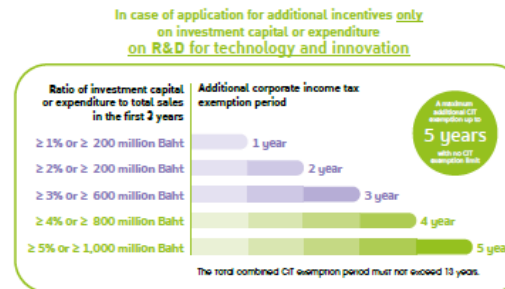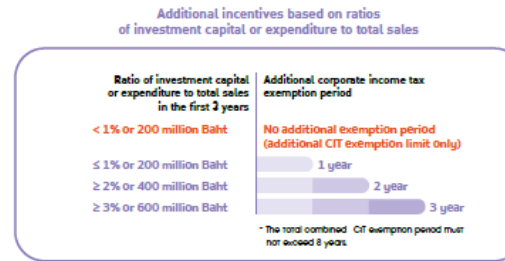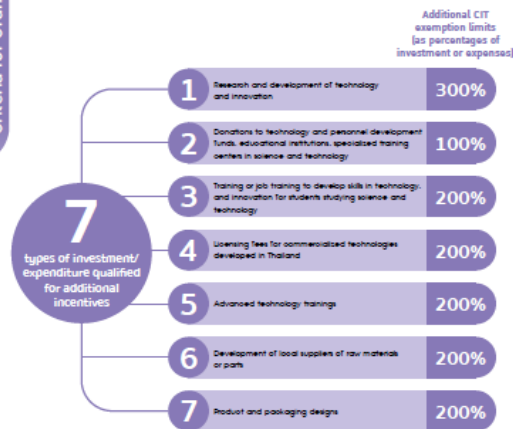## Criteria for Granting Promotion Incentives

1 Basic Incentives

Criteria for Granting Promotion Incentives

Activity Group	Incentives				
	Exemption of corporate income tax	Exemption of import duties on machinery	Exemption of import duties on raw materials used in R&D	Exemption of import duties on raw materials used in production for export	Non-tax incentives**
Technology and Innovation Development	10 years no cap	✓	✓	✓	✓
A1	8 years no cap	✓	✓	✓	✓
A2	8 years	✓	✓	✓	✓
A3	5 years	✓	✓	✓	✓
A4	3 years	✓	✓	✓	✓
B1	— *	✓	—	✓	✓
B2	—	—	—	✓	✓

* Activities in Group B1 shall receive additional three-year corporate income tax exemption on the revenue in case of:
- Investment in automation or robotic system, the cap on corporate income tax exemption on the revenue of the project shall not exceed 50% of the investment capital (excluding cost of land and working capital).
- Investments in automation systems, the corporate income tax exemption cap will be raised to 100% of the investment excluding land cost and working capital if the value of linkages to the Thai automation industry reaches at least 30% of the total value of the automation system. Application is submitted by December 2022 (Announcement of the Board of Investment No. 2/2564 Measures for Additional Rights and Benefits for Activities in Group B that Utilize Modern Machinery together with Automation or Robotics System)

** Non-tax incentives : Permit to own land, Permit to bring into the Kingdom skilled workers and experts to work in investment promoted activities, Permit for foreign nationals to enter the Kingdom for the purpose of studying investment opportunities, Permit to take out or remit money abroad in foreign currency.

The Office of the Board of Investment, "A guide to the Board of Investment 2021," The Office of the Board of Investment, Bangkok, 2021.

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2 Additional Incentives (Merit-based Incentives)

2.1 Merit-based incentives for Competitiveness Enhancement

7 types of investment/ expenditure qualified for additional incentives

Additional CIT exemption limits (as percentages of investment or expenses)

1. Research and development of technology and innovation — **300%**
2. Donations to technology and personnel development funds, educational institutions, specialised training centers in science and technology — **100%**
3. Training or job training to develop skills in technology and innovation for students studying science and technology — **200%**
4. Licensing fees for commercialised technologies developed in Thailand — **200%**
5. Advanced technology trainings — **200%**
6. Development of local suppliers of raw materials or parts — **200%**
7. Product and packaging designs — **200%**

Additional incentives based on ratios of investment capital or expenditure to total sales

Ratio of investment capital or expenditure to total sales in the first 3 years	Additional corporate income tax exemption period
< 1% or 200 million Baht	No additional exemption period (additional CIT exemption limit only)
≤ 1% or 200 million Baht	1 year
≥ 2% or 400 million Baht	2 year
≥ 3% or 600 million Baht	3 year

- The total combined CIT exemption period must not exceed 8 years.

In case of application for additional incentives only on investment capital or expenditure on R&D for technology and innovation

Ratio of investment capital or expenditure to total sales in the first 3 years	Additional corporate income tax exemption period
≥ 1% or ≥ 200 million Baht	1 year
≥ 2% or ≥ 200 million Baht	2 year
≥ 3% or ≥ 600 million Baht	3 year
≥ 4% or ≥ 800 million Baht	4 year
≥ 5% or ≥ 1,000 million Baht	5 year

A maximum additional CIT exemption up to **5 years** with no CIT exemption limit

The total combined CIT exemption period must not exceed 13 years.

2.1 Additional Incentives for Competitiveness Enhancement (continued)

Activity Group	CIT Exemption	Additional Incentives for the Merit of Competitiveness Enhancement		Total	
		Additional CIT Exemption			
Technology and Innovation Development	10 years with no cap	1-3 years	1-5 years	11-13 years	11-13 years
A1	8 years with no cap	1-3 years	1-5 years	9-11 years	9-13 years
A2	8 years	1-3 years	1-5 years	9-11 years	9-13 years
A3	5 years	1-3 years	1-5 years	6-8 years	6-10 years
A4	3 years	1-3 years	1-5 years	4-6 years	4-8 years
B1	—	1-3 years*	1-5 years*	1-3 years*	1-5 years*
B2	—	—	—	—	—

The Office of the Board of Investment, "A guide to the Board of Investment 2021," The Office of the Board of Investment, Bangkok, 2021.

INVESTMENT SUPPORT

Authors	THEORY
Modigliani & Miller (1958); Stein (2003); Yoshikawa (1980)	NEOCLASSICAL FRAMEWORK - Investment opportunities drive firms' investments. - Investing when marginal benefit of the capital investment equals its marginal cost.
Myers & Majluf (1984); Fazzari et al. (1988)	AGENCY FRAMEWORK Market frictions, e.g. informational asymmetry, cause moral hazard and adverse selection that lead to underinvestment problems.

Authors	Results of government subsidy
Deng et al. (2020, 2021); Hu et al. (2019)	Encourage long-term investments only for the 1st stage subsidy/excessive investment. Ameliorate underinvestment concerns.
Howell (2017); Li et al. (2019); Lee et al. (2014)	Greater access to finance & undertake positive NPV projects. Pursue highly risky projects. Encourages the creation of products and provides brand.
Hu et al. (2019)	Increase the moral hazard of the management & negative NPV projects.

- Thailand's investment growth have been hindered by intermittent political uncertainty & exposure to the regional and global economic crises.

- Government support has no effect on competitiveness and tax planning efficiency (Prempanichnukul, 2020).

- Inefficiently administered investment as practices (e.g. tax) in the hands of the two government entities (Dusitnanond, 2011).

H1: Investment subsidies have no influence on underinvestment problems.

ANALYST FOLLOWING

Authors	THEORY & Results of ANALYST FOLLOWING
Jiraporn et al. (2012); He & Tian (2013); Barth et al. (2002)	As information intermediaries and business performance monitors. Reduce the undervaluation & misprice of businesses with high intangibility.
Irani & Oesch (2013)	By the agency theory, it disseminates information to outsiders, allowing the discovery of management misconduct, e.g. EM, compensation plans.
Bartov et al. (2002); Guo (2019)	Pressure firms to concentrate on short-term activities to generate profits. Manage R&D, acquire innovative firms, and invest in start-ups.
To et al. (2018)	Spend more on human capital expenditures and productive capital equipment.

ANALYST COVERAGE

https://market.sec.or.th/public/orap/IC06.aspx?lang=th

https://www.settrade.com/th/research/iaa-consensus/main

- Analysts prefer to follow businesses with effective corporate governance (Yu, 2009).

- CAPX projections can assist capital providers in evaluating business investment prospects more accurately (Choi et al, 2020).

  - In the emerging market, firms with analyst followings endeavor to align principal-agent interests and keep analyst attention.
  - Improvement of investment efficiency by e.g., rising inadequate investment.

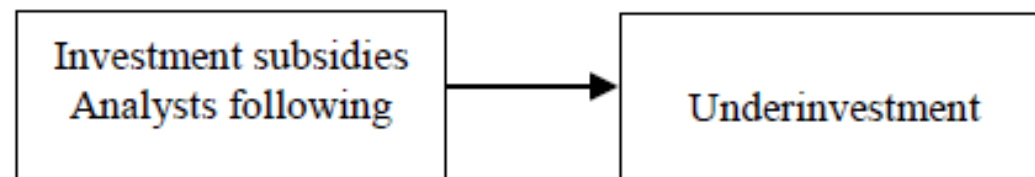**H2: Analyst following mitigates underinvestment problems.**

Fig.1. Conceptual framework

III. METHODOLOGY

SAMPLE SELECTION

1. Thai listed firms from 2000-2019.

2. (1) agro and food; (2) consumer product; (3) industrials; (4) property and construction; (5) resource; (6) service; and (7) technology.

3. Richardson (2006)'s the investment model to identify the observation's investing behavior (over- or under-investment).

4. The sample: observations with negative residual value from the investment mode (underinvestment).

Initial sample		5,610	obs. (100%)
Less:	incomplete data	1,352	obs. (24.1%)
	unusual data	<u>56</u>	obs. (1.0%)
The final sample		**4,202**	obs. (74.9%)

DATA

- The Market Analysis and Reporting Tool (SETSMART), the SEC, the SET, the SETTRADE and the companies' websites.

- Data about investment promotion certificate was **hand-collected** from the firms' annual reports.

- As signs of good news, granted firms prefer to disclose the BOI investment benefits and privileges

MODELS AND VARIABLE MEASUREMENT

Model (1):

$$UNDER_{i,t} = \beta_0 + \beta_1 BOICARD_{i,t} + \sum_1^6 Control\ variables$$
$$+ \sum_1^{19} Year\ fixed\ effect + \sum_1^6 Industry\ fixed\ effect$$

Model (2):

$$UNDER_{i,t} = \alpha_0 + \alpha_1 ANALYST_{i,t} + \sum_1^6 Control\ variables$$
$$+ \sum_1^{19} Year\ fixed\ effect + \sum_1^6 Industry\ fixed\ effect$$

Model (3):

$$UNDER_{i,t} = \delta_0 + \delta_1 BOICARD_{i,t} + \delta_2 ANALYST_{i,t} + \sum_1^6 Control\ variables$$
$$+ \sum_1^{19} Year\ fixed\ effect + \sum_1^6 Industry\ fixed\ effect$$

- **BOICARD, the BOI investment subsidies, DUMMY VAR.**
- **ANALYST, analyst following, DUMMY VAR.**
- GROWTH, growth opportunities, is calculated by the ratio of the market value to the book value of total assets.
- SLACK, financial slack, is measured by the ratio of cash to property, plant and equipment.
- AGE, firm age, is estimated by the number of years that the firm has been listed in the Thai stock market.
- SIZE, firm size, is measured by the natural logarithm of total assets at the end of fiscal year.
- LEV, firm leverage, is measured as the ratio of total liabilities to total assets.
- ROA, performance, is calculated by the ratio of net profits to total assets.
- Year fixed effect, 19 DUMMY VAR.
- Industry fixed effect, 6 DUMMY VAR.

INV.MODLE = f(lagged growth opportunities, leverage, cash flows, firm age, firm size, stock returns, and capital investment). The negative residuals were multiplied by negative one. The lower values→ lower degrees of underinvestment.

DESCRIPTIVE STATISTICS

TABLE I.   DESCRIPTIVE ANALYSIS

Variables	Mean	SD	Q1	Median	Q3
UNDER	0.060	0.080	0.022	0.042	0.067
BOICARD	0.339	0.473	0.000	0.000	1.000
ANALYST	0.324	0.467	0.000	0.000	1.000
GROWTH	2.416	6.611	0.690	1.900	3.430
SLACK	0.882	1.157	0.036	1.267	2.450
AGE	26.457	6.951	18.000	25.000	34.000
SIZE	22.116	1.466	21.028	21.930	22.969
LEV	0.172	5.852	0.000	0.101	0.461
ROA	0.074	7.817	0.019	0.056	0.097

Note: The sample consists of 4,202 firm-year observations during the studied periods.

- ~ Private firms in China

- 1/3 firms received the BOI card

- 1/3 firms followed by analyst(s)

- ~ Shanghai and Shenzhen Stock Exchanges

- ≠ US innovative firms

TABLE II.   PEARSON CORRELATION ANALYSIS

Variables	1.	2.	3.	4.
1.UNDER				
2.BOICARD	-0.025			
3.ANALYST	-0.032**	0.055***		
4.GROWTH	0.106***	0.008	-0.000	
5.SLACK	0.096***	-0.035**	-0.007	0.003
6.AGE	-0.068***	-0.007	-0.170***	-0.003
7.SIZE	-0.046***	0.101***	0.533***	-0.009
8.LEV	0.063***	-0.005	0.056***	-0.020
9.ROA	0.044***	-0.011	0.006	0.003

	5.	6.	7.	8.
6.AGE	0.019			
7.SIZE	-0.047***	-0.028*		
8.LEV	-0.009	-0.021	0.126***	
9.ROA	0.161***	-0.016	-0.035**	-0.021

Notes: The sample consists of 4,202 firm-year observations during the studied periods. *, **, and *** represent the statistical significance at the 0.1, 0.05, and 0.01 level, respectively.

TABLE III.   HYPOTHESIS TESTS

Variables	Coefficients (t-values)		
	(1)	(2)	(3)
Intercept	0.143***	0.112***	0.114
	(6.55)	(4.65)	(4.68)
BOICARD	0.021		0.026
	(0.76)		(0.96)
ANALYST		-0.089***	-0.091***
		(-2.75)	(-2.81)
GROWTH	0.001***	0.001***	0.001***
	(7.05)	(7.08)	(7.07)
SLACK	0.006***	0.006***	0.006***
	(5.80)	(5.85)	(5.86)
AGE	-0.003***	-0.004***	-0.004***
	(-3.18)	(-3.55)	(-3.52)
SIZE	-0.030***	-0.017	-0.018
	(-3.60)	(-1.60)	(-1.69)
LEV	0.000***	0.000***	0.000***
	(3.86)	(3.77)	(3.76)
ROA	0.000	0.000	0.000
	(1.58)	(1.63)	(1.63)
Year fixed effect	Yes	Yes	Yes
Industry fixed effect	Yes	Yes	Yes
F-value	7.46***	7.69***	7.49***
Adjusted R^2	0.047	0.048	0.048
Observations	4,202	4,202	4,202

Note: *** represents the statistical significance at the 0.01 level.

SENSITIVITY TESTS

❑ Using a leading dependent variable, the underinvestment levels in the next year.

❑ A UNDER variable in year t+1 was regressed on a BOICARD variable and the control variables in year t.

❑ Results:
   ❑ The coefficient for BOICARD is still statistically insignificant.

   ❑ No connection between the present investment subsidies and the subsequent reduction in underinvestment problems.

V. CONCLUSION AND DISCUSSION

- ❑ **The BOI investment support fails to enhance investment levels of the underinvested firms.**
  - ❑ Náglová (2018): investment subsidies $\varnothing$ competitiveness due to no improvement in performance for subsidy recipients.
  - ❑ Ziga-Vicente et al. (2012): no relationship between R&D subsidies and private R&D investment due to the heterogeneity of firms (e.g. innovation dynamics, financial restrictions, amount of public subsidies).
- ❑ **The firms have a different incentive to pursue government subsidies.**
- ❑ **Market forces thought that analyst following could mitigate underinvestment.**
  - ❑ He et al. (2019): analysts function limits management's negative news hoarding behaviors and minimizes future stock price crash risk.
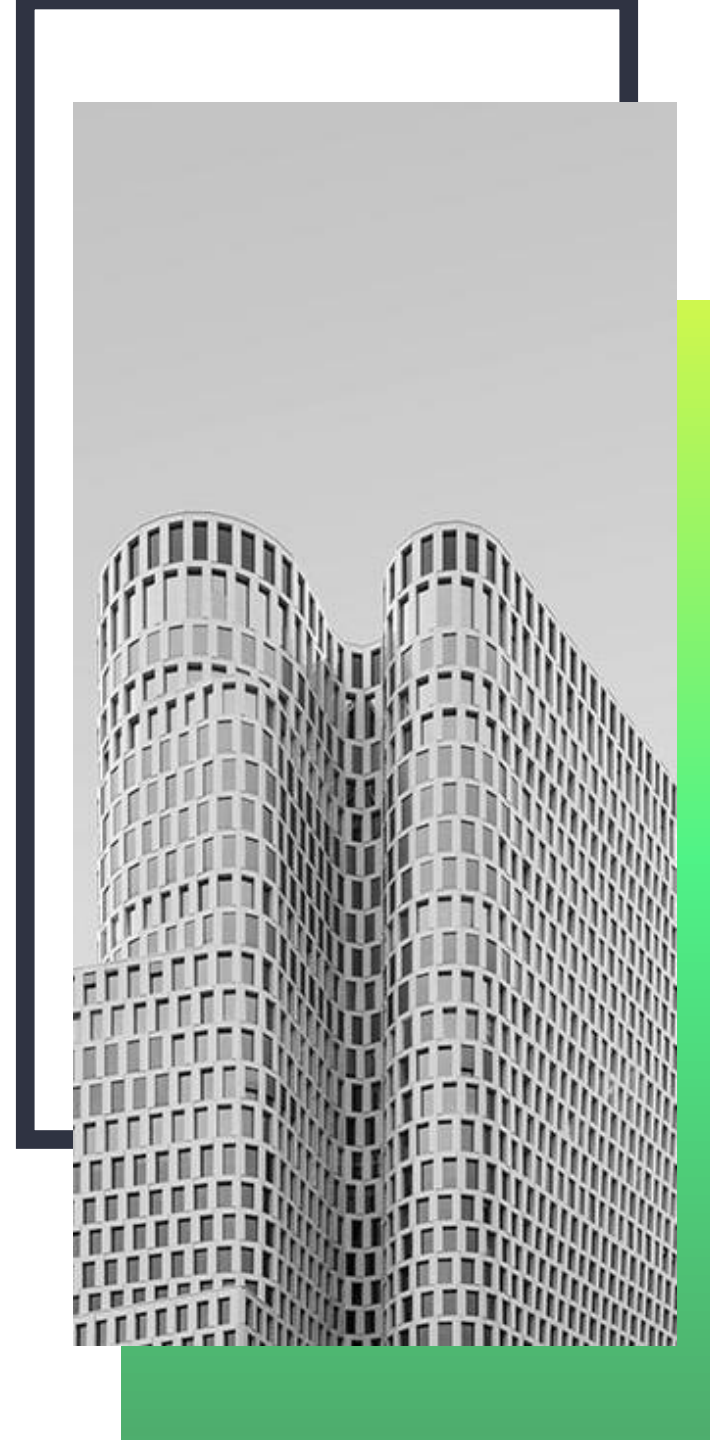
ACADEMIC CONTRIBUTION

❖ **The majority of those studies utilize Chinese firm.**

   ✓ Han et al. (2019): no improvement of underinvestment for the China subsidized firms.

❖ **Relied on the non-BRICS emerging market like Thailand.**

❖ **Supporting evidence on improvement in underinvestment for the firms followed by analysts from various economies**

   ✓ To et al. (2017): higher productivity & more efficient employment

   ✓ Guo et al. (2019): engage in the acquisition of innovative firms & business venture

PRACTICAL CONTRIBUTION

❑ Increase in a variety of investment incentives to quickly enhance investment in private sectors.
  ❑ Provided to recipients who lack financial resources, otherwise capital spending will be made redundant, resulting overinvestment problems.
❑ The overlapping powers of the Revenue Department and the BOI should be addressed as it causes the firms trouble in profit and loss calculations.
  ❑ the BOI should be free of political pressure to avoid the selection of recipients with little impact on public prosperity.
❑ Levered firms may not prefer some benefits from tax shelters.
  ❑ E.g. short-term loan and loan guarantee programs
❑ Market participants/regulators.
  ❑ Evaluate the effectiveness of investment.
  ❑ Introduce external corporate governance mechanisms.

Limitations

Future research

Thank you