

Ardianto, Ardianto; Anridho, Nadia; Ngelo, Agnes Aurora; Ekasari, Wulandari Fitri; Haider, Imran

Article

Internal audit function and investment efficiency: Evidence from public companies in Indonesia

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*Corresponding author: Nadia Anridho, Department of Accounting, Faculty of Economic and Business, Universitas Airlangga, Jl. Airlangga No.4 - 6, Airlangga, Kec. Gubeng, Surabaya, Jawa Timur 60115, Indonesia
E-mail: nadia.anridho@feb.unair.ac.id

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ACCOUNTING, CORPORATE GOVERNANCE & BUSINESS ETHICS | RESEARCH ARTICLE

Internal audit function and investment efficiency: Evidence from public companies in Indonesia

Ardianto Ardianto¹, Nadia Anridho^{1*}, Agnes Aurora Ngelo¹, Wulandari Fitri Ekasari¹ and Imran Haider²

Abstract: This study examines the relationship between internal audit functions and investment efficiency. We want to test the involvement of internal audit functions in corporate strategic management decisions like investment efficiency. This study employs all non-financial public listed on the Indonesia Stock Exchange from 2016 to 2019, and we obtained 1,360 firm-year observations. We discover that the internal audit function negatively affects corporate investment efficiency. This implies that the internal audit function has a minor role in giving value-added service regarding investment decisions in the context of listed public companies in Indonesia. Our result is robust to the endogeneity test of Heckman Two-Stages regression. Therefore, in the context of corporate strategic decisions like investment efficiency, we document that the internal audit function does not efficiently enhance the efficiency of corporate investment decisions in the setting of Indonesian public companies. We expect this result to improve the insight regarding the internal audit function in Indonesia and encourage the practice of internal audit function in Indonesian publicly listed companies to increase their efficiency in performing their consulting role for giving value-added service to management, especially in terms of investment decisions.

Subjects: Financial Accounting; Corporate Governance

Keywords: internal audit function; investment efficiency; consulting role; governance

JEL classification: E22; G30; G32, G34

1. Introduction

Based on Minister of Finance Regulation No. 88 of 2015, companies should build good corporate governance effectively. Quality of internal audit is one of the governance mechanisms within the corporation to achieve internal accountability and transparency (Rahayu et al., 2020). Information provided by internal auditors becomes the maximum input for management to make short- and long-term decisions. One of the crucial decisions is about how companies invest efficiently. The study by Abbott et al. (2022) states that information provided by internal audit functions can improve the ability of management for investment decisions.



Internal auditor also helps the corporate governance system, which acts as a watchdog and provides audit services whose nature assists the company to perform better (Ferry et al., 2017). This is because the current internal audit function, aside from providing assurance services for company management, but the current internal audit function can serve as consulting services for company management (Kotb et al., 2020). Moreover, the scope of the internal auditors is intensified, and they began to perform a more value-adding service for the companies (Kotb et al., 2020).

Currently, the role of internal audit can provide consulting services for management in the form of advice or recommendations on performance quality, business environment security, and even environmental audits (Gramling et al., 2004). Another example, internal auditors are asked to provide consulting services in business activities such as acquisitions, mergers, and strategic alliances (Brody & Lowe, 2000). Prior studies even show that current internal audit practices that are involved in providing assurance and consulting services to corporate strategic decisions, such as ESG reporting issues (Soh & Martinov-Bennie, 2015). Moreover, other literature suggests that the internal audit function has unexploited potential for firms to improve their integrated reporting practice (Engelbrecht et al., 2018). In the context of firm operational efficiency, it is also remarked that internal audit function quality can improve a firm's operational efficiency by giving strategic recommendations for management (Chen et al., 2020). Therefore, previous findings indicated that the internal audit function provides auditing services and offers suggestions and insights. Thus, for management regarding corporate strategic decisions.

However, there is a concern regarding the ambiguous role of the internal auditor (Ahmad et al., 2009) since internal audit functions' purposes might differ, depending on the respective organizational context. The prior study points out that the activities and values of internal auditors are somewhat obscure (Lenz & Hahn, 2015). It is getting serious about how internal auditors function to play their role both independently and objectively, because consulting services may create a conflict of interest between internal auditors and management (Brody & Lowe, 2000). This concern leads to questioning the effectiveness of internal auditors in providing value and improving corporate operations.

In the corporate hierarchy, the top management that plays a significant role in efficient investment decisions is the CEO (Ullah, Majeed, et al., 2021). This concluded that the CEO decides on the investment and financing (Hoitash et al., 2016). Furthermore, the CEO also obtains recommendations and suggestions from the CFO, who is in charge of financial stewards of companies, which its information comes from the internal auditor. Previous research already finds that sometimes in-house auditor works inefficiently (Mashayekhi et al., 2022). Therefore, there is a possibility that the internal audit function will not significantly affect the investment decision because they cannot optimize their assistance through their inconsistent work. In the end, the sole decision-maker regarding investment is the CEO and CFO.

Hence, we have questions on how the role of the internal audit function will provide sufficient information for management to make the right investment decision. The interesting point in this study is that we want to examine whether the internal audit function in Indonesia has a significant role to supervise the effectiveness of corporate governance. Specifically, whether the internal audit function efficiently recommends top management regarding the investment decision. Many studies examine the relationship between the internal audit functions and their role in overseeing financial reporting, operations, or compliance, while little is acknowledged about the part of internal audit functions in corporate strategic decisions (Amoako et al., 2023; Bajary et al., 2023; Usman et al., 2023).

Based on previous studies, the difference in corporate economic requirements and degree of economic development cause the internal auditing practice to differ between countries (Abdolmohammadi & Tucker, 2002; Cenker & Nagy, 2004; Sarens et al., 2011). Therefore, in this study, we provide the setting of the internal audit function in Indonesia, which is a developing

country since there is limited empirical evidence of internal audit literature in developing countries settings. According to prior literature, the role of the internal audit function in developing countries only focused on traditional financial reporting audits and compliance with internal controls, but still rare attention toward the value-added act of the internal auditor (Alhajri, 2017). Moreover, another piece of literature stated that internal auditing could be considered a monitoring mechanism for agency cost that is more typical in US-style shareholder-centered governance (Sarens & Abdolmohammadi, 2011). Henceforth, it is necessary to examine the involvement of internal audit functions in the setting of non-US countries or developing countries. Finally, this study aims to observe the relationship between internal audit function on investment efficiency.

This study will contribute in some way. Firstly, the result of this study will enhance the internal audit literature by providing empirical evidence regarding the role of the internal audit function in corporate investment efficiency. Secondly, this finding has proved that the result supports the agency theory. Thirdly, the results give practical implications on how companies must improve the efficiency of internal audit functions in Indonesia to provide a better value-added service to support corporate investment efficiency because it is vital for firms to maintain their sustainability. Lastly, practically, this study contributes to the regulation development to improve the effectiveness of the internal audit function in the current governance environment (Oussii & Taktak, 2018).

This article is lettered with the following structure: Section 2 discusses the literature review and hypothesis development, section 3 discusses the research methodology, Section 4 discusses the study results, and Section 4 explains the conclusion.

2. Theoretical literature review

According to the agency theory, the conflict of interest that exists between the principal and agency could lead to agency conflict, such as the tendency of management to do opportunistic behavior like pursuing projects and investments that generate high returns in the short term instead of maximizing the shareholder welfare in the long terms. When viewed from the agency theory perspective, the internal auditor is a governance oversight mechanism to monitor the behavior of senior managers. It will reduce the possibility of opportunistic behavior (Adams, 1994). Thus, the internal auditor function is likely to improve internal control to prevent financial fraud, increase the reliability of financial information, and reduce the tendency for errors made by management. Hence, the agency theory can help explain the existence, role, and internal audit responsibilities.

Indonesia is one of the countries that positions internal auditors as a function whose role is to help companies achieve good governance (Dzikrullah et al., 2020; Rahayu et al., 2020; Suryanto et al., 2017; Suyono & Hariyanto, 2012). In contrast to several countries in the USA that implement a one-tier system, the unique two-tier system in Indonesian companies separates the supervisory and management functions into two bodies at different levels in the corporate structure, placing the position of internal auditors to be more independent. This makes the internal audit function a tool for companies to increase efficiency in achieving several company goals.

Investment efficiency is one of the goals that many companies want to achieve. As previous research states that achieving investment efficiency will place the company into a strategic position in the eyes of stakeholders (Hu et al., 2022) obtaining investment efficiency is an important thing that management wants to achieve. However, investment efficiency is also a separate agency issue for some parties because of the information asymmetry possibility in it (Xu et al., 2012). So, in this case, an internal mechanism in the company that could overcome these problems is necessary. The most relevant party is the internal auditor.

The agency theories in the prior studies are applied to test the relationship between internal auditing practices with differences in organizational form empirically (Adams, 1994). Furthermore, several studies have proven that the internal audit function is the best tool for companies to

overcome agency problems (Hegazy & Farghaly, 2022; Paape, 2007). This is proved by the lower information asymmetry produced by the company which has an efficient internal audit function (Amin & Jasman, 2017). Not only that, many previous studies have also proven that operational efficiency, reporting, and company performance increase significantly when the internal audit function can run efficiently (Chen et al., 2020; Cho et al., 2015; Gras-Gil et al., 2012; Harymawan & Putri, 2023; Madawaki et al., 2022; Talab et al., 2018).

3. Empirical literature review and hypotheses development

According to previous research, the current role of internal audit is not only limited to the aspect of assurance that monitors the corporate governance system related to risk assessment, control assurance, and compliances but also participates in providing recommendations in the form of consulting services for management to improve the quality of management performance (Gramling et al., 2004).

Through consulting services, company management hopes that internal audit existence can help improve the efficiency and effectiveness of business processes (Rakipi et al., 2021). This only works if the internal auditors are informed of the development of company data to assist management in providing recommendations related to the company's business processes. In addition, concerning investment efficiency, the internal auditor function should assist top management in identifying investment opportunities and helping to assess which level of investment is optimal.

In the Indonesian context, the function of internal auditors within an organization has been regulated in the regulation of the Minister of Finance of the Republic of Indonesia no 88 of 2015. The arrangement requires every company to have good governance while having an internal auditor division within its organizational structure. From some perspectives, internal auditors have many roles within the company. Not only as a watchdog who does it help the company to monitor operational and financial processes according to the set rules, but the internal audit function also acts as a bridge and a good communicator for owners and managers (Ferry et al., 2017). This places the position of the internal auditor as a reliable consultant within the company.

Several consulting roles, typically performed by internal auditors, can be executed through various approaches. By processing, evaluating, and improving the company's internal control system, management will make an internal auditor a person who can identify weaknesses in business processes and provide relevant recommendations to increase control effectiveness, reduce risk, and ensure compliance with applicable policies and regulations. This is in line with the results of previous research which stated that internal auditors are now no longer a company's watchdog, but more a company's consultant and catalyst (Rahayu et al., 2020).

Internal auditors will provide information and reports to the CEO regarding relevant internal audit results (Pforsich et al., 2006). This will give an in-depth understanding of compliance, risk, and the effectiveness of internal controls within the organization. In addition, this report will help CEOs understand overall business conditions and make better decisions. In addition, the internal auditor also plays a role in providing objective opinions and recommendations to the CEO based on the findings and analysis that has been carried out.

Through a deep understanding of business processes and the risks faced by the organization, internal auditors can provide CEOs with valuable insights in making strategic decisions (Melville, 2003). The CEO can rely on internal auditors to provide comprehensive risk analysis, estimate the effectiveness of controls, and assist during project evaluations or initiatives that will significantly impact the organization.

Likewise, research from Mert (2021) states that the work results of internal auditors in their reports will be highly beneficial for stakeholder decision-making, especially CEOs and investors. In

this case, the auditor's performance will benefit the company to provide excellent confidence to decision-makers so that it is possible to achieve investment efficiency.

In the case of external auditors, their presence can assist clients' investment efficiency because they can become efficient intermediaries of information for company management. Therefore, important information regarding the business environment will help management identify investment opportunities adequately (Bae et al., 2017). Although this study considers the context of the internal auditor, there are slight similarities in the duties of internal auditors and external auditors. Henceforth, this could support the argument that internal auditors can be a proper medium for company management to play their role in providing recommendations. This is also regarding investment decisions in companies.

Moreover, from the perspective of agency theory, one of the roles of the internal audit function is to reduce information asymmetry problems between principals and agents (Adams, 1994), in which it is assumed that the adequate internal audit function could mitigate the investment inefficiency which could happen because of information asymmetry problems between the principals and the agents.

However, we discover that the decision-maker regarding the investment decision is the CEO (Ullah, Fang, et al., 2021). The authority to regulate investments may be the CEO, and the internal audit function might not be efficient in affecting investment decisions. Furthermore, a prior study stated that the perceived value and image of internal auditors are somewhat different from reality, even though their activities and value are occasionally obscure (Lenz & Hahn, 2015). This will serve as an argument that the role of the internal auditor in assisting the CEO in providing a suitable judgment about investment efficiency will have less effect.

Even in many entities, the internal audit function focuses on internal information flows and compliance to ensure the suitability of internal information (Engelbrecht et al., 2018). Moreover, the concern emerges regarding the ambiguous role of the internal auditor. According to prior literature, the advocates of agency theory point out that the internal audit function aims to ensure the internal control system and risk management process (Oussii & Taktak, 2018), but little is known about the consulting role of the internal audit function from the perspective agency theory.

Hence, there are two contra arguments regarding the relationship between internal audit function and investment efficiency, in which we propose the hypothesis of this study is as follows

H: *Internal audit function relates to the investment efficiency of company*

4. Research design

4.1. Sample selection and data source

This study uses data on Indonesian companies listed on the Indonesia Stock Exchange (IDX) in 2016–2019 to see the relationship between the internal audit function and investment efficiency. We use this data period to avoid any bias that is affected by the COVID-19 pandemic in Indonesia. Information related to the internal audit function is acquired through hand collected process from the company's annual report, and financial data is obtained through the OSIRIS database. In this study, we use sample selection criteria as provided in the following Table 1. The initial observation is 3,448, but we exclude companies in the SIC (Standard Industrial Classification) number 6, which contains finance, real estate, and insurance industries. Furthermore, we exclude several missing data, and we obtain a final sample of 1,360 firm-year observations.

Furthermore, we also provide the data distribution based on industry classification and year. Indonesia has a small amount of industry in agriculture, forestry and fishing, and health, legal, educational services & consulting services sectors. It affects the study sample distribution, so

Table 1. Sample selection criteria and data distribution

Panel A. Sample selection criteria					
Description	Number of Observation				
Listed companies on Indonesia Stock Exchange (IDX) 2016–2019	3,448				
(-) Excluded by:					
Companies that are included in the SIC category number 6	(665)				
Missing data	(1,423)				
Total Observation	1,360				
Panel B. Data distribution by industry and year					
SIC	Year				
	2016	2017	2018	2019	Total
0 (Agriculture, Forestry, and Fishing)	14	13	13	14	54
1 (Mining)	47	46	50	60	203
2 (Construction)	86	89	90	99	364
3 (Manufacturing)	61	57	59	60	237
4 (Transportation, Communication, and Utilities)	44	55	55	66	220
5 (Wholesale and Retail Trade)	33	34	38	38	143
7 (Service Industries)	28	29	31	34	122
8 (Health, Legal & Educational services, and Consulting)	0	0	8	9	17
Total	313	323	344	380	1,360

based on the data, it shows that the data on both sectors in this study is low, while manufacturing becomes the sector that dominates the sample. It is because the manufacturing sector is one of the largest industry sectors in Indonesia (BPS, 2022).

4.2. Model specification

To examine the relationship between internal audit function and investment efficiency, the following model on equation 1 is created. The dependent variable of this study is investment efficiency. Meanwhile, we use the internal audit function as our independent variable.

$$ABSMININVEFF_{i,t} = \beta_0 + \beta_1 IAFFUNC_{i,t} + \beta_2 BSIZE_{i,t} + \beta_3 BIG4_{i,t} + \beta_4 PPE_{i,t} + \beta_5 AGE_{i,t} + \beta_6 ROA_{i,t} + \beta_7 FSIZE_{i,t} + \beta_8 LEV_{i,t} + \varepsilon_{i,t} \quad (1)$$

4.3. Measure of investment efficiency

According to Huang (2020), investment efficiency happens when there is no investment distortion like under-investment or over-investment, or when there is no deviation from the expected investment level. Moreover, another literature defines investment efficiency as the company's ability to take on investment projects with a positive net present value (Gomariz & Ballesta, 2014).

Following prior literature, we measure investment efficiency levels by calculating the abnormal investment level. The abnormal investment level can be obtained from the residual value of the following regression model by Huang (2020):

$$INVEFF_{i,t} = \beta_0 + \beta_1 MTB_{i,t-1} + \beta_2 SG_{i,t-1} + \beta_3 FCF_{i,t} + \beta_4 LEV_{i,t-1} + \beta_5 LOGSALE_{i,t-1} + Industry Dummy + Year Dummy + \varepsilon_{i,t}$$

Description:

$INVEFF$ = Total capital expenditure and R&D expenses divided by initial assets

MTB = Market-to-book ratio, which is measured by subtracting the total value of assets from the book value of the common share and adding the market value of the common share, then dividing by the total assets.

SG = Sales growth, which is calculated by subtracting the number of sales from the previous year's sales, and dividing by the last year's sales

FCF = Free cash flow, which is by dividing the total operating cash flow by total assets

LEV = Leverage calculated by dividing total debt by total assets

$LOGSALE$ = Natural logarithm of the firm's total sales

After generating the residual value from the previous regression model, we will absolute the value and multiply it by -1 to easier interpret the results. Therefore, if the results have a positive direction, it implies investment decisions are more efficient, and vice versa.

4.4. Measure of the internal audit function

Generally, the internal audit function is part of corporate governance responsible for performing analysis and independent appraisal of the adequacy and effectiveness of risk management and internal control system in the company (Soh & Martinov-Bennie, 2015). Prior literature stated that the internal audit function provides independent and objective assurance on internal corporate governance, risk management, internal control, and compliance.

We measure this variable based on three proxies. First, we consider the number of internal audit personnel in the firm. The criteria are accomplished when there are three internal audit personnel (Dzikrullah et al., 2020). Second, we use the indicator variable of certified internal audit within the company (Dzikrullah et al., 2020; Goodwin-Stewart & Kent, 2006), and third, we use the indicator variable of the existence of an internal audit department within the company (García et al., 2019). Furthermore, we use a weighted calculation based on the three proxies above.

4.5. Control variables

Following prior studies, we apply some variable control that consisted of variables related to corporate governance and firm characteristics. The control variables in this study are the board size (Liu & Tian, 2021), auditor size (Boubaker et al., 2018), number of PPE (Bae et al., 2017), firm age (Rajkovic, 2020), profitability (Ullah et al., 2020), company size (Rajkovic, 2020), and leverage (Mirza et al., 2020). The control variables mentioned above are several predictors of a firm's investment efficiency that are used in prior studies. In this study, we include the year and industry fixed effects. The year-fixed effect is used to control the variations in economic conditions across the research observation period, while the industry-fixed effect is used to control the differences in characteristics from each industry in this study.

The detail of variable names, calculation methods, and sources are presented in the following Table 2.

5. Result and discussion

5.1. Descriptive statistics and univariate analysis

We present the descriptive statistics in Table 3 which shows that the investment efficiency variable (*ABSMININVEFF*) and the internal audit function variable (*IAFFUNC*) have a mean value of -0.001 and 0.505 , respectively. It means that on average most Indonesian companies invest inefficiently and their quality of internal audit averages at a middle level. The characteristics of control variables in this study are presented in Table 3. The results show the mean value of board size (*BFSIZE*), Big Four auditor (*BIG4*), PPE, and firm age (*AGE*). Profitability (*ROA*), company size (*FSIZE*), and leverage (*LEV*) are, respectively, 8.621 , 0.367 , 27.099 , 3.149 , 2.044 , 28.442 , and 0.540 .

This study performs the Pearson correlation test, and according to Table 4, our independent variable, the internal audit function (*IAFFUNC*) has a negative correlation with the investment efficiency, which is significant at the level of 5%. This shows that internal auditor quality univariately cannot help managers to decide on an efficient investment. Furthermore, all control variables also have a negative correlation with investment efficiency, except *FSIZE* and *LEV*. It means that most of the control variables univariately contribute to inefficient investment significantly.

5.2. OLS regression

The results of the several linear regression tests in this research are shown in Table 5. Based on the results in the table shows that there is a significant negative relationship between the internal audit function and investment efficiency with a coefficient and t-value of -0.001 and -2.67 , respectively, at a 1% significance level. It means that when the role of the internal audit function increases by 1, it will drop significantly at 0,001 of the level of investment efficiency. This result confirms our prior argument that we propose the internal audit function to provide consulting services for management does not apply to investment decisions. The findings show that the internal audit function did not promote investment efficiency because the investment decisions are in the hands of top management, like the CEO. Moreover, from this finding, it shows that the consultant service of internal auditor is not strong enough, especially to giving the recommendation regarding the investment decision on CEO. In other words, we believe that in Indonesia, the watchdog role of internal auditor is more massive than the consultant role.

Table 2. Variable operational definition

Dependent Variable			
Investment Efficiency	<i>ABSMININVEFF</i>	The residual value of Huang's (2020) regression model, which has been absolute value and multiplied by -1. This variable shows the value of investment efficiency.	OSIRIS & Financial Report
Independent Variable			
Internal Audit Function	<i>IAFFUNC</i>	Weighted calculation of the size of the company's internal audit, the presence or absence of the company's internal audit department, and internal audit certification (Dzikrullah et al., 2020).	Annual Report
Control Variable			
Number of board commissioners and board director	<i>BSIZE</i>	Number of board commissioners and board director	Annual Report
Auditor BIG4	<i>BIG4</i>	The indicator variable is assigned a value of 1 for companies audited by Public Accounting Firm Big4, and 0 for otherwise.	Annual Report
PPE	<i>PPE</i>	The value of the natural logarithm of the company's PPE amount	OSIRIS
Firm Age	<i>AGE</i>	Natural logarithm of the number of years the company was founded.	OSIRIS
Profitability	<i>ROA</i>	Total net income divided by the total assets of the company.	OSIRIS
Firm Size	<i>FIRMSIZE</i>	Natural logarithm of total assets	OSIRIS
Leverage	<i>LEVERAGE</i>	Total debt divided by total assets	OSIRIS

Table 3. Descriptive statistics

	Mean	Median	Minimum	Maximum
<i>ABSMININVEFF</i>	-0.001	-0.000	-0.025	-0.000
<i>IAFFUNC</i>	0.505	0.333	0.000	1.000
<i>BSIZE</i>	8.621	8.000	4.000	18.000
<i>BIG4</i>	0.367	0.000	0.000	1.000
<i>PPE</i>	27.099	27.331	20.179	31.582
<i>AGE</i>	3.149	3.296	0.693	4.682
<i>ROA</i>	2.044	2.280	-42.540	35.800
<i>FSIZE</i>	28.442	28.417	24.377	32.270
<i>LEV</i>	0.540	0.479	0.023	3.969

Table 4. Pearson correlation

	ABSMININVEFF	IAFFUNC	BFSIZE	BIG4	PPE	AGE	ROA	FBSIZE	LEV
ABSMININVEFF	1.000								
IAFFUNC	-0.061** (0.017)	1.000							
BFSIZE	-0.093*** (0.000)	0.386*** (0.000)	1.000						
BIG4	-0.090*** (0.001)	0.260*** (0.000)	0.350*** (0.000)	1.000					
PPE	-0.049* (0.054)	0.432*** (0.000)	0.546*** (0.000)	0.345*** (0.000)	1.000				
AGE	-0.143*** (0.000)	0.129*** (0.000)	0.225*** (0.000)	0.109*** (0.000)	.189*** (.000)	1.000			
ROA	-0.221*** (0.000)	0.161*** (0.000)	0.214*** (0.000)	0.213*** (0.000)	.102*** (.000)	0.044* (0.064)	1.000		
FBSIZE	-0.019 (0.451)	0.496*** (0.000)	0.614*** (0.000)	0.391*** (0.000)	.836*** (.000)	0.163*** (0.000)	0.181*** (0.000)	1.000	
LEV	0.009 (0.737)	-0.065*** (0.007)	-0.027 (0.285)	-0.063*** (0.015)	-.037 (.122)	0.062*** (0.010)	-0.325*** (0.000)	-0.069*** (0.004)	1.000

Notes: p-values in parentheses.
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table 5. OLS regression of internal audit function and investment efficiency

	(1)
	<i>ABSMININVEFF</i>
<i>IAFFUNC</i>	−0.001*** (−2.67)
<i>BSIZE</i>	−0.000 (−0.75)
<i>BIG4</i>	−0.000*** (−2.83)
<i>PPE</i>	0.000 (0.99)
<i>AGE</i>	−0.000 (−1.33)
<i>ROA</i>	−0.000*** (−3.32)
<i>FSIZE</i>	0.000 (1.16)
<i>LEV</i>	−0.000 (−1.24)
<i>_cons</i>	−*0.003* (−1.79)
<i>r</i> ²	0.239
<i>N</i>	1360

Notes: t statistics in parentheses.

*p < 0.1, ** p < 0.05, *** p < 0.01.

Moreover, another literature also explains that there are some concerns regarding internal audit in practice that does not play a monitoring role effectively. Furthermore, in practice, it is still found that what the internal auditors do fluctuates in addressing the risks and delivering value for the company (Kotb et al., 2020). The roles providing assurance might be more pervasive for internal auditors because they are responsible for managing internal controls effectively to minimize the occurrence of fraudulent financial statements (Dzikrullah et al., 2020). The results indicate that in the setting of Indonesian public companies, internal audit functions need to significantly improve the corporate decision regarding investment. However, these results cannot be generalized to every region, because the degree of economic development of a country could affect the internal audit practice of the country (Abdolmohammadi & Tucker, 2002; Sarens et al., 2011). This result also shows that in the context of a non-US country, the efficiency of the internal audit function is contrary to US country with a shareholder-centered governance style which shows the internal audit function can be a monitoring mechanism to mitigate the agency cost between the principal and the agent (Sarens & Abdolmohammadi, 2011). It happens because the internal auditing profession has developed and expanded in the US, which is pretty different from developing countries.

The result of this study differs from the previous study, which stated that internal auditors work with management to recommend solutions and improve the organization process (Lowe et al., 1999) in terms of investment decisions. Hence, this result shows that there is a performance gap in the role of the internal auditor in providing a value-adding service.

Table 6. Heckman two stages regression

	1 st Stage Regression	2 nd Stage Regression
	<i>IAFFUNC</i>	<i>ABSMININVEFF</i>
IAFFUNC		−0.001***
		(−2.81)
MEAN_IAF	0.517***	
	(30.37)	
BSIZE	0.009***	−0.000
	(3.19)	(−0.99)
BIG4	0.051***	−0.000***
	(3.26)	(−2.98)
PPE	0.007	0.000
	(1.31)	(0.85)
AGE	0.030**	−0.000
	(2.11)	(−1.39)
ROA	0.002***	−0.000***
	(2.83)	(−3.38)
FSIZE	0.046***	0.000
	(6.24)	(0.72)
LEV	0.047***	−0.000
	(3.02)	(−1.18)
MILLS		−0.002
		(−1.20)
_cons	−1.599***	−0.001
	(−10.95)	(−0.34)*
r ² _p	0.4520	0.239
N	1360	1360

Notes: t statistics in parentheses.

*p < 0.1, ** p < 0.05, *** p < 0.01.

5.3. Robustness test

In this study, we want to test the potential endogeneity issue by using Heckman Two-Stages Regression to handle the unobserved variable. In this study, we use a mean of industries that perform good internal audit functions as our instrument. We argue about the average of companies that perform good internal audit functions will affect other companies to have the same good internal audit function. Therefore, our instrument variable in this study is seized in the variable *MEAN_IAF*, which is categorized as 1 if has a value more than the median of the internal audit functions value, and 0 otherwise.

According to Table 6, the first column indicates the relationship between the instrument variable and independent variable is significantly positive. This result supports our claim that the average of companies that perform good internal audit functions is more likely to affect other companies to have the same good internal audit function.

The second column shows the robustness result of our hypothesis. We capture the logical conclusion in the second-stage regression, which shows that the internal audit function has a negative relationship with investment efficiency at a level of 5%. We can see in this empirical test, internal audit functions do not efficiently affect the corporate strategic decision like investment efficiency.

Table 7. Interaction variable of internal audit function and big 4 audit firm to investment efficiency

	(1)
	ABSMININVEFF
<i>IAFFUNC_BIG4</i>	−0.001** (−2.26)
<i>IAFFUNC</i>	−0.000 (−0.69)
<i>BSIZE</i>	−0.000 (−0.79)
<i>BIG4</i>	0.000 (0.91)
<i>PPE</i>	0.000 (1.07)
<i>AGE</i>	−0.000 (−1.30)
<i>ROA</i>	−0.000*** (−3.32)
<i>FSIZE</i>	0.000 (1.04)
<i>LEV</i>	−0.000 (−1.12)
<i>_cons</i>	−0.003* (−1.84)
<i>r2_a</i>	0.242*
<i>N</i>	1360

Notes: t statistics in parentheses.

*p < 0.1, ** p < 0.05, *** p < 0.01.

Table 8. OLS regression of internal audit function proxies on investment efficiency

	(1)	(2)	(3)
	ABSMININVEFF	ABSMININVEFF	ABSMININVEFF
<i>IASIZE</i>	−0.001** (−2.50)		
<i>IADEP</i>		−0.000 (−0.53)	
<i>IACERT</i>			−0.000** (−2.25)
<i>BSIZE</i>	−0.000 (−0.84)	−0.000 (−1.07)	−0.000 (−0.88)
<i>BIG4</i>	−0.000*** (−2.84)	−0.001*** (−2.97)	−0.000*** (−2.76)

(Continued)

Table 8. (Continued)

	(1)	(2)	(3)
	<i>ABSMININVEFF</i>	<i>ABSMININVEFF</i>	<i>ABSMININVEFF</i>
<i>PPE</i>	0.000	0.000	0.000
	(0.87)	(0.80)	(0.94)
<i>AGE</i>	−0.000	−0.000	−0.000
	(−1.22)	(−1.47)	(−1.41)
<i>ROA</i>	−0.000***	−0.000***	−0.000***
	(−3.38)	(−3.41)	(−3.31)
<i>FSIZE</i>	0.000	0.000	0.000
	(1.14)	(0.61)	(0.90)
<i>LEV</i>	−0.000	−0.000	−0.000
	(−1.17)	(−1.23)	(−1.14)
<i>_cons</i>	−0.003*	−0.002	−0.003
	(−1.84)	(−0.99)	(−1.53)
<i>r2_a</i>	0.238	0.234	0.237
<i>N</i>	1366	1360	1360

Notes: t statistics in parentheses.

*p < 0.1, ** p < 0.05, *** p < 0.01.

5.4. Additional analysis

We want to extend the study by further interacting our independent variable of internal audit function (*IAFFUNC*) with Auditor Big Four companies (*BIG4*). The result of this additional analysis is presented on table 7. Interestingly, we still document that the internal audit function in the company that is audited by Big Four companies is likely to have investment efficiency. This additional test shows that the internal audit function does not enhance corporate investment efficiency.

Furthermore, in Table 8, we test each internal audit function proxy on investment efficiency. The results show that the intermediary of several internal audit personnel (*IASIZE*) and certified internal auditors (*IACERT*) are significantly negatively related to investment efficiency at a 5% level. This implies that each proxy is negatively related to investment efficiency.

6. Summary and conclusion

Practically, internal audit functions have evolved to give assurance services and offer consulting services (value-added services) for management to improve internal control and corporate operations. However, there is a lack of empirical evidence of internal audit function to corporate strategic decisions in the setting of Indonesian companies that are listed publicly. Therefore, this study aims to study the relationship between internal audit function and investment efficiency in a publicly listed company in Indonesia.

The result explains that the internal audit function has a significant negative relationship with investment efficiency. Our result is robust to the endogeneity test using Heckman Two-Stages Regression. Furthermore, we did an additional analysis and found that even the companies audited by Big Four companies still have a significant negative relationship with investment efficiency. Moreover, we test each proxy of the internal audit function and document two of three factors that are negatively related to investment efficiency. These results show that the internal audit function does not have a significant role in giving value-added service regarding investment decisions in the

context of listed public companies in Indonesia. Therefore, we find contradicting results with prior studies that suggest that the internal audit function can effectively give value-added service to management. In this study, the internal audit function has not fully affected the investment decision in the company. We concluded that this happens because CEO is the decision-maker regarding the investment accord (Ullah, Fang, et al., 2021). Furthermore, we also believe that there is a lack of consultant role of the internal auditor in Indonesia (Rahayu et al., 2020). Therefore, the CEO who take the strategical position, does not perceive significant assistance from the internal auditors who only focus on the watchdog role. Consequently, we do not document a positive relationship between internal audit function and investment efficiency. Furthermore, this result is ensuing concerns from previous literature, which stated that what the internal auditors do is still inconsistent in addressing the risks and delivering value for the company.

We expect that this result can enhance the insight and literature regarding the internal audit function in Indonesia. In addition, the result of this study contributes on how the internal audit function work will give relevant recommendation on management. Internal auditor should not only have a role as a watchdog, but also can do a consultant role in presenting challenges and constructive recommendations to the CEO. By identifying gaps or weaknesses in organizational systems and processes, as well as providing solutions to increase efficiency, effectiveness, and compliance, the internal auditor position can help the CEO to continuously drive improvements and achieve organizational goals better. In this study, we only focus on internal audit functions, one that future research can perform further analysis and relate the internal audit function with another element of corporate governance. Future research can also further test the efficiency of the internal audit functions regarding its role to arrange consulting services. Moreover, further study can consider another element of corporate governance to examine the efficiency of internal audit functions. We hope that the suggested future research topics could encourage other relevant research topics of internal audit function practice in Indonesia.

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Author details

Ardianto Ardianto¹

Nadia Anridho¹

E-mail: nadia.anridho@feb.unair.ac.id

ORCID ID: <http://orcid.org/0000-0001-6591-2471>

Agnes Aurora Ngelo¹

Wulandari Fitri Ekasari¹

Imran Haider²

ORCID ID: <http://orcid.org/0000-0001-8476-4830>

¹ Department of Accounting, Faculty of Economic and Business, Universitas Airlangga, Jawa Timur, Indonesia.

² School of Accounting, Economics and Finance, Faculty of Business and Law, Curtin University, Perth, Australia.

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