Do Investment Subsidy and Analyst Following Improve Underinvestment Problems?: Evidence from Thailand

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Abstract—This study aims to investigate the association between investment subsidies, analysts' following, and investment levels for underinvested firms in the Thai capital market during 2000–2019. Longitudinal data about the investment grants was hand-collected from the annual reports of each firm. Unbalanced panel data and the fixed effect regression were analyzed. The findings show that the investment benefits and privileges from the government agency fail to increase capital spending for the underinvestment firms. However, market forces thought analysts to follow were found to enhance insufficient investment levels.

Keywords—investment subsidy, analyst following, underinvestment

I. INTRODUCTION

In imperfect capital markets, information divergence between key stakeholders and agency costs results in an underinvestment process in which not all projects with a positive net present value (NPV) are implemented. According to Morgado and Pindado [1], this process is driven by asymmetric information, which contributes to conflicts in the contracts: (1) between shareholders and bondholders, and (2) between current and prospective shareholders. The former includes the occurrence of moral hazard action, in which shareholders have an incentive to abandon a positive NPV project if its value is less than the amount of issued debt. The latter includes the adverse selection problem, in which firms forego a project with a positive net present value. Prospective shareholders may overpay for firm shares due to informational asymmetry. Existing shareholders then suffer greater losses if investment projects are launched rather than abandoned.

In the real economy, market failures, such as financial constraints, uncertainty, and dynamic externality, reduce the amount of capital invested in R&D [2]. The 2008 global financial meltdown forced governments to implement a variety of monetary policies, including investment stimulus programs, in order to revive the economy. According to Deng, Ding, Liao, and Zhu [3], economic stimulus has a significant influence on investment for lower-growth firms, allowing them to easily undertake unaffordable projects and gain competitive advantages. Governments frequently use various

forms of investment subsidies (e.g., cash grants, tax deductions/exemptions, and import duty relief) as a necessary mechanism to overcome market imperfections, capitalize on economies of scale, and promote social policies [4]. Inefficient resource allocation will encourage unfair market competition and corrupt practices if government subsidies are misused with improper incentives and inaccurate information [5], [6].

On the one hand, as they produce and disseminate firmspecific information across financial markets, analysts with analytical skill and private knowledge account for an external mechanism to address market failures [7]. Analysts' earnings forecasts and stock recommendations have an impact on firms' financial and investment decisions [8]. The firms followed by the most analysts tend to reduce R&D expenditures while acquiring more innovative firms and investing in venture capital [9]. According to prior research, analysts' role as information providers helps firms improve investment efficiency [e.g., 10]. However, analysts may force managers to forego valuable long-term investments in order to meet short-term targets [11].

This study aims to determine whether investment incentives and analyst monitoring reduce underinvestment in the Thai emerging market. Thailand's policies are intended to assist the nation escape the middle-income trap and become an economically prosperous high-income nation. Five decades ago, the Office of the Board of Investment (BOI), a major part of the institutional ecosystem, was charged with promoting direct investment to boost private investment levels in the country. However, political unrest in Thailand is a persistent problem, and the two major financial crises had a significant negative impact on the country's economy. Market failure is encouraged by this erratic political economy, which could produce incoherent and ineffective policies. It is unclear whether government intervention in the form of investment subsidies can address imperfect markets, particularly in medium-sized emerging economies. Empirical evidence from the BRICS countries such as China shows that double-leveled investment subsidies reduce firms' underinvestment [3]. On the one hand, the corporate governance mechanism through analyst coverage was found to reduce a variety of earnings management practices for ASEAN countries [12], but whether

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it helps firms improve their insufficient investment level is debatable. This study will fill those gaps in the literature by investigating the effects of external mechanisms, i.e., investment subsidies and analyst following, on investment inefficiency.

The organization of this research is as follows. The second section describes the literature review, hypotheses, and conceptual framework. The third section details the research methodology. The fourth section discusses the results, while the conclusion and discussion are provided in the fifth section.

II. LITERATURE REVIEW, HYPOTHESES, AND CONCEPTUAL FRAMEWORK

A. Investment Background and Promotion

Thailand had seen rapid growth prior to the 1997 Asian Financial Crisis, with an annual rate of about 8% [13]. Following the crisis, the nation proceeded through much longer and more drastic recessions, which were accompanied by a decline in domestic spending, particularly private investment, as well as ongoing capital outflows and falling exchange rates. Economic recovery did not happen by itself, but as a result of large-scale financial assistance and the implementation of a consistent policy [14]. Due to the migration of agricultural workers into manufacturing, per capita incomes have continued to rise despite slower growth and modest investment expansion during the recovery periods. Early in the 2010s, Thailand became a member of the group of upper middle-income nations [13]. Despite the fact that private investment has started to grow positively again since 2000, the ratio of private investment to GDP was still lower than it was during the boom years of 1986-1996 [15].

According to the report of Siam Commercial Bank as the first Thai bank, Thai businesses must spend more on capital assets such as factories, information technology, machinery, and equipment in order to increase productivity, as low private investment is the most important barrier to the country's economic recovery [16]. The National Economic and Social Development Plans and numerous phased programs in Thailand have established the direction of investment requirements. For instance, the 10th National Economic and Social Development Plan (2007-2011) emphasizes a better economic and financial infrastructure to increase businesses' capacity for technological and innovative advancement. The BOI, as a government agency under the Office of the Prime Minister, was formed in order to promote direct investment and prescribe the investment promotion policies under Investment Promotion Act No. 2 (1991), No. 3 (2001), and No. 4 (2017).

For companies or applicants who meet the requirements, the BOI will issue a promotion certificate. Investment incentives are categorized as tax and non-tax benefits, and these benefits are available in two forms: (1) fundamental incentives and (2) additional incentives. The first form includes both technology- and activity-based incentives, such as investment privileges for those businesses engaged in advanced manufacturing, high-value services, etc. The latter takes into account (1) merit-based incentives involving extra benefits that will be granted for firms spending on valuecreation activities and (2) area-based incentives involving added privileges for firms located in the specified areas. According to the Guide to the BOI [17], examples of tax incentives include the exclusion or reduction of import duties on machinery; the exclusion or a 50 percent reduction of corporate income tax; the double deduction of costs for transportation, electricity, and water supply; and an additional 25 percent deduction of costs for installation or construction of facilities. The non-tax incentives include permission to employ foreign experts and skilled workers; permission for foreigners to own land; and permission to withdraw or remit funds in foreign currencies.

B. Investment Support

Firms' investments would be driven entirely by investment opportunities in a market frictionless utopia [18], [19]. The marginal Q ratio is the only factor that influences capital investment policy under the neoclassical framework, so firms make investments at the equilibrium point where the marginal benefit of capital investment equals the marginal cost based on the adjustment costs of placing in the new capital [20], [21]. In line with agency theory, a firm would underinvest in the real world due to market frictions such as informational asymmetry that causes behaviors of moral hazard and adverse selection [22], [23]. In accordance with the asymmetric information theory that describes a price skew due to unequal information between sellers and buyers, government intervention can hinder prices from precisely reflecting existing facts, which can cause market failure.

To offset market imperfections and increase economic growth, government support is used as a policy instrument in many emerging markets by directing financial and nonfinancial resources to targeted industries. Most literature on the relationship between government intervention and investment focuses on the China setting, as government subsidies are among the top four sources of funding for all businesses [24]. Recent research by Deng, Ding, Liao, and Zhu [3] demonstrates that in China, early-stage subsidies encourage long-term investments, with 0.588% of each 1 RMB in subsidies going to private investment. In later stages of government subsidy roadmaps, 0.122 RMB out of 1 RMB is used for this. The conclusion reached by Hu, Jiang and Holmes [25] is that subsidies ameliorate underinvestment concerns but exacerbate excessive investment levels, indicating that financial resources and assistance were spent on unproductive projects. According to Deng, Jiang, Li, and Liao [26], politically connected firms switch their investment climate from underinvestment to overinvestment, as a result of the government's execution of the economic stimulus program. The authors of Han, Zhang, Bi, and Huang [5] demonstrate that there is no evidence of an improvement in the underinvestment problems of subsidized firms, but there is evidence of the relationship between subsidized firms and overinvestment.

Investment subsidies could increase levels of inadequate investment in three ways. First, capital and resource subsidies allow underinvested businesses greater access to finance and enable them to undertake positive NPV projects that they could not ordinarily pursue [27]. This leads to the availability of investment opportunities and speedy investment execution. Second, as a result of the government subsidy effect, subsidized firms pursue highly risky projects [28]. Because financial aid often encourages the creation of products and provides brand recognition in order to increase sales volume [29]. Thirdly, in order to obtain government subsidies or tax refunds, firms must expand their investments [26].

On the other hand, if investment privileges are granted to subsidy recipients who engage in negative NPV projects due to the moral hazard of the management, subsidies will be misused [25]. Thus, government assistance cannot address underinvestment for subsidized firms. Here, Thailand's economic and investment growth have been hindered by its intermittent political upheaval as well as its exposure to the regional and global economic crises over the past three decades. Despite the potential benefits of the investment stimulus package, it appears that government support has no effect on competitiveness and tax planning efficiency [30]. Moreover, placing the administration of investment incentives (i.e., tax benefits) in the hands of two distinct entities, the Revenue Department and the BOI, increases confusion and generates difficulties and ambiguity in the implementation of investment incentives for applicants. Dusitnanond [31] states that, despite the fact that a number of BOI-promoted enterprises were in comparable conditions, the two government agencies had different views and practices regarding tax incentives, resulting in inefficiently administered investment. Thus, this study predicts no association between investment subsidies and underinvestment as follows.

H1: Investment subsidies have no influence on underinvestment problems.

C. Analyst Following

Financial analysts are a vital group of economic agents in the capital market, playing crucial roles as information intermediaries and business performance monitors [32]. Analysts have a direct effect on the firm's valuation and the behavior of investors. Information gathered and reviewed by analysts reduces the likelihood that market participants would undervalue businesses [11] and misprice firms with substantial intangible asset investment [33]. Analysts give investors reports on a company's activities that alleviate information divergence between managers and investors and reduce adverse selection problems under agency theory. If the capital expenditure (CAPEX) reports provide information about businesses' future growth opportunities beyond other information sources, the analysts frequently make CAPEX forecasts that have a substantial impact on investment levels [34].

Among the determinants that might distort businesses' incentives for capital allocation, prior research has shown that

analyst following has a substantial impact on firms' financial policy decisions. For instance, analyst following is connected with greater access to external financing, cheap capital costs, and a higher degree of liquidity on hand [35], [36], [37]. As external monitors of managers, analysts are able to disseminate information to outsiders, allowing the discovery of management misconduct such as earnings manipulation and compensation plans [7], [38].

In addition to the information effect, analyst following generates the pressure effect, in which firms are penalized for missing earnings expectations. Then, managers seek to concentrate on short-term activities to generate profits [39]. Innovation firms with analyst coverage are frequently required to reduce R&D spending, resulting in fewer patents issued [11]. In addition, an increase in financial analyst coverage encourages firms to manage R&D expenditures, acquire innovative companies, and invest in start-ups [40]. When businesses are supervised by a high number of analysts, the firms are more likely to have excessive levels of investment, lower projected returns, and more external financing than firms with less analyst coverage [35]. Analyst following also increases corporate productivity by increasing firms' access to external finance; thus, firms are able to spend more on human capital expenditures and productive capital equipment [7].

In developing markets, previous studies have demonstrated that analyst following is an alternative corporate governance mechanism to restrain earnings management and that analysts prefer to follow businesses with effective corporate governance [e.g., 41]. In those firms with aligned interests between managers and investors and less risk from an investment, analysts would follow and recommend these firms to investors [42]. This paper postulates that in the emerging market, firms with analyst followings endeavor to align principal-agent interests and attract analyst attention. Hence, firms need to improve underinvestment problems. Choi, Hann, Subasi, and Zheng [34] contend that information given in analyst projections, such as CAPEX, can assist capital providers in evaluating business investment prospects more accurately. Analyst projections are likely to serve as a key signal regarding the quality of a company's investment by rising levels of inadequate investment. Thus, this study predicts a negative relationship between analyst following and underinvestment as follows.

H2: Analyst following mitigates underinvestment problems.

D. Conceptual Framework

This research illustrates the research framework in Figure 1 as follows.



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III. METHEDOLOGY

A. Sample Selection and Data

The scope of the sample comprises all underinvestment firms in the Stock Exchange of Thailand (SET) for the period spanning 2000 to 2019. The sample covers the seven industry groups: (1) agro and food; (2) consumer product; (3) industrials; (4) property and construction; (5) resource; (6) service; and (7) technology, which exclude companies in the financial industry due to being subject to different practices of financial information required by either the Bank of Thailand or the Department of Insurance. At the early stage of sample identification, this study uses the investment model to identify each firm-year observation's investing behavior (overinvestment or underinvestment). Then, firm-year observations that their investment degrees are lower than those of industry peers (underinvestment) were utilized as an initial sample.

All SET-listed firms that constitute 9,043 firm-year observations were subtracted by 954 and 2,479 firm-year observations of the financial firms and the overinvestment firms, respectively, thus remaining of 5,610 firm-year observations (100%) as the initial sample of the underinvestment firms. The final sample consists of 4,202 firm-year observations (74.9%) after excluding 1,352 firm-year observations (24.1%) with incomplete data and 56 firm-year observations (1.0%) with unusual data.

The financial data was collected from the databases of the Market Analysis and Reporting Tool (SETSMART), the Securities and Exchange Commission (SEC), the SET, and the companies' websites. Data about the investment promotion certificate was hand-collected from the firms' annual reports. As being signs of good news, granted firms prefer to disclose investment benefits and privileges obtained from the BOI.

B. Models and Variable Measurement

Instead of the random effect models, the fixed effect models were employed to analyze the unbalanced panel data. As it is implausible that the variation across firm-year observations is random and uncorrelated with the models' independent variables. The ordinary least squares regression models also include the control variables, the fixed year effect, and the industry fixed effect as follows.

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):

$$UNDER_{i,t} = \alpha_0 + \alpha_1 \text{ANALYST}_{i,t} + \sum_{1}^{6} Control \ variables + \sum_{1}^{19} Year \ fixed \ effect + \sum_{1}^{6} Industry \ fixed \ effect$$

Model (3):

UN

$$\begin{aligned} \text{IDER}_{i,t} &= \delta_0 + \delta_1 \text{BOICARD}_{i,t} + \delta_2 \text{ANALYST}_{i,t} + \sum_{1}^{\circ} \text{Control variables} \\ &+ \sum_{1}^{19} \text{Year fixed effect} + \sum_{1}^{\circ} \text{Industry fixed effect} \end{aligned}$$

For all models, i and t represent each firm and year, respectively. The dependent variable, UNDER_{i,t}, is a measure of underinvestment levels for firm i in year t that was calculated by using the investment efficiency model in the study of Richardson [43]. In the investment model that is the function of lagged growth opportunities, leverage, cash flows, firm age, firm size, stock returns, and capital investment, regression residuals that were estimated from the model within the industry represent the amount of investment deviating from a normal investment level. Negative residual values represent underinvestment behavior. This study drops the overinvestment sample with positive residual values. To ease interpretation, the negative residuals were multiplied by negative one, and the lower values indicate the lower degrees of underinvestment. The two independent variables include BOICARD, the investment subsidies, and the indicator variable is coded one if firm i in year t received the BOI investment privileges and zero otherwise. Next, ANALYST, analyst following, is the indicator variable is coded one if firm i in year t is followed by analyst(s) and zero otherwise.

The hypothesis test models include six control variables following previous studies [e.g., 25, 8]. 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, comprised of 19 dummy variables, is used to control for differences in investment behaviors over the 20 sample years. Industry fixed effect is measured by six dummy variables is used to control for differences in business climate and investment risks across seven industry groups.

IV. RESULTS

A. Descriptive Statistics

Table I tabulates descriptive analysis for the underinvestment firms. The average value of UNDER is 0.060, which is comparable to those underinvestment levels in emerging economies described by Chen, Hope, Li, and Wang [44]. The BOICARD mean of 0.339 indicates that one-third of the underinvested firms acquired investment benefits and privileges from the Thailand board of investment. The 0.324 mean of ANALYST indicates that financial analysts followed approximately one-third of the underinvested firms. Of the control variables, the 2.416 of GROWTH mean is fair similar to those value of firms listed on the Shanghai and Shenzhen stock exchanges analyzed by Bhat, Chen, Chen,

and Jebran [45]. The average SLACK of 0.882 manifests that the underinvested firms have extra liquidity on average. The 26.457 of AGE mean suggests that the underinvestment sample has been listed in the Thai market for around 26 years. The average of SIZE is 22.116, indicating that the total assets of the sample are around 4bn baht. The mean and median LEV values of 0.172 and 0.101, respectively, are much lower than those of Chinese firms with government assistance during the financial crisis [26]. The average ROA of 0.074 and the median ROA of 0.101 indicate that Thai firms with underinvestment are less profitable than US innovative firms [9].

In Table II showing Pearson's analysis of correlation, the negative but insignificant correlation between UNDER and BOICARD implies that there is no linkage between government subsidies and underinvestment. The significant and negative correlation between UNDER and ANALYST (-0.032) reveals that analyst following is adversely associated with underinvestment problems. The majority of the remaining correlations are statistically significant. For instance, the negative correlations between UNDER, AGE, and SIZE indicate that firms with a long record and substantial size could minimize investment insufficiency. Positive correlations between UNDER. GROWTH. SLACK. LEV. and ROA suggest that underinvestment firms have a propensity for high growth, liquidity, debt, and profitability. The variance inflation factors (VIFs) of the predictors range from 1.01 to 1.71 (untabulated results), confirming the absence of multicollinearity issues.

Variables	Mean	SD	Q1	Median	Q3
UNDER		0.080		0.042	0.067
BOICARD	0.060	0.473	0.022	0.000	1.000
ANALYST	0 339	0.467	0.000	0.000	1.000
GROWTH	0.557	6.611	0.000	1.900	3.430
SLACK	0.324	1.157	0.000	1.267	2.450
AGE		6.951		25.000	34.000
SIZE	2.416	1.466	0.690	21.930	22.969
LEV	0 002	5.852	0.026	0.101	0.461
ROA	0.862	7.817	18.00	0.056	0.097
	26.45 7		18.00		
	22.11		21.02		
	6		8		
	0.172		0.000		
	0.074		0.019		

TABLE I. DESCRIPTIVE ANALYSIS

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

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***	*	-0.000		
5.SLACK	0.096***	0.008	-0.007	0.003	
6.AGE	-0.068***	-0.035**	-	-0.003	
7.SIZE	-0.046***	-0.007	0.170***	-0.009	
8.LEV	0.063***	0.101**		-0.020	
9.ROA	0.044***	*	0.533***	0.003	
		-0.005	0.056***		
		-0.011	0.050***		
-			0.006		
	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.

B. Hypothesis Test

In Table III, the regression coefficients for BOICARD (0.021 and 0.026) are insignificant for the models (1) and (3), thus supporting prediction of H1 that the impact of investment promotions on underinvestment problems does not exist. The coefficients for ANALYST (-0.089 and -0.091) are significant and negatively associated with UNDER (p<0.01) in the models (2) and (3). This supports the prediction of H2 that analyst following alleviates underinvestment concerns. For the control variables, the coefficients for GROWTH, SLACK, and LEV are positive and statistically significant for all models (p<0.01). Thus, firms with high growth, more cash liquidity, and large debt tend to employ investment policies that lower capital spending. The coefficients for AGE are negative and statistically significant for all models (p<0.01). Therefore, firms with long operations have less experience with underinvestment. The coefficient for SIZE is negative and statistically significant for the first model (p<0.01). Therefore, large-sized firms are less likely to experience insufficient investment. The insignificant coefficients for ROA imply that financial performance has no influence on investment inefficiency.

C. Additional Analysis

Some eligible advantages and privileges that come with a BOI promotion certificate for a firm might lead to sluggish investment consequences. Instead of utilizing the current underinvestment levels, the study conducts a robustness test 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 in order to reevaluate the first hypothesis. The regression coefficient for BOICARD is still statistically insignificant (untabulated results), indicating that there is no connection between the present investment subsidies and the subsequent reduction in underinvestment problems.

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	

V. CONCLUSION AND DISCUSSION

This study aims to explore whether underinvested firms that are granted investment support from the BOI and followed by financial analysts could address the inadequacy of investment. The sample constitutes the 2000-2019 listed firms that their investment behavior is underperformed. Data about the received investment benefits and privileges was hand-collected from each firm's annual reports. Financial figures were retrieved from a variety of the SET relevant databases, and the websites of the companies. By using unbalanced panel data and the fixed effect regression models, this study summarizes that, firstly, the BOI investment support fails to enhance investment levels of the underinvested firms. The findings conform with Náglová' s [46] Czech evidence that investment subsidies cannot be considered a fundamental factor of competitiveness owing to the absence of an improvement in business performance for subsidy recipients. According to the survey results, Ziga-Vicente, Alonso-Borrego, Forcadell, and Galán [47] discussed that there is no relationship between R&D subsidies and private R&D investment due to the heterogeneity of companies, such as innovation dynamics, financial restrictions, and the amount of public subsidies. Here, the absence of a relationship between investment support and underinvestment implies that the firms have a different incentive to pursue government subsidies. Secondly, this current study concludes that market forces thought that analyst following could mitigate underinvestment in the Thai emerging market. The findings validate He, Bai, and Ren's [48] conclusion that analysts conduct an effective monitoring function that limits management's negative news hoarding behaviors and minimizes future stock price crash risk.

This paper contributes to prior studies examining the investment outcome of subsidies to firms. The majority of those studies utilize Chinese firms as the sample, as the country is characterized by strong government intervention [e.g., 25]. Relied on the non-BRICS emerging market like Thailand, the findings complement the evidence of Han, Zhang, Bi and Huang [5] showing that improvement of underinvestment is disappear for the China subsidized firms. The evidence on improvement in underinvestment for the firms followed by analysts extends Doukas, Kim, and Pantzalis [35]'s findings that analyst coverage is related to excessive investment behaviors. This current study also complements the works of Lee and Mo [8] and To, Navone, and Wu [7] that conclude higher productivity and more efficient employment for the analyst-followed firms. Moreover, the findings add the evidence to the research in Guo, Pérez-Castrillo, and Toldrà-Simats [40] who found that firms with analyst coverage engage in the acquisition of innovative firms and the business venture.

The results of this study could have important implications for the policy makers. Firstly, the government should adopt a variety of investment incentives to quickly enhance investment in private sectors. In China, for example, the strategy of staged subsidy allocation (the early and the later stages) helps firms address underinvestment in R&D [3]. Second, the overlapping powers of the Revenue Department and the BOI should be addressed as it causes the promoted firms trouble in profit and loss calculations due to divergent opinions and practices where tax incentives are concerned [31]. Third, despite the fact that the BOI is a government agency under the Office of the Prime Minister, its endeavors should be free of political pressure to avoid the selection of projects/recipients with a high likelihood of achievement but little impact on public prosperity. Investment support should be provided to recipients who lack financial resources, otherwise capital spending will be made redundant, resulting overinvestment problems.

Fourth, the government has made an attempt to improve benefits and privileges to boost R&D investment, for instance, by offering additional schemes of merit- and area-based incentives for the granted firms. For levered firms with limited financial resources, however, some benefits from tax shelters do not serve as a tool to boost innovative spending. A policy initiative to supply financial sources such as short-term loan and loan guarantee programs might be necessitated. Fifth, the banking sector should exert more control over loan approval for BOI firms and analyst-followed firms as these firms' investment decisions may be influenced by market forces but not by government subsidies. Last but not least, the findings also help market participants evaluate the effectiveness of

investment and encourage market regulations to introduce external corporate governance mechanisms. For underinvested firms, financial analysts play an important role in balancing capital allocation by either broadcasting information about value creation activities to financial providers or persuading the management to avoid negative NPV projects. Future research on analyst following, particularly in emerging markets, should concentrate on which channels have direct influence on addressing insufficient investment and how overinvestment behaviors affect analyst coverage or are driven by analyst pressure.

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