



## Chief risk officer and audit fee: An investigation from financial industries in Indonesia

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### ABSTRAK

Penunjukan seorang CRO (Chief Risk Officer) mempengaruhi implementasi ERM (Enterprise Risk Management), yang mengurangi risiko dan menurunkan biaya audit. Peraturan Otoritas Jasa Keuangan No. 17/2014 di Indonesia mengharuskan perusahaan memiliki RMC (Risk Management Committee), yang berbeda dengan posisi CRO yang setara dengan C-Level. Studi ini menguji dampak dari keberadaan CRO terhadap biaya audit eksternal. Data yang digunakan adalah perusahaan-perusahaan keuangan yang terdaftar di Bursa Efek Indonesia (BEI) tahun 2011 sampai 2020. Hasilnya menunjukkan bahwa perusahaan yang menggunakan CRO memiliki risiko yang lebih rendah, yang pada gilirannya mengurangi biaya audit. Selain itu, keahlian seorang CRO juga berdampak pada ERM yang lebih tinggi, yang kemudian mempengaruhi pengurangan biaya audit. Studi ini memberikan kontribusi kepada dunia praktis dengan mendukung penunjukan CRO dengan tujuan mengurangi risiko perusahaan. Dengan demikian, perusahaan dapat memberikan kinerja yang lebih baik.

### ABSTRACT

The appointment of a CRO (Chief Risk Officer) influences the implementation of ERM (Enterprise Risk Management), which reduces risk and lowers audit costs. Financial Services Authority Regulation No.17/2014 in Indonesia requires companies to have an RMC (Risk Management Committee), which is different from a CRO equivalent to a C-Level. This study examines the impact of a CRO on external audit costs. The data consists of financial companies listed on the Indonesia Stock Exchange (IDX) from 2011 to 2020. The results show that companies using a CRO have lower risk, thereby reducing audit costs. Additionally, the expertise of a CRO also impacts a higher ERM, which in turn affects the reduction of audit costs. This study contributes to the

practical world by supporting the appointment of a CRO to reduce company risk. Thus, the company can deliver better performance.

## INTRODUCTION

The position of Chief Risk Officer (CRO) has been gaining popularity since the collapse of mortgage-based financial instruments in the United States in 2008. Many people are affected by the breakdown of the property bubble, such as people losing their homes, pensions, and life savings. The crisis led us to a growing awareness of the importance of risk management techniques and structures within financial organizations. After the economic crisis in 2008, new CRO positions have typically emerged at companies that have to deal with industry-specific crises (Vittorio & Rund, 2020). CRO is needed to ensure the company's risk exposure information reaches the board and is considered while making strategies. According to Deloitte's risk management survey in 2019 (Ruggeri *et al.*, 2019), among US companies that had at least US\$ 500 million in annual sales, 50% of them had CRO to manage second-line risk management functions such as compliance, cybersecurity, health and safety, and operational risk. The report also showed that when the CRO was always present in the board meetings, the other senior management leaders had strong or total confidence in the risk data presented at the meeting. It indicates that having a specified position in the C-level for risk management increases the impact where risk can give valuable input in the strategic decision when it is being discussed and made.

In Indonesia, Article 17 of Financial Services Authority Regulation No. 17/2014 mandates that financial companies must form a Risk Management Committee (RMC) to implement integrating company risk management. This regulation is specific to financial companies because this sector has more complex risks that can impact the broader community compared to companies in other industries. The RMC has tasks similar to a CRO, including identifying key risks, assessing the company's risk appetite, and implementing measures to recuperate from unforeseen adversities. The board of commissioners of financial companies can form an RMC to ensure the implementation of risk management is going well. However, if the establishment of an RMC is deemed unnecessary, the supervisory duties can be assigned to the audit committee (KNKG, 2012)

Stakeholders criticize the existence of a stand-alone RMC, which triggers overlapping responsibilities with the audit committee (Abdullah & Shukor, 2017). The establishment of an audit committee is mandatory for public companies in Indonesia, in which case the responsibilities of the audit committee are not only financial reporting, external audit, internal control, and other audit committee duties but also the function of overseeing potential risks in the process (Beasley *et al.*, 2009). In this regard, RMCs and audit committees are often considered to have similar roles, except for access to external audit engagements, which can only be performed by the audit committee, not the RMC. The audit committee is directly involved in negotiating the

scope of audit work and determining the amount of the audit fee. At the same time, the RMC does not have similar direct access to external auditors (Larasati *et al.*, 2019).

However, Article 17 of Financial Services Authority Regulation No. 17/2014 implies that RMC members can have concurrent positions in C-level management, which triggers doubts over their independence so that RMC members cannot fully dedicate their efforts to analyzing risks and measures that the company can take when a crisis occurs. In addition, the absence of a place for risk management at the C-level may imply that the organization does not consider risk equivalent to financial, operational, IT, and other C-level management responsibilities despite having the same urgency. Also, not designating a place for risk management on the C-level can imply that the organization is not taking risks to be on par with finance, operations, IT, and other C-level management responsibilities despite the same urgency. Companies might be reluctant due to the added costs, but as we are entering rough and unstable times due to the COVID-19 pandemic, having additional measures and manpower to deal with unforeseen risks will be worth it.

Basel Committee has recommended in its 2010 corporate governance practice that RMC led by CRO is responsible for organizing the Enterprise Risk Management (ERM) system, and (Scherbina *et al.*, 2013) show that if CRO reports directly to the board, it shortens the period of reporting, and thus the efficiency of CRO arise. Appointing a CRO helps increase the ERM quality by reducing the firm risk (Li *et al.*, 2022). However, the one that is explicitly mandated to the financial institutions in Indonesia is to have RMC, not CRO. The lack of C-level risk management shows the organization undervalues risk compared to finance, operations, IT, and other key C-level responsibilities, despite risk's equal importance. The reason behind the Financial Services Authority Regulation no.17/2014 mandate on RMC to the financial institution is to integrate the risk that the company might face due to the complex nature of the industry. RMC must identify risks and make recommendations to the board, including the audit committee on resolving them. The presence of RMC usually indicates a higher quality of risk management disclosure; thus, usually, the audit committee corresponds to the risk disclosure by demanding a higher audit quality, resulting in a higher audit fee (Jia *et al.*, 2019; Larasati *et al.*, 2019; Prabhawa *et al.*, 2021).

Firm risk is one of the determinant factors auditors use to propose audit fee (Widmann *et al.*, 2021). While the existence of a CRO cannot influence the audit committee, it still plays a part in the number of audit fee proposed by the auditors. Auditors evaluate client risk based on client-specific characteristics such as financial condition, corporate governance level, and financial reporting quality. Previous research has found that higher audit fee is associated with higher perceived client risk (Yang *et al.*, 2018). The presence of CRO leads to better risk governance as it needs accountability for risk at the highest levels of the organization (Magee *et al.*, 2019). Through more effective risk management, better risk governance can improve risk-adjusted performance. With risk-adjusted performance, the company is not setting up a

goal or strategy with more risk than the company could handle, thus hypothetically reducing the audit fee. Knechel *et al.* (2007) show that the audit fee is reduced when a company discloses a relatively high level of compliance risk management.

With the logic that reduced risk resulted in lower audit fee, the existence of CRO should result in lower audit fee. Recruiting CRO impacts firm risk governance and reduces risk and more efficient operational risk (Li *et al.*, 2022). Not only that, the background of CRO can enhance its performance in managing ERM (Magee *et al.*, 2019). So, CROs with adequate educational backgrounds, such as accounting, management, and business administration, will further reduce audit fee. In this study, the first objective is to obtain empirical evidence on whether CRO existence relates to the amount of audit fee. The second objective is to obtain evidence of whether CRO education background will further influence the audit fee.

This research is expected to contribute both theoretically and practically. First, this study expands the literature on factors mitigating audit fee in the financial industry by focusing on the existence of a chief risk officer. The research results are expected to be considered for investors and management to enforce the mandate to appoint CROs in the banking, insurance, and real estate industries to reduce company risk. Therefore, companies can achieve better performance.

## LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

The appointment of a CRO influences the lowering of a firm's risk by creating better risk management and good risk governance (Li *et al.*, 2022; Scherbina *et al.*, 2013). Firm risk is one of the determinants that auditors consider when recommending audit fee (Widmann *et al.*, 2021). Auditors assess client risk based on client attributes such as financial condition, level of corporate governance, and financial reporting quality. Recruiting CRO impacts firm risk governance and reduces risk and more efficient operational risk (Li *et al.*, 2022). Lower firm risk is viewed positively by the external auditor because they can trust the data that needs to be audited. With audit pricing theory, the lower the risk, the lower the audit fee the auditor charges as they do not have to do extensive audit procedures and add the risk premium (Bailey *et al.*, 2018; DeFond & Zhang, 2014).

In Indonesia, the Financial Services Authority Regulation No. 17/2014 requires financial conglomerates to form an RMC as part of the execution of integrated business risk management. With the mandate from financial services authority to make RMC for banking institutions, it has been proved that the non-performing loan ratio is decreasing, thus lowering the credit risk (Center For Risk Management & Sustainability, 2023). The highest probability of CRO existence will be here since the RMC is only mandated for banking institutions. Supporting the probability of a CRO position in the banking industry is the recommendation from the Basel Committee, a banking supervisory body, that CRO should lead RMC. Alongside the banking

industry, the author wants to add other financial industries since it has been proven by Karanja & Rosso (2017) that most of the appointed CROs are in the financial industries.

However, the presence of a CRO could also result in higher audit fee from the demand perspective. As CRO discloses and manages more risk, they might want better assurance from external auditors and demand higher audit quality. Harymawan *et al.* (2021) and Larasati *et al.* (2019) research showed that audit committees demand a higher audit coverage to minimize errors from the extensive risk disclosure that RMC reported. As we all know, the presence of CRO and RMC is interrelated based on the Basel Committee recommendation. Based on the correlation between CROs and risk from previous studies, we expect lower audit fee for firms with CROs. Thus, the first hypothesis is:

**H1:** CRO's existence on the board of directors is negatively associated with the firm's external audit fee.

Not only is a CRO necessary, but to produce the optimum result, the CRO must have the right qualifications. Ideally, someone who will lead the operation of firm risk management should have a suitable educational background. Because CRO roles are versatile yet still very specific in risk areas, a person with accounting, management, and or business administration education is more well-suited (Protiviti Independent Risk Consulting, 2006). Bailey (2022) mentioned that firms hiring CROs with MBA degrees have better ERM quality. ERM quality is related to a firm's overall risk because ERM reduces earnings volatility, thus lowering the financial risks as the firm's ability to pay its liabilities is more stable (Committee of Sponsoring Organizations of the Treadway Commission, 2017). In Indonesia, a board member has to pass the fit and proper test by financial regulation authorities, as mentioned in Financial Services Authority Regulation No. 27/POJK.03/2016. However, board member credibility is not as guaranteed as in bank institutions. Thus, there is a need to study the CRO education background. If CRO expertise influences the risk, then firms with CRO but do not have the expertise will have higher audit fee than those with CRO expertise. Thus, the second hypothesis is:

**H2:** CRO expertise is negatively associated with the firm's external audit fee

## RESEARCH METHODS

The main variables used in this study are CRO existence, CRO expertise, and audit fee. Audit fee is the dependent variable measured using the natural logarithm of external auditor fee published in the annual report (Larasati *et al.*, 2019). Additionally, the existence and experience of CROs are variables of interest. The CRO existence is measured using a dummy variable. If otherwise, firms with CRO positions on the board of directors are given 1 and 0. Then, CRO expertise in this study is measured by looking

at the appointed CRO's educational background and risk management certification. Bailey (2022) suggests that, ideally, CROs possess previous experience in auditing, risk assessment, or risk management. Thus, the criteria for CRO expertise are if they have an educational background in accounting, management, business administration, and or have risk management certification. If otherwise, firms with CROs with the proper criteria are given 1 and 0.

Referring from previous studies (Bailey, 2022; González *et al.*, 2020; Harymawan, 2020; Judd *et al.*, 2017; Larasati *et al.*, 2019; Leidner & Lenz, 2017), several variables are used as control variables in this study. They included external auditor (BIG4), the number of firm boards (BOARD), the number of independent commissioners (INDCOM), audit report lag (ARL), return on asset (ROA), leverage (LEV), firm size (FSIZE), firm loss (LOSS), and capital intensity (CAPINT). In addition, this study also uses year-fixed effect variables to accommodate differences in observational characteristics. Furthermore, the operational definition of each variable is listed in Table 1.

**Table 1**  
**The Operational Definition of Variables**

Variable	Description	Measurement	Data Sources
<b>Dependent Variable</b>			
AUD_FEE	Audit fee	The natural logarithm value of audit fee for external auditors.	Annual Report
<b>Interested Variables</b>			
CRO_EXISTENCE	CRO existence	Dummy variable, given 1 if CRO has a position on the firm's C-Level and 0 if otherwise.	Annual Report
CRO_EXPERTISE	CRO expertise	Dummy variable, given 1 if firms with CROs have an educational background in accounting, management, business administration, and/or have risk management certification, and 0 if otherwise.	Annual Report
<b>Controls Variables</b>			
BIG4	External auditor	Dummy variable, given 1 if BIG4 auditor audits a firm, and 0 if otherwise.	Annual Report
BOARD	Board size	The number of commissioners and directors in the firm.	Annual Report
INDCOM	Independent commissioner	The number of independent commissioners in the firm.	Annual Report
ARL	Audit report lag	The number of days between the fiscal year's end and the audit report's signing.	Annual Report
ROA	Return on asset	Net income divided by total assets.	OSIRIS
LEV	Leverage	Total liabilities are divided by total assets.	OSIRIS

Variable	Description	Measurement	Data Sources
FSIZE	Firm size	The natural logarithm of total assets.	OSIRIS
LOSS	Firm's loss	Dummy variable, given 1 if net income is negative, and 0 if net income is positive.	OSIRIS
CAPINT	Capital intensity	Total property, plant, and equipment; total assets.	OSIRIS

In this study, the data population will be all public firms in Indonesia classified as financial industries (SIC 6) from 2011 to 2020. The data from 2011 to 2013 represents a period where companies' appointment of a CRO was still voluntary, while data from 2014 to 2020 reflects the period after this regulation became mandatory. This allows for an analysis of the impact of CRO appointments on external audit costs both before and after the regulation's implementation, providing a broader perspective on the changes resulting from this policy. The firms were chosen to better understand CRO and audit fee relationships. From the total data gathered, 1,964 observations were deleted due to missing CRO existence data. Table 2 summarizes the sample selection procedure.

**Table 2**  
**The Sample Selection Procedure**

Description	Firm-Years Observation
Total data from companies with SIC code 6, listed on the IDX from 2011 to 2020.	3,347
(Missing data)	(3,123)
Final Sample	224

We tested the relationship between CRO existence and CRO expertise with audit fee by using the following model:

$$AUD\_FEE_{i,t} = \beta_0 + \beta_1 CRO\_EXISTENCE_{i,t} + \beta_2 BOARD_{i,t} + \beta_3 INDCOM_{i,t} + \beta_4 BIG4_{i,t} + \beta_5 ROA_{i,t} + \beta_6 LEV_{i,t} + \beta_7 FSIZE_{i,t} + \beta_8 LOSS_{i,t} + \beta_9 ARL_{i,t} + \beta_{10} CAPINT_{i,t} + \beta_{11} years\ fe_{i,t} + e_{i,t} \dots\dots\dots 1$$

$$AUD\_FEE_{i,t} = \beta_0 + \beta_1 CRO\_EXPERTISE_{i,t} + \beta_2 BOARD_{i,t} + \beta_3 INDCOM_{i,t} + \beta_4 BIG4_{i,t} + \beta_5 ROA_{i,t} + \beta_6 LEV_{i,t} + \beta_7 FSIZE_{i,t} + \beta_8 LOSS_{i,t} + \beta_9 ARL_{i,t} + \beta_{10} CAPINT_{i,t} + \beta_{11} years\ fe_{i,t} + e_{i,t} \dots\dots\dots 2$$

**RESULTS AND DISCUSSION**

**Sample Distribution**

The sample distribution of the CRO variable employed in this study each year is shown in Table 3. Panel A shows the distribution of CRO existence, and panel B shows the distribution of CRO expertise each year. From 224 observations, only 23% of the total sample have CRO. Meanwhile, only 12% of 224 observations have CROs

with expertise qualifications. Notice that 2020 is the year with the most CRO appointments with significant gaps compared to previous years. The assumption is that firms hired CROs more in 2020 due to the instability of the COVID-19 pandemic. In addition, this year also has the most samples.

**Table 3**  
**The Sample Distribution of the CRO Variable**

Panel A. Sample Distribution of the CRO Existence						
YEAR	Firms without CRO existence		Firms with CRO existence		Total	
	N	%	N	%	N	%
2011	4	100	0	0	4	100
2012	10	100	0	0	10	100
2013	15	100	0	0	15	100
2014	8	89	1	11	9	100
2015	13	100	1	0	14	100
2016	14	88	2	12	16	100
2017	23	92	2	8	25	100
2018	25	96	1	4	26	100
2019	23	88	3	12	26	100
2020	55	70	24	30	79	100
Total	173	77	30	23	224	100

  

Panel B. Sample Distribution of the CRO Expertise						
YEAR	Firms without CRO expertise		Firms with CRO expertise		Total	
	N	%	N	%	N	%
2011	4	100	0	0	4	100
2012	10	100	0	0	10	100
2013	15	100	0	0	15	100
2014	8	89	1	11	9	100
2015	13	93	1	7	14	100
2016	15	94	1	6	16	100
2017	25	100	0	0	25	100
2018	25	96	1	4	26	100
2019	24	92	2	8	26	100
2020	59	75	20	25	79	100
Total	198	88	26	12	224	100

## Descriptive Statistics

Descriptive statistics are statistical methodologies that are widely used in research to provide an overview of how the data from the study's variables are organized. The four indicators employed in this study's descriptive statistics are each variable's mean, median, minimum, and maximum values. The results of descriptive statistics are shown in Table 4. The average result of logarithm natural from audit fee is 20.515 with a median of 20.482, a minimum result of 18.498, and a maximum of 23.306. Higher result of logarithm natural audit fee indicates a higher level of risk (Bailey *et al.*, 2018; Bronson & Hogan, 2017; DeFond & Zhang, 2014; Judd *et al.*, 2017; Leidner & Lenz, 2017; Yang *et al.*, 2018).



**Table 4**  
**Descriptive Statistics**

	Mean	Median	Minimum	Maximum
AUD_FEE	20.515	20.482	18.498	23.306
CRO_EXISTENCE	0.152	0.000	0.000	1.000
CRO_EXPERTISE	0.116	0.000	0.000	1.000
ROA	2.826	2.530	-37.080	26.420
LEV	0.498	0.495	0.004	1.000
FSIZE	29.423	29.391	25.687	34.972
LOSS	0.183	0.000	0.000	1.000
ARL	88.138	86.000	14.000	180.000
CAPINT	0.083	0.028	0.000	0.703
BOARD	9.205	9.000	4.000	31.000
INDCOM	1.821	2.000	0.000	7.000
BIG4	0.290	0.000	0.000	1.000

**Pearson Correlation**

Pearson Correlation is a statistical approach for assessing the correlation between two variables to guarantee that it is unaffected by other variables. The Pearson Correlation for this investigation is shown in Table 5. As indicated in Table 5., the variable of the existence of CRO (CRO\_EXISTENCE) has a significant positive relationship with audit fee (AUD\_FEE) at the 10% level. Meanwhile, the variable of expertise of CRO (CRO\_EXPERTISE) has a significant positive relationship with audit fee (AUD\_FEE) at the 5% level. LEV, FSIZE, BOARDSIZE, INDCOMM, and BIG4 are positively associated with AUD\_FEE.

**Table 5**  
**Pearson Correlation**

	[1]	[2]	[3]	[4]	[5]	[6]
[1] AUD_FEE	1.000					
[2] CRO_EXISTENCE	0.111* (0.098)	1.000				
[3] CRO_EXPERTISE	0.151** (0.024)	0.857*** (0.000)	1.000			
[4] ROA	0.051 (0.443)	-0.055 (0.414)	-0.040 (0.548)	1.000		
[5] LEV	0.394*** (0.000)	0.369*** (0.000)	0.366*** (0.000)	-0.081 (0.225)	1.000	
[6] FSIZE	0.745*** (0.000)	0.323*** (0.000)	0.358*** (0.000)	0.050 (0.460)	0.567*** (0.000)	1.000
[7] LOSS	-0.075 (0.266)	-0.072 (0.286)	-0.099 (0.138)	-0.640*** (0.000)	-0.149** (0.026)	-0.169** (0.011)
[8] ARL	-0.093 (0.166)	-0.194*** (0.004)	-0.229*** (0.001)	-0.326*** (0.000)	-0.239*** (0.000)	-0.260*** (0.000)
[9] CAPINT	-0.084 (0.209)	-0.116* (0.084)	-0.114* (0.090)	-0.003 (0.962)	-0.145** (0.030)	-0.230*** (0.001)
[10] BOARD	0.565*** (0.000)	0.162** (0.015)	0.188*** (0.005)	0.128* (0.056)	0.300*** (0.000)	0.663*** (0.000)
[11] INDCOM	0.512*** (0.000)	0.204*** (0.002)	0.222*** (0.001)	0.010 (0.882)	0.331*** (0.000)	0.621*** (0.000)
[12] BIG4	0.468*** (0.000)	0.223*** (0.001)	0.260*** (0.000)	0.084 (0.211)	0.266*** (0.000)	0.451*** (0.000)

		[7]	[8]	[9]	[10]	[11]	[12]
[7]	LOSS	1.000					
[8]	ARL	0.442*** (0.000)	1.000				
[9]	CAPINT	0.096 (0.151)	0.069 (0.302)	1.000			
[10]	BOARD	-0.185*** (0.006)	-0.376*** (0.000)	-0.140** (0.036)	1.000		
[11]	INDCOM	-0.071 (0.287)	-0.289*** (0.000)	-0.169** (0.011)	0.757*** (0.000)	1.000	
[12]	BIG4	-0.150** (0.025)	-0.216*** (0.001)	-0.188*** (0.005)	0.348*** (0.000)	0.296*** (0.000)	1.000

Note: \*, \*\* and \*\*\* represent significance at  $p < 0.10$ ,  $< 0.05$  and  $< 0.01$ .

### Main Regression

We present the results of multiple linear regression to test the first and second hypotheses in Table 6. The first column shows the test result for the relationship between CRO existence and audit fee. We document a negative significant relationship between CRO existence and audit fee at the 1% significance level (coeff = -0.368,  $t = -2.80$ ). This result indicated that every company with a CRO on the board of directors will have a lower audit fee. A lower audit fee means a lower firm's risk (DeFond & Zhang, 2014; Judd *et al.*, 2017; Yang *et al.*, 2018), and it has been proven that hiring CRO lowers a firm's risk (Li *et al.*, 2022). This finding supports the first hypothesis.

Meanwhile, in the second column, we display the test result for the relationship between CRO expertise and audit fee. We document a negative significant relationship between CRO existence and audit fee at the 5% significance level (coeff = -0.350,  $t = -2.39$ ). It implies that CROs with an education background in accounting, management, business administration, and risk management certification have a negative relationship with audit fee. This result is consistent with previous studies, which state that CRO expertise is related to the firm's ERM quality (Bailey, 2022). MBA-educated CROs are connected with higher ERM quality. Higher-quality ERM systems progressively lower audit fee, audit delays, and the likelihood of late submission (Bailey *et al.*, 2018). Thus, the second hypothesis is accepted.

**Table 6**  
**Regression Results for CRO Existence and CRO Expertise with Audit Fee**

	Predicted Sign	(1) AUD_FEE	Predicted Sign	(2) AUD_FEE
CRO_EXISTENCE	-	-0.368*** (-2.80)		
CRO_EXPERTISE			-	-0.350** (-2.39)
BOARD	+	0.022 (1.12)	+	0.020 (1.07)
INDCOM	+	0.105 (1.35)	+	0.093 (1.24)
BIG4	+	0.489*** (4.09)	+	0.492*** (4.09)
ROA	+	0.004	+	0.004

	Predicted Sign	(1) AUD_FEE	Predicted Sign	(2) AUD_FEE
LEV	+	(0.34) 0.270	+	(0.39) 0.237
FSIZE	+	(1.00) 0.397***	+	(0.90) 0.399***
LOSS	+	(9.29) 0.125	+	(9.44) 0.132
ARL	+	(0.67) 0.005***	+	(0.73) 0.005***
CAPINT	+	(3.03) 0.667**	+	(2.99) 0.653**
_cons		(2.10) 7.976***		(2.05) 8.024***
Year FE		(7.48) Yes		(7.52) Yes
R <sup>2</sup> adjusted		0.610		0.607
N		224		224

Note: \*\* and \*\*\* represent significance at  $p < 0.05$  and  $< 0.01$ .

### Robustness Analysis

The issue of endogeneity is a common concern in accounting and finance research (Azzam & Alhababsah, 2022). Thus, we employ two endogeneity tests to minimize endogeneity issues in our results. The endogeneity tests include coarsened exact matching (CEM) and Heckman's two-stage regression.

#### Coarsened Exact Matching (CEM)

We argue that the existence of CROs and CRO expertise in this study may generate a potential endogeneity problem. Therefore, we employ CEM to handle this problem. CEM is believed to be more eminent than Propensity Score Matching (PSM), as the PSM design choice has several weaknesses, i.e., matching with or without replacement, the number of additional variables in the model, the number of iterations, and bootstrapping analysis (Harymawan, 2018). Table 7 reports the results of the CEM regression test using 112 firm-year observations for the first equation model and 83 firm-year observations for the second one. The CEM test is based on all control variables used in the model and uses three strata as the basis. The decreased amount of observations is due to several requirements in CEM for observation to be classified as matched by CEM.

Based on Table 7, column 1, we capture the consistent result of CRO existence as negatively related to audit fee at 5% significance level (coeff = -0.366,  $t = -2.40$ ). Then, in Table 7, column 2, we capture that CRO expertise has negatively significant with audit fee at 5% significance level (coeff = -0.370,  $t = -2.38$ ). Therefore, the results of this study are consistent and robust based on the self-selection bias problem of observable variables.

**Table 7**  
**Regression of CEM Method**

	Predicted Sign	(1) AUD_FEE	Predicted Sign	(2) AUD_FEE
CRO_EXISTENCE	-	-0.366** (-2.40)		
CRO_EXPERTISE			-	-0.370** (-2.38)
Controls		Yes		Yes
_cons		8.703*** (5.22)		6.765*** (3.91)
Year FE		Yes		Yes
R <sup>2</sup> adjusted		0.645		0.786
N		112		83

Note: \*\* and \*\*\* represent significance at  $p < 0.05$  and  $< 0.01$ .

### Heckman Two-Stage Regression

We argue there are possibilities of unobserved variables that could influence the CRO existence, CRO expertise, and audit fee variable. Unobserved variables are known as variables that are not included in the main regression model but may have a relationship with the dependent variable (Prabhawa *et al.*, 2021). Furthermore, in Indonesia, companies can choose whether to employ a CRO or not or to employ a CRO with or without expertise (background in accounting, management, business administration, and/or possessing risk management certifications). When combined, it is possible that the one with a relationship with audit fee is not CRO existence and CRO expertise but an unobserved variable. Therefore, we employ Heckman's two-stage regression analysis to address this issue and minimize the occurrence of undesired relationship sources from CRO traits instead of CRO existence and CRO expertise.

This study uses an instrumental variable: the likelihood of a CRO appointment and its presence on boards in one industry year (PROCRO\_EXISTENCE and PROPCRO\_EXPERTISE). The variables are calculated using the mean of the CRO\_EXISTENCE and CRO\_EXPERTISE values throughout an industry and year. These two variables are believed not to directly correlate with the dependent variable except through the independent variables. Our Heckman two-stage regression analysis is provided in Table 8.

Table 8 Panel A shows the results of the first and second-stage Heckman two-stage regression for the relationship between CRO existence and audit fee. Our Heckman two-stage regression analysis shows that PROCRO\_EXISTENCE has a significant positive relationship at a 1% level with CRO\_EXISTENCE (coeff = 14.683,  $t = 13.11$ ). This result implies that firms in an industry and year dominated by boards are more likely to have CRO positions. The CRO position (CRO\_EXISTENCE) displays a negative significance with audit fee (AUD\_FEE) in the second stage of regression at 1% (coeff = -0.359,  $t = -2.69$ ). However, the MILLS variable shows insignificant audit fee results (coeff = -0.235,  $t = -0.21$ ).

Then, Table 8 Panel B shows the results of the first-stage and second-stage Heckman two-stage regression for the relationship between CRO expertise and audit fee. The results show that PROPCRO\_EXPERTISE has a significant positive relationship at a 1% level with CRO\_EXPERTISE (coeff = 18.583, t = 11.27). This result shows that firms in an industry and a year dominated by boards are more likely to have a CRO with accounting, management, business administration, and or risk management certification. Then, in the second stage of regression, the result shows that CRO expertise (CRO\_EXPERTISE) displays a negative significance with audit fee (AUD\_FEE) at a 5% level significant (coeff = -0.348, t = -2.38). However, the MILLS variable shows insignificant audit fee results (coeff = -0.186, t = -0.21).

These results confirm that our model result in the main analysis does not have an endogeneity issue, specifically an unobserved variables issue, as the result is consistent, but the MILLS is insignificant.

**Table 8**  
**The Results of Heckman Two-stage Regression**

Panel A: Heckman's two-stage regression results for the relationship between CRO existence and audit fee.

	Predicted Sign	(1) CRO_EXISTENCE	Predicted Sign	(2) AUD_FEE
PROPCRO_EXISTENCE	+	14.683*** (13.11)		
CRO_EXISTENCE			-	-0.359*** (-2.69)
MILLS				-0.235 (-0.21)
Controls		Yes		Yes
_cons		-8.606*** (-2.68)		9.923 (1.12)
Year FE		Yes		Yes
R <sup>2</sup> adjusted				0.608
N		224		224

Panel B: The results of Heckman two stage regression for the relationship between CRO expertise with audit fee.

	Predicted Sign	(1) CRO_EXPERTISE	Predicted Sign	(2) AUD_FEE
PROPCRO_EXPERTISE	+	18.583*** (11.27)		
CRO_EXPERTISE			-	-0.348** (-2.38)
MILLS			-	-0.186 (-0.21)
Controls		Yes		Yes
_cons		-10.129** (-2.51)		9.744 (1.18)
Year FE		Yes		Yes
R <sup>2</sup> adjusted				0.605
N		224		224

Note: \*\* and \*\*\* represent significance at p<0.05 and <0.01.

### Additional Analysis: CRO existence, CRO expertise, and audit fee in the big firm vs small firms

We generate big and small firms categorized using the median of FSIZE variable. Table 9 Panel A reports the results of the relationship between the CRO existence and audit fee in the sample of big and small companies. The results demonstrate that big firms considerably benefit the CRO\_EXISTENCE relationship with AUD\_FEE. This means that CRO existence in a more prominent firm can mitigate operational, compliance, regulatory, and strategic risks, which has a better impact on reducing audit fee. This analysis results support findings in previous studies (Pratt *et al.*, 2023). Then, Table 9 Panel B reports the results of the relationship between the CRO expertise and audit fee in the sample of big and small companies. The results show that CRO expertise has a negative significant relationship with audit fee in big firms. It means that CROs with the right qualifications in big firms have lower audit fee, thus implying a lower risk. The study by Bailey (2022) showed that CRO expertise relates to the quality of ERM implementation. High-quality ERM reduces the company's risk as it manages the risk affecting its earnings volatility (Committee of Sponsoring Organizations of the Treadway Commission, 2017). Bigger firms have a higher risk, more volatile cash flows, and riskier stock returns (Angelo & Johnston, 2023). Thus, the impact of CRO's expertise in the related field is more palpable in bigger firms.

**Table 9**  
**CRO Existence, CRO Expertise, and Audit Fee in The Big Firms vs Small Firms**

Panel A. CRO existence and audit fee in the big vs small firms				
	Big Firms		Small Firms	
	Predicted Sign	(1) AUD_FEE	Predicted Sign	(2) AUD_FEE
CRO_EXISTENCE	-	-0.523*** (-2.99)	-	-0.202 (-0.80)
Controls		Yes		Yes
_cons		11.503*** (4.38)		10.299*** (4.37)
Year FE		Yes		Yes
R <sup>2</sup> _adjusted		0.419		0.266
N		112		112
Panel B. CRO expertise and audit fee in the big vs small firms				
	Big Firms		Small Firms	
	Predicted Sign	(1) AUD_FEE	Predicted Sign	(2) AUD_FEE
CRO_EXPERTISE	-	-0.456** (-2.54)	-	-0.092 (-0.31)
Controls		Yes		Yes
_cons		10.970*** (4.24)		10.446*** (4.43)
Year FE		Yes		Yes
R <sup>2</sup> _adjusted		0.403		0.262
N		112		112

Note: \*\* and \*\*\* represent significance at  $p < 0.05$  and  $< 0.01$ .

**CRO Existence, CRO Expertise, and Audit Fee in the BIG4 vs Non-BIG4 firms**

Table 10 Panel A reports the results of the relationship between the CRO existence and audit fee in the sample of companies audited by Big4 firms or not. The results show that when Big4 audits companies, it turns out that CRO existence does not show a significant relationship with audit fee. Otherwise, the regression in non-Big4 samples shows a negative significant relationship. This might be since our samples have primarily come from firms affiliated with non-Big4. The total number of companies with non-Big4 affiliations is three times bigger than the total of firms audited by Big4.

Then, Table 10 Panel B reports the results of the relationship between the CRO expertise and audit fee in the sample of companies audited by Big4 firms. Similar to the results of the relationship between CRO existence and audit fee, we found that the negative and significant relationship between CRO expertise and audit fee only occurs when a firm is audited by non-Big4. The audit fee is lower if the company uses non-Big4 firms because they do not have to pay a premium for their reputation (DeFond & Zhang, 2014). The study by Bailey (2022) discovered a link between CRO expertise and the firms' ERM quality. CROs with an MBA are associated with improved ERM quality. ERM quality affects the company's overall risk. Thus, firms with expert CROs have a lower risk than those without the expertise.

**Table 10**  
**CRO Existence, CRO Expertise, and Audit Fee in the BIG4 VS Non-BIG4 Firms**

Panel A. CRO existence and audit fee in the Big4 vs. non-Big4				
	Big4		Non-Big4	
	Predicted Sign	(1) AUD_FEE	Predicted Sign	(2) AUD_FEE
CRO_EXISTENCE	-	-0.294 (-1.45)	-	-0.384** (-2.13)
Controls		Yes		Yes
_cons		8.221** (2.54)		8.036*** (6.95)
Year FE		Yes		Yes
R <sup>2</sup> adjusted		0.499		0.529
N		65		159
Panel B. CRO expertise and audit fee in the Big4 vs. non-Big4				
	Big4		Non-Big4	
	Predicted Sign	(1) AUD_FEE	Predicted Sign	(2) AUD_FEE
CRO_EXPERTISE	-	-0.277 (-1.31)	+	-0.404** (-2.51)
Controls		Yes		Yes
_cons		8.221** (2.53)		7.988*** (6.93)
Year FE		Yes		Yes
R <sup>2</sup> adjusted		0.496		0.525
N		65		159

Note: \*\* and \*\*\* represent significance at p<0.05 and <0.01.

## CONCLUSIONS, LIMITATIONS, AND SUGGESTIONS

This study elucidates the relationship between the presence of a Chief Risk Officer (CRO) and their expertise with audit fee. Utilizing data from the Indonesia Stock Exchange for Standard Industrial Classification (SIC) code 6 during the 2011–2020 period, this research's findings document that a CRO's existence is significantly and negatively associated with audit fee. These results indicate that companies with a CRO on their board of directors will incur lower audit fee. A reduction in audit fee implies a lower risk for the firm. Furthermore, our research also reveals that CRO expertise has a significant and negative correlation with audit fee. This implies that CROs with educational backgrounds in accounting, management, business administration, or risk management certifications are inversely related to audit fee. The robustness of these results is affirmed by using Coarsened Exact Matching (CEM) and Heckman's two-stage regression methods. Additional analyses were conducted to augment the research findings.

The findings of this study offer several theoretical and practical advancements. Theoretically, it provides novel evidence that challenges existing audit pricing theories. It suggests that government bodies, investors, and other stakeholders could leverage these research outcomes to investigate and consider the mandate of appointing CROs within the banking, insurance, and real estate sectors to mitigate corporate risk. The presence of a CRO on the board of Indonesian companies suggests a reliable risk management system, which can assist firms in devising strategies within acceptable risk parameters, thereby enhancing performance and garnering public trust. Moreover, a dependable risk management system can lead to more efficient operations and improved performance.

Nonetheless, we acknowledge the limitations of this study. Specifically, Indonesia's scarcity of data on audit fee disclosures significantly constrains the research sample size. This is attributed to the lack of regulatory requirements to disclose the amount of audit fee. Future research might adopt alternative methodologies, such as through observation or direct interviews.

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