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Role of Analyst Following in the Relationship between Integrated Reporting Quality (IRQ) Disclosure and Cost of Equity Capital in Developed Markets

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Abstract The study aims to examine the role of analyst following (AF) in the relationship between IR quality (IRQ) disclosures and implied cost of equity capital (ICC) in the developed market in Australia and New Zealand. The study also examined whether companies with higher-quality integrated reporting (IR) benefit from the cost of equity capital reduction. The main objective is to identify the role of AF in explaining the relationship between IRQ disclosure and ICC. Besides, the study highlighted the average effects of IR benefits, which increase when there is more information asymmetry between firms and investors. Furthermore, IR could play a bigger role (with greater information asymmetry) than cross-sectional tests. The study used a common sample of 100 top companies based on Standard and Poor's market capitalisation in Australia and New Zealand (2014-2016), with 870 observations of post-implementation IR. This study showed a significant, negative relationship between IRQ and the ICC with top companies in Australia and New Zealand. Also, the results showed that AF is a partial mediator in explaining the relationship between IRQ and the cost of equity capital. The findings also indicated that AF has a vital role in IRQ disclosures, associated with a subsequent reduction in the cost of equity capital in the developed market.

Keywords Analyst Following, IR Quality (IRQ), Implied Cost of Equity Capital (ICC)

1. Introduction

The growing need for corporate transparency has encouraged companies to report their performance to shareholders, investors and society from economic, social and environmental perspectives. Corporate report has evolved within growing economies due to enhanced capital markets, requiring corporate disclosure to be true and fair, whereby companies should report their performance (financial and non-financial) to stakeholders [49,41] to make relevant decisions. The rising interest in non-financial information has caused many companies to participate in sustainability reporting (Klynveld Peat Marwick and Goerdeler (KPMG) [41]. Moreover, the additional requirements for corporate transparency have also encouraged companies to report their performance to shareholders, investors, and society from economic, social, and environmental perspectives. Due to the challenges faced by entities in analysing information, IR is developed to minimise the problem [49]. Specifically, traditional reporting failed to link the relevance of financial reporting and sustainability and the connection to a firm's strategy [57]. Besides, traditional report does not promote value creation mechanisms, which should adapt to changes in the business environment [1].

The International IR Council (IIRC) defines an integrated report as *"a concise communication about how an organisation's strategy, governance, performance, and prospects lead to the creation of value over the short,*

medium and long term' [38]. The goal of implementing IR is to upgrade the quality, not to provide more information. Besides, the IR is information that investors are interested in during investment appraisal [29] to enhance decision making. Generally, investors in the capital market seek a better reporting system to predict accounting information on future performances accurately. The IIRC mainly aims to improve annual reports, supply more detailed financial information about future prospects [24] and ensure a transparent process for all communication to stakeholders [21]. Additionally, the IR framework enhances the information quality for stakeholders, expands "integrated thinking"; and sets the rules and standards for a beneficial integrated model [39]. Nonetheless, studies on the role of AF are limited.

An essential criterion involves investors and stakeholders embracing the use of IR in the capital market to provide high-level disclosure in a single report [8]. Thus, stakeholders should obtain a holistic understanding of a company, its operations and performance [28]. The IR also provides investors with relevant information for long-term decision-making [39], highly crucial to the capital market to reveal crucial information. Furthermore, IR affects the capital market, creating stock price reactions and impacts on the cost of capital, such as increasing an investor's ability to estimate future cash flow [8]. Additionally, IR provides material information to the capital market, enabling investors to predict market out-turns accurately and accurate company valuations [24]. Although IR practice is voluntary and not mandatory [18], most big companies worldwide have adopted the process.

The IR is more applicable to industrialised countries [24]. For instance, Australia and New Zealand have efficient market performance [56]. As common law countries, Australia and New Zealand generally provide better protection for investors; hence, easing IR implementation. Nevertheless, despite the potential of IR in enhancing the quality of accounting information for stakeholders, few studies have highlighted the subject. Moreover, although AF is a crucial accounting requirement, limited studies have investigated its role. Hence, the study aims to analyse the new corporate reporting behaviour and examine the voluntary effect of reducing equity capital cost in the 100 top companies in Australia and New Zealand.

2. Literature Review

2.1. Voluntary Disclosure and Analyst Following and Cost of Equity Capital

Prior studies argue that an analyst is an important mediator between a firm and investors, and has a significant influence on the cost of equity. However, how analyst following influences the cost of equity has not been studied in depth [62]. Past studies suggest that disclosure of financial or Non-financial encourages information asymmetry and reduces the cost of equity capital [25]. The information risk theory states that due to information asymmetry between outside investors and managers, managers tend to get external investors' interests by using internal information benefits [2]. Therefore, a stronger information asymmetry between investors and firms produces higher returns on capital for outside investors to protect their interests. Thus, information asymmetry is the main factor affecting the efficiency of the market economy [48]. Several studies have examined the relationship between voluntary disclosure and AF. For example, [20] studying 324 firms' year observations in Canada, highlights the quality and quantity of financial disclosure negatively related to the cost of equity capital for firms with low AF. The study discovered a significant positive relationship between social disclosure and the cost of equity capital. Hence, the level of disclosure is linked to the number of AF, whereby firms with high information disclosure quality experience improved external supervision mechanisms [37]. Therefore, better quality disclosure attracts greater AF. Studies also mentioned that an analyst is crucial in explaining the role of firms and investors, significantly influencing the cost of equity [62]. Conversely, [20] studies revealed no relationship between voluntary environmental disclosure and the cost of equity capital. Voluntary disclosure theory asserts that voluntary disclosures help to improve the information environment of companies by enhancing analysts' understanding of companies' prospects[624]. [64] Study finds analysts' forecast error reduces as a company's level of alignment with the IR framework increases. Further, the improved alignment is associated with a subsequent reduction in the cost of equity capital for certain reporting companies. The general argument from these studies is that better disclosure quality enhances analysts' understanding of the company's performance and future outlook and helps analysts interpret the disclosures in an informed and similar manner, which in turn results in improved forecast accuracy and a lower forecast dispersion.

Non-financial information can help analysts predict whether the non-financial information is value relevant. Notably, Chang et al. (2015) discovered that corporate social responsibility (CSR) information increased investors' willingness to invest in the company when the information has high relevance. Meanwhile, [58]studies revealed that analysts tend to under-react to non-financial disclosure measures with the significant predictive ability for future earnings. [55] Studies found a significant negative relationship between CSR disclosure ratings and the cost of equity capital, concluding a more noticeable negative relationship in the firms operating in environmentally sensitive industries. [26] reported a potential benefit in initiating voluntary disclosure of CSR activities: reducing firms' cost of equity capital. Furthermore, firms with a high cost of equity capital in previous years tend to institute disclosure of CSR activities in the current year. Besides, initiating firms with superior social responsibility performance experience a further reduction in the cost of

equity capital. [26] It highlighted a negative association between CSR disclosure and the cost of equity capital, a relationship more noticeable in stakeholder-oriented countries. Observably, financial and CSR disclosure substitutes one another in reducing the cost of equity capital. The AF quality is measured using the number of AF for the firm and an index of AF quality.

Recently, [62] studies concluded that an analyst is a crucial mediator between a firm and investors, significantly influencing the cost of equity. [26, 8, 49] examined IR and the cost of equity capital as an inconsistent relationship. Meanwhile, [26] investigated CSR disclosure and found that environmental disclosure can relieve information asymmetry, reducing the cost of equity capital. Thus, the stronger the degree of information asymmetry between investors and corporations, the higher the return on capital required by outside investors to protect their interests, although information asymmetry mainly affects efficiency in the capital market [62]. Therefore, AF improves environmental information disclosure and lowers the cost of equity. The increasing concern about information disclosure is vital in relieving information asymmetry and attracting outside investors, thus lowering the risk premium investors require and the cost of equity capital. The study contributions include adding AF to the limited literature on the relationship between IRQ disclosure and cost of equity capital.

Although some studies examine the relationship between IRQ disclosure, AF and cost of equity capital, the subject remains unclear. Most studies focused on the relationship between environmental disclosure and cost of equity and ignored the role of AF between IRQ disclosure and the cost of equity capital. Hence, the study investigates the link between IRQ disclosure and the cost of equity by using AF as the mediating variable in identifying the impact. Additionally, the study used the prospect theory (PT) and signalling theory (ST) to explain the link between IRQ disclosures and AF and cost of equity capital.

Model 1

$$c \ldots ICC_{it} = \beta_0 + \beta_1 IRQ_{it} + \beta_2 LTG_{it} + \beta_3 CSR_{it} + \beta_4 LEV_{it} + \eta i + \mu it$$

$$a \ldots b \ldots IRQ_{it} = \beta 0 + \beta 1 AFit + \beta 2 LTGit + \beta 3\ CSR\ it + \beta 4 LEV\ it + \eta i + \mu it$$

$$AF_{it} = \beta 0 + \beta 1 ICCit + \beta 2 LTGit + \beta 3 CSR\ it + \beta 4 LEV\ it + \eta i + \mu it$$

X=IRQ Y=ICC

c = the total effect of X on Y c = c' + ab c'= the direct effect of X on Y after controlling for M;c' = c-ab

ab = indirect effect of X on Y

3. Theoretical Framework

Management behaviour creates an information gap between the firm and investors. For example, the investors' uncertainty about the quality of investment opportunities and lack of distrust towards management cause them to charge an equity premium to provide capital to the firm [22]. Observably, the cost of equity capital in New Zealand and Australia is high [42,45], which explains the relationship between IRQ disclosure and the ICC. The study is based on the voluntary disclosure theory.

Notably, past studies have applied the voluntary disclosure theory, processing information theory and political social and institutional theory[47,4,8] to examine the relationship between IRQ disclosure and ICC. Meanwhile, several theories have been used to describe the relationship between voluntary disclosure, AF and ICC: physiology theory, institutional theory and voluntary disclosure theory [9,8]. The study is based on the most suitable theory that explains the relationship between IRQ disclosure, AF and ICC. Hence, the study applied the prospect theory that describes the decisions made under the circumstance of uncertainty and risk[50]. Prospect theory explains decisions that people make under circumstances of uncertainty and risk. Thus, prospect theory can be used to explain analyst earnings forecast behaviour and the cost of equity capital. [60]It suggests that corporate disclosure helps analysts and investors to estimate future earnings as a corporate manager has to disclose relevant information. Urges, high-quality disclosure of corporate reporting increases the number of analysts using the information to interpret business performance. Hence, the practice encourages investors to invest in the business; thus, increasing the cash flow and reducing the cost of equity capital. Accordingly, companies are encouraged to disclose information quality through IR, which reduces the information risk and allows raising capital at the lowest cost possible. Besides, [60]it proposed that relevant information reported in the corporate disclosure helps analysts and investors estimate future earnings. Studies have also proven the link between voluntary disclosure and AF [36,13]. Thus, the following is proposed:

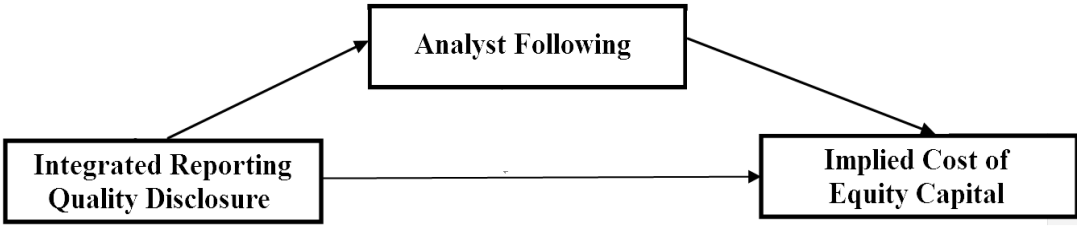

Figure 1. Path Diagram of IRQ disclosure, analyst following and cost of equity capital

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H1. There is a negative relationship between IRQ disclosure and the cost of equity capital.

H2. AF mediates the relationship between IRQ and the cost of equity capital.

Note: *"When the level of corporations' disclosure is high, companies with a large number of AF and decreased the cost of equity capital because analysts obtained sufficient information through the IR with a deeper understanding of a company's performance by obtaining highly accurate information. Thus, analysts interpret business performance to predict future earnings forecasts, attract* more *investors to invest their investment, leading to a lower cost of equity capital. Investors do not require information from the company, noting the report publicly available. Meanwhile, one method of reducing the cost of equity capital is by reducing the estimation risk through an effective analyst. Generally, analysts encourage firms to produce high-quality disclosure to understand the company performance better, simultaneously encouraging investors on business performance and interpreting future earnings forecasts to attract more investors and shareholders. Therefore, high or low AF is crucial in creating a strong relationship between IRQ disclosure and cost of equity capital "IRQ disclosure reduces the cost of equity capital when the companies have high AF".*

4. Materials and Methods

The study sample involved 100 top companies listed under the Australian and New Zealand stock exchanges, engaged in IR over the years (2014, 2015 and 2016, 2017, 2018) [1]. The data were mainly from varied sources, including samples of earnings per share (EPS) analysts' forecasts from I/B/E/S Database for cost of equity capital estimation (monthly) 870 companies, and IR from annual IR, hand collection, company websites, IIR database. Meanwhile, there are missing data for IR score construction 29 and missing data with control variable data 13. Additionally, data on AF were obtained from the I/B/E/S Database, whereas corporate governance from three sources of data collection, annual reports, websites and direct contacts. Ultimately, the final sample size for analysis was 870 from 600 top companies listed in Australia and New Zealand.

The dependent study variable is the ICC. Generally, numerous models can calculate the cost of equity capital, with significant debate about the best measure[14,27]. Accordingly, the average ICC is calculated using the price-earnings to growth (PEG) ratio model developed in Easton (2004) in the 12 months after the fiscal year-end. Following to [15,55,49,62].

Generally, [27] model was used as an alternative proxy of the cost of equity capital due to several reasons. Firstly, [13] concluded that rPEG dominates the other models by embedding the relationships with the firm-specific risk factors. Secondly, after adding the future realised return model and the impact of analyst forecast bias, both analyses supported the validity of rPEG due to a strong link with firm-specific risk and future realised returns.

The estimation model is as follows:

Equation (5-1)

$$icc_{peg} = \sqrt{\frac{EPS_2 - EPS_1}{P_0}}$$

Where

icc peg = the implied cost of equity capital.

EPS_2 = two-year- ahead median analyst's earnings forecast per share.

EPS_1 = one-year- ahead median analyst's earnings forecast per share.

P_0 = daily price per share immediately prior to the EPS forecasts.

Studies by [59,35,3] are based on the content elements of the disclosure checklist in the framework to standardise IR by IIRC. Besides, a weighted scoring approach was used [14,27] to measure the quality of integrated reports. Next, a detailed scoring scheme of 0-3 was applied to score the

[1] To calculate the implied cost of equity capital (ICC) for each year, under method price-earnings growth (PEG) ratio is developed in model Easton (2004). Based on the equation, it should take two years ahead median analyst's earnings forecast per share. In this light, in calculating the cost of equity capital for the year 2016, it should take a median analyst's earnings forecast per share for 2017 and 2018.

findings, aligning with past studies [35,3]. The scoring scheme is '0-3', whereby zero (0) is for compliance, and one (1) if the companies provided general qualitative disclosures, two (2) for specific information, and three (3) for detailed discussion incorporating quantitative figures. (see Appendix 1)

The number of AF is a proxy to measure AF [40,5,17,62]. For instance, [40] studied analyst characteristics and market liquidity using the number of AF high and low as a proxy to measure AF while [40] used the number of AF to measure AF. Meanwhile, [17] (2008) showed that analyst coverage is measured as the number of unique analysts issuing earnings forecasts based on the I/B/E/D Detailed Earnings Forecasts file in the year before the offer.

Based on Table 1, the average ICC in Australia and New Zealand is 0.298, with a minimum value of 0.138 and a maximum value of 0.667. A standard deviation of 0.100 shows that most companies in both countries have close to the average ICC. Nonetheless, some companies have extremely low or high ICC. Notably, the average ICC of 0.298 in Australia and New Zealand is higher than the United States (US) and South African listed companies [27,64] 0.11 and 0.137, respectively. On average, Australia and New Zealand have a higher cost of capital than the US and South Africa. Besides, the average IRQ score is 0.723, with a minimum score of 0.106 and the maximum score of 3.464. Compared to the benchmark score of 3, Australia and New Zealand have not performed well with their IR framework. A standard deviation of 0.456 also shows a considerable gap among the study samples IRQ. The findings align with [54] integrated disclosure score index based on a checklist, whereby the average IR scored 0.395, with a maximum scoring of 1.000. The score is lower than [64] on the quality of integrated reports score in South Africa, averaged at 6.283 using a disclosure checklist based on a full framework (content elements and guiding principles). The method aligns with King III's (2009) recommendation that the board, through the audit committee, should collectively ensure the information integrity in the integrated reports.

The average total score of AF in Australia and New Zealand was 0.109, with a minimum score of 0.000 and a maximum of 0.635. Moreover, a standard deviation of 0.128 indicates that most companies in Australia and New Zealand have close to an average number of AF, with few companies having high AF and others lower. [62] reported a higher average of 2.178, the maximum being 6.103 and a minimum of 0.621. Additionally, the average monthly LTG rate is 0.209, with a minimum growth rate of 0.017 and a maximum of 0.695, with a standard deviation of 0.143. Meanwhile, the average corporate social responsibility score is 0.100, with a minimum score of 0.006 and a maximum of 0.481, with a standard deviation of 0.085. Finally, the average Leverage is 0.155, with a minimum value of 0.012 and a maximum of 0.524, with a standard deviation of 0.070.

Table 2 shows that the ICC has a negative and significant correlation of -0.139 with IRQ DISCLOSURE. Hence, companies with a high quality of disclosure have a lower cost of equity capital, consistent with [33,49]. Besides, ICC has a negative correlation of - 0.068 with AF, consistent with[15]. Conversely, the IRQ DISCLOSURE has a positive correlation with AF at 0.364. Nonetheless, companies that disclose high-quality information have several AF.

Table 1. Summary Statistic for Full Sample Size

	Full Sample				
Variable	**Obs**	**Mean**	**Std.dev.**	**Min**	**Max**
ICC-PEG	870	0.298	0.100	0.138	0.667
IRQDIS	870	0.723	0.470	0.106	3.464
AF	870	0.109	0.107	0.000	0.635
LTG	870	0.209	0.143	0.017	0.695
CSR	870	0.100	0.085	0.006	0.481
LEV	870	0.155	0.070	0.012	0.524
Where ICC = implied cost of equity capital. IRQDIS= IR quality disclosure AF = the number of analyst following; LTG = the average of the monthly long-term growth rate during the fiscal year, obtained from I/B/E/S. CSR = a corporate social responsibility report issued by the company. LEV = the ratio of the total debt divided by total assets.					

Table 2. The Bivariate Data Correlations for all Variables

Obs=780	ICC-PEG	IRQ-DIS	AF	LTG	CSR	LEV
ICC-PEG	1					
IRQDIS	-0.139**	1				
AF	-0.068	0.364**	1			
LTG	0.319**	0.832**	0.318**	1		
CSR	0.191**	0.709**	0.353**	0.800**	1	
LEV	0.4372	0.0033	-0.0040	0.2309*	0.0451	1

Table 3. Means Comparison (Means in bold are significantly different at p < 0.05, two-tailed)

	Full sample		High Analyst		Low Analyst		t-value	p-value
			Following		Following			
Variable	Obs	Mean	Obs	Mean	Obs	Mean		
ICCPEG	870	0.298	314	0.215	208	0.302	2.245	0.027
IRQDIS	870	0.723	314	0.846	208	0.551	-9.663	0.004
LTG	870	2.813	314	2.901	208	1.549	2.561	0.000
CSR	870	0.286	314	0.227	208	0.351	-1.929	0.041

Note: The mean comparison of AF with all the variables is based on two groups of companies that have a high and low number of AF. Independent-Sample T-Test used to measure mean scores.

Table 4. Normality test

	ICC- PEG	IRQ-DIS	AF	LTG	CSR	LEV
Skewness	0.526	0.865	0.877	0.932	0.492	0.950
Kurtosis	-0.273	1.046	2.442	0.163	2.197	1.759

Based on Table 2, ICC has a positive correlation of 0.319 with LTG. Unlikely, the results showed that ICC has a positive and significant effect of 0.832 with IRQ DISCLOSURE. The ICC has a positive and significant correlation of 0.191 with CSR. Meanwhile, CSR has a positive and significant correlation of 0.709 with IRQ DISCLOSURE. Finally, the result shows ICC has a negative and visible correlation of 0.4372 with Leverage (LEV). Generally, the correlations are consistent with the first study hypothesis and past studies [26].

Table 3 displays the mean [2] comparison between companies with high and low AF. The results indicated that companies with a high number of analysts have a lower cost of equity capital (m = 0.215) than companies with low numbers of AF (m = 0.302). The results also suggested that companies with high numbers of analysts have high quality IR (m = 0.846) than companies with a low number of AF (m= 0.551). Nevertheless, companies with a high AF have lower CSR scores (m = 0.227) than companies with low numbers of analysts (m = 0.351). Conversely, companies with a high number of AF have low Leverage (m = 0.091) than companies with a low number of analysts (m = 0.144). [52] stated that normality tests help highlight the characteristics of a sample and check for any violation of underlying assumptions of the panel data analysis. Graphical analysis, partial regression, residual, and standard probability plots are widely used to test the assumptions of normality[34]. Other methods include skewness and kurtosis to examine the normal data distribution. Accordingly, the study used to mean, skewness and kurtosis and graphical analysis to test for normality of the samples. [52] proposed that skewness ranging from -1 to +1 indicates that the data is normally distributed. Table 4 shows the results of the normality test.

[21] confirmed that an independent variable (IV) should not have collinearity with other IVs. Thus, multicollinearity arises when one IV is correlated to a higher degree with another IV and when independent variables correlate with each other. Multicollinearity problems show perfect or exact relationships between regression explanatory variables, indicating that the explanatory variables are highly correlated with or among other explanatory variables, causing difficulty finding reliable estimates of the regression coefficients. Therefore, the regression analysis should have no perfect relationships among the explanatory variables. Contrarily, a multicollinearity problem occurs when the regression assumption is violated. The study measured the multicollinearity among the IVs, DVs and control variables to enhance the robustness of the results. The common way to solve multicollinearity problems is to examine the variance inflation factors (VIF) of the variables for all models. Furthermore, a VIF threshold value of 10 suggests no multicollinearity problem based on [34].

Table 5. Multicollinearity Test

Model	**VIF**
1	2.68
2	3.51

Heteroscedasticity is the constancy in the error variance across observations. Specifically, if the error variance is not constant, then the residual variance is called "heteroskedastic". The presence of heteroscedasticity is tested in various ways. The formal tests for constancy of error variance include Cameron & Trivadi's decomposition of the [61].

[2] The mean score of AF is 0.109 with a standard division of 0.107. The minimum number is 0.000, and the maximum is 0.635.

Table 6. White's test for all Models (Cameron & Trivedi's decomposition of IM-test)

	Model	**Wald Chi-Square test**		
Regression		Chi^2 (174)	Prob> Chibar2	H Null
(ICC)	1	1.7e+06	0.0000	Rejected
(ICC)	3	1.8e+0.6	0.0000	Rejected

White's test results in Table 6 indicate that the p-value is small; hence, rejecting the null hypothesis that the variance of the residual is homogenous. Therefore, [51] standard error pooled regression was used to control the heteroscedasticity and autocorrelation effects [30]. Furthermore, a modified Wald test for group-wise heteroscedasticity was performed on a fixed effect regression model. Levene's test for homogeneity of variance was performed, and the assumption of homogeneity of variances was tested and satisfied via Levene's *F* test, $F(4.72) = 0.19$, P = 0.03. The independent sample t-test was associated with a statistically meaningful effect, $t(520) = -2.35$, $P = 0.03$. The results signified a statistical significance in Levene's test and the independent sample t-test. Thus, equal variances were assumed. Endogeneity is caused by omitted variables or the self--selection problem. Thus, the Hausman specification test was used to test endogeneity to justify choosing between fixed effects and random effects. The null hypothesis did not correlate with the regressors and the error term, whereas the alternative hypothesis suggested a correlation between the regressors and the error term.

Table 7. Hausman test results

Test	**Value**	**Model 1**	**Model 2**
Hausman test	Chi-square	32.36	22.66
	(p-value)	(0.000)***	(0.000)***
Chi-square in parentheses *, **, and *** represent the significant at 10%, 5% and 1%.			

Table 8. Panel Data Results Model 3 of ICC (Firms = 174, Obs = 870, Period = 2014, 2015, 2016) Mediator Effect of Analyst Following between IRQ disclosure and Cost of Equity Capital

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
VARIABLES	ICC	ICC	ICC	IRQ	IRQ	IRQ	AF	AF	AF
	Pooled OLS	Random	Fixed Effect	Pooled OLS	Random	Fixed Effect	Pooled OLS	Random	Fixed Effect
		Effect			Effect			Effect	
	Coef.	Coef.	Coef.	Coef.	Coef.	Coef.	Coef.	Coef.	Coef.
	(Std.error)	(Std.error)	(Std.error)	(Std.error)	(Std.error)	(Std.error)	(Std.error)	(Std.error)	(Std.error)
IRQ	-0.257***	-0.250***	-0.215***						
	(0.0109)	(0.0110)	(0.0139)						
ITG	0.940***	0.918***	0.816***	1.279***	1.266***	1.252***	1.715***	1.703***	1.679***
	(0.0402)	(0.0399)	(0.0476)	(0.133)	(0.131)	(0.157)	(0.0715)	(0.0715)	(0.0873)
CSR	-0.0796	-0.0796	-0.0820	1.071***	1.166***	1.438***	-0.436***	-0.448***	-0.529***
	(0.0527)	(0.0534)	(0.0686)	(0.178)	(0.179)	(0.226)	(0.118)	(0.120)	(0.152)
LEV	0.211***	0.240***	0.439***	-1.010***	-1.070***	-1.348***	0.0131	-0.0145	-0.227
	(0.0414)	(0.0435)	(0.0675)	(0.136)	(0.144)	(0.221)	(0.0952)	(0.101)	(0.160)
AF				0.811***	0.790***	0.715***			
				(0.0579)	(0.0578)	(0.0715)			
ICC							-0.926***	-0.941***	-0.960***
							(0.0685)	(0.0699)	(0.0931)
Constant	0.264***	0.259***	0.224***	0.309***	0.317***	0.354***	0.205***	0.217***	0.269***
	(0.00779)	(0.00820)	(0.0118)	(0.0237)	(0.0252)	(0.0355)	(0.0195)	(0.0200)	(0.0252)
Observations	870	870	870	870	870	870	870	870	870
R-squared	0.650		0.639	0.812		0.807	0.705		0.684
Number of		174	174		174	174		174	174
code									

Coefficient values (Robust t-statistics) are shown with standard errors clustered at the company level errors in parentheses *** p < 0.01, ** p < 0.05, * p < 0.

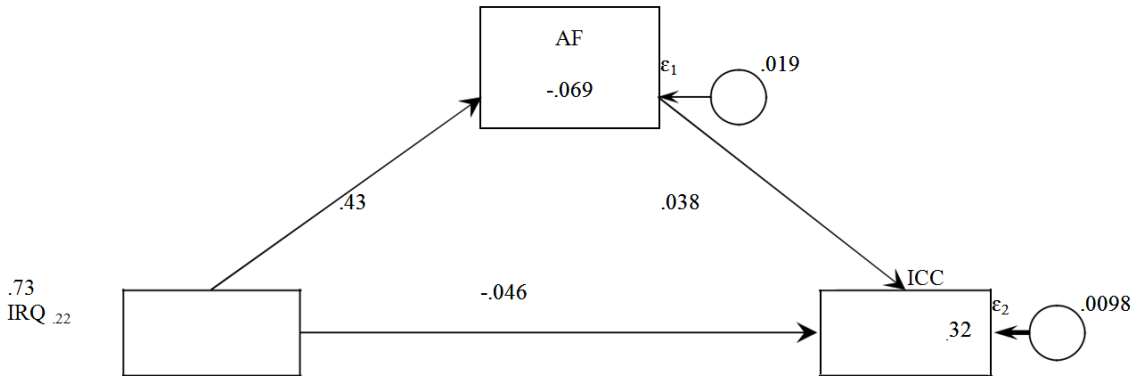

Figure 2. Mediation variable of analyst following

Table 9. Fixed Effect results in Mediator Effect Analyst Following between IRQ disclosure and Cost of Equity Capital

	(1)	(2)	(3)
VARIABLES	ICC	IRQ	AF
IRQ	-0.215***		
	(0.0139)		
LTG	0.816***	1.252***	1.679***
	(0.0476)	(0.157)	(0.0873)
CSR	-0.0820	1.438***	-0.529***
	(0.0686)	(0.226)	(0.152)
LEV	0.439***	-1.348***	-0.227
	(0.0675)	(0.221)	(0.160)
AF		0.715***	
		(0.0715)	
ICC			-0.960***
			(0.0931)
Constant	0.224***	0.354***	0.269***
	(0.0118)	(0.0355)	(0.0252)
Observations	870	870	870
R-squared	0.639	0.807	0.684
Number of code	174	174	174
Coefficient values (Robust t-statistics) are shown with standard errors clustered at the company level errors in parentheses *** p < 0.01, ** p < 0.05, * p < 0.			

Table 10. Mediation Effect Analysis

Total effect IRQ->ICC		Direct effect IRQ->ICC				Indirect effect IRQ->ICC				
Coef.	p-value	Coef.	p-value			Coef.	Std.	t- value	p- value	B1(25%,95.7%)
-0.0295	0.01	-0.0460	0.05	H4	IRQ->AF->ICC	0.0165	0.0135	1.22	0.222	-0.010, .0431941

Table 9 shows the Robustness of the Model. The R-squared, which measures the goodness-of-fit of the models, is beyond 50%. The R-Squared for model 1 is 0.639%, model 2 is 0.807%, and model 3 is 0.684%. Hence, all the models explained over 60% of the variation in ICC, indicating the models are a good fit for further analysis.

Table 9 presents the fixed effect results for the three models. The first model estimates the impact of the cost of equity capital on control variables, the second model IRQ DISCLOSURE on ICC with other control variables and the distribution error term. The third model also shows the impact of IRQ DISCLOSURE when AF is used as a mediator variable on ICC with other control variables and the distribution error term.

Table 9 Models 1, 2, and 3 is an additive effect specification of the relationship between the ICC as a dependent variable, IRQ as an independent variable and AF as the mediator variable to explain the relationship between IRQ disclosure and ICC. Table 9 Model 1; fixed effect regression indicates a significant negative effect at a level of 99% with IRQ DISCLOSURE and cost of equity capital in top firms of Australia and New Zealand. The results confirmed [49,62], who found a negative relationship between IRQ and cost of capital. Thus, the voluntary theory confirms the signalling theory. Besides, IRQ DISCLOSURE reduces the cost of equity capital based on the voluntary disclosure theory. The results also indicated that IRQ DISCLOSURE has a significant negative impact on the ICC in Australia and New Zealand. Therefore, firms that disclose high-quality information of IRQ have a lower cost of equity capital. The results demonstrated that firms must produce IR as a new practice to lower the cost of equity capital. Thus, the results supported the first hypothesis.

In Table 9, Model 2 fixed effect regression indicated that IRQ DISCLOSURE has a positive and significant effect at a level of 99% with AF. Hence, firms with high-quality disclosure have a higher number of AF. The results confirmed [12,14,32] who studied the level of disclosure in firms, revealing that greater disclosure in firms with a low AF was linked with a lower cost of equity. Table 9 Model 3 shows that the AF has negative effects, and the cost of equity capital in Model 3 is negligible. The results also suggested that ICC has a significant negative effect at a level of 99% with AF. The findings align with [12,14,3262] on the level of disclosure in firms, indicating greater disclosure in firms with a low AF was associated with a lower cost of equity.

Table 9 Models 1, 2 and 3 shows that the control variables produce positive and negative relationships with ICC. Moreover, the LTG in all three models had a positive and significant effect at a level of 99%. The results are consistent with [31], who observed that the ICC was positively linked with the LTG rate. Meanwhile, the CSR results showed a negative and negligible effect between ICC and CSR. Nonetheless, companies' disclosure of CSR reporting produces a reduced cost of equity capital. The results parallel with [26,26,62], revealing a negative relationship between ICC and CSR. Model 2 suggested a positive and significant effect at level 99% between IRQ and CSR, whereas Model 3 showed a negative and significant effect between AF and CSR. Therefore, companies' disclosure of CSR reporting has many AF. For Leverage, only Model 1 had a positive and significant effect between Leverage and ICC. The result is consistent with ([30,31,62]. Nonetheless, the results predicted a positive relationship between Leverage and cost of equity capital.

In Table 10, a mediation analysis was performed to assess the mediating role of AF on the link between IRQDIS and the cost of equity capital. The results revealed that the total effect of IRQ DISCLOSURE on ICC was significant (H1: β = -0.295, t = -3.20, p-value = 0.01 < 0.05). The impact of IRQ disclosure and ICC became significant by including AF (β = - 0.117, t = -9.84, p-value = 0.00 < 0.05). Meanwhile, the total indirect effect of IRQ DISCLOSURE on ICC through ICC was significant (β= - 0.876, t = 9.46, p-value = 0.00 < 0.05). The results also suggested no zero between upper and lower (0.694, 0.105), while the IRQ coefficient after adding AF reduced from (β - 0.0295 to 0.876). Thus, the relationship between IRQ and ICC is partially mediated by AF.

Thus, high-quality disclosure with a number of AF reduces the cost of equity capital in top companies in Australia and New Zealand. Generally, the AF is vital in explaining the relationship between IRQ DISCLOSURE and equity capital costs in Australia and New Zealand between 2014-2016. The IRQ DISCLOSURE affects ICC when the AF is high. The study proved that AF is a partial mediator in linking IRQ disclosure and the cost of equity capital. Thus, firms using high-quality disclosure have numerous AF. Consequently, the cost of equity capital decreases for firms implementing IR practices in a developed market. The results also suggested AF as a mediator supporter in the second study hypothesis.

The results are also supported by the prospects and signalling theories. Hence, as a corporate manager is obliged to disclose relevant information, corporate disclosure helps analysts and investors Estimate future earnings. Consequently, the AF can improve environmental information disclosure and lower the cost of equity. The AF also compels corporations to encourage management to provide high-quality firm information to improve all corporate information disclosure. Summarily, analysts can lower the cost of equity by increasing environmental information disclosure. The study showed that AF has a statistical effect on enhancing the relationship between IRQ and the cost of equity capital. Therefore, the AF did not strongly support the third study hypothesis. Fixed effected regression support of H2 was also observed, suggesting a partial mediator in the relationship between the disclosure score of IR and that ICC is more significant among companies with AF.

IR in Australia and New Zealand is voluntary and practised by most top companies. Past studies also showed that companies are encouraged to practice IR as a new form of corporate reporting to minimise the cost of equity capital. Although the cost of equity capital in the top countries is relatively high, practising IR enables to reduce the cost by making high-quality disclosure for pertinent areas of operation, such as strategy, risk, and how firms create value over time. The study revealed that top firms in Australia and New Zealand practising IRQ DISCLOSURE lowers the cost of equity capital. Furthermore, the IRQ improves and expands the information available to capital market participants, lower information asymmetry, and provides an inexpensive but complete overview of a firm's activities, expanding the firm's investor base. Significantly,

reducing parameter uncertainty and estimation risk helps financial capital providers understand a firm's value creation better by presenting a holistic picture of the six capitals the firm depends.

From an investor's perspective, most countries expect IR to produce high-level disclosure in one report, allowing stakeholders to understand a company, its strategy and performance. IR also provides investors information relevant to decisions made in the long term. Hence, IR is crucial to the capital market. The firm's perspective is internal, whereby IR integrates a broader set of factors for long-term success across the board. Secondly, external reporting has drivers in and around the competition. IR can also change stakeholders' perspectives and improve communication with external stakeholders. Moreover, firms producing IR with a high level of alignment enjoy the benefits of reducing the cost of capital. Ultimately, an integrated report benefits all stakeholders interested in an organisation's ability to create value over time.

5. Conclusions

Voluntary information disclosure has focused on various kinds of information disclosure like sustainability reporting and environmental reporting based on the IIR framework. Moreover, IR enables companies to reduce equity cost by making high-quality disclosure in pertinent areas of operation, strategy, risk, and how firms create value over time encouraging stakeholders to invest. Expanding the limited empirical research on integrated reporting quality disclosure and capital market consequences in South African highlights the lack of demand for a worldwide research sample on this issue. contributions made by this study is the addition of analyst following. Specifically, some studies have examined the relationship between IRQ disclosure and analyst earnings forecast still the relationship between IRQ disclosure and analyst following remains unclear. The findings showed several significant, far-reaching policy implications. Firstly, the type of corporate reporting applicable in a given country can further reduce the cost of equity capital. The study also promotes IR globally to attract more countries to implement the policy to enhance the research area. Besides, voluntary information disclosure focused on various voluntary information disclosure such as sustainability reporting or environmental reporting. IR discloses voluntary disclosure based on the IIR framework. The findings showed a negative and significant effect with IRQ DISCLOSURE and ICC with top companies in Australia and New Zealand, in line with the voluntary disclosure theory; thus, supporting the first hypothesis. Secondly, the findings emphasised the interdependencies between corporate reporting in IRQ DISCLOSURE with a higher number of AF. The findings also suggested disclosing high-quality reporting increases the number of AF in a developed market. Meanwhile, the analyst's ability should improve with the amount of disclosure provided, which helps analysts produce mass information to assess a company's future performance.

Firms will disclose different information through IRQ that could improve analysts' forecasting abilities. Therefore, analysts act on the interpretation of the business performance to advise investors and stakeholders. Consequently, investors are encouraged to buy stocks with higher liquidity cash flows, decreasing the cost of equity capital. Specifically, the results suggested that AF has a weak mediating role in the capital market in enhancing the relationship between IRQ DISCLOSURE and the cost of equity capital. Analysts also encouraged firms to disclose more and higher quality environmental information, specifically various corporate reporting information, including IR. Thus, the study showed that AF as a mediator could partially explain the relationship between IRQ DISCLOSURE and the cost of equity capital. The results are supported by the prospects theory, consistent with the study objective and supporting the hypothesis.

Appendix

Disclosure Checklist (Content Elements) of Integrated Reporting (IR)

		Disclosure Items	Maximum score	Average disclosure
	Content Element 1	Organizational Overview and External Environment		
1	4.5	Organization's mission, vision, values, and culture (No disclosure=0, Disclosure=1)		
2	4.5	Principal activities and markets (No disclosure=0, Disclosure=1)		
3	4.5	Ownership and operating structure (No disclosure=0, Disclosure=1)		
4	4.5	Competitive landscape and market positioning (No disclosure=0, Disclosure=1)		
5	4.5	Key quantitative information (for example, the number of employees, revenues, and number of countries operating, highlighting, in particular, significant changes from prior periods) (No disclosure=0, Financial KPIs only =1, Both financial and non-financial KPIs=2, KPIs linked with objectives and/or capital=3)		
6	4.5	Significant factors affecting the external environment and the organization's response (legal, commercial, social, environmental, and political context) (No disclosure=0, partial disclosure=1, company specific disclosure=2, company specific adequate disclosure=3)		
		Subtotal (Content Element 1)		
		% (Content Element 1)		
	Content Element 2	Governance		
7	4.9	Organization's leadership structure (skills and diversity; e.g., range of backgrounds, gender, competence, and experience of BOD) (No disclosure=0, Members of the BOD/Committees are listed=1, Names, experience, and skills are also listed=2)		
8	4.9	Role of highest governance body in setting purpose, values, and strategy (No disclosure =0, Disclosure=1)		
9	4.9	Role of highest governance body in risk management (No disclosure=0, Disclosure=1)		
10	4.9	Specific processes and particular actions used to make strategic decisions and risk management (No disclosure=0, Limited Disclosure=1, Adequate disclosure=2)		
11	4.9	How remuneration and incentives are linked to value creation (No disclosure=0, General disclosure=1, Specific disclosure=2)		
12	4.9	Actions taken to influence and monitor cultural environment and ethical values of the organization (No action determinable from narrative=0, Determinable actions=1)		
		Subtotal (Content Element 2)		
		% (Content Element 2)		
	Content Element 3	Business Model		
13	4.13	Explicit identification of the key elements of the business model (No disclosure=0, Disclosure=1)		
14	4.13	A simple diagram highlighting key elements, supported by a clear explanation of the relevance of those elements to the organization (No disclosure=0, Disclosure with diagram or narrative=1, Disclosure with both diagram and narratives=2)		
15	4.14	Relating and disclosing capitals with business model (No disclosure=0, Narrative disclosure only=1, Narrative with limited quantitative disclosure=2, Adequate disclosure=3)		
16	4.56	The interdependencies and trade-offs between the capitals: financial, manufactured, intellectual, human, social and relationship, and natural (No disclosure=0, Disclosure=1)		
17	4.13	Connection to information covered by other content elements, such as strategy, risks and opportunities, and performance (including KPIs and financial considerations, such as cost containment and revenues) (No disclosure = 0, Limited disclosure = 1, Adequate disclosure=2)		
18	4.16	Changes in organization's strategy when, for instance, new risks and opportunities are identified or past performance is not as expected/aligning business model with changes in its external environment (No disclosure = 0, Limited disclosure = 1, Adequate disclosure=2)		
		Subtotal (Content Element 3)		
		%(Content Element 3)		

Table Continued

	Content Element 4	Risks and Opportunities		
19	4.25	The specific sources of risks and opportunities (No disclosure=0, Disclosing risks only=1, Disclosing both risk and opportunity=2)		
20	4.25	Possible impacts of risk and opportunity on the organization (No disclosure=0, Disclosing risks impacts only=1, Disclosing both risk and opportunity=2)		
21	4.25	The specific steps being taken to mitigate or manage key risks or to create value from key opportunities (No disclosure=0, Disclosure on risk mitigation only=1, Disclosure on risk mitigation mainly with limited on opportunity=2, Adequate disclosure both on risks and opportunity=3)		
		Subtotal (Content Element 4)		
		%(Content Element 4)		
	Content Element 5	Strategy and Resources Allocation		
22	4.28	The organization's short, medium, and long term strategic objectives (No disclosure=0, Partial disclosure=1, Adequate disclosure=2)		
23	4.28	The strategies it has in place, or intends to implement, to achieve those strategic objectives (No disclosure=0, Disclosure=1)		
24	4.28	The resource allocation plans it has to implement its strategy (No disclosure=0, Limited disclosure=1, Adequate disclosure=2)		
25	4.29	Linkage between the organization's strategy and resource allocation plans, and organization's business model (No disclosure=0, Partial Disclosure=1, Adequate Disclosure=2)		
26	4.29	The extent to which environment and social considerations have been embedded into the organization's strategy to give it a competitive advantage (No disclosure=0, Disclosure=1)		
27	4.29	Stakeholder engagement in formulating strategies and resource plans (No disclosure =0, Identification of related stakeholders=1, Specific details on stakeholders=2)		
		Subtotal (Content Element 5)		
		%(Content Element 5)		
	Content Element 6	Performance		
28	4.31	Quantitative indicators with respect to targets and risks and opportunities (No disclosure=0, Disclosure=1, Disclosure with trends=2)		
29	4.31	The Organization's effects (both positive and negative) on the capitals (No disclosure=0, Mainly positive disclosure=1, Adequate disclosure=2)		
30	4.31	The state of key stakeholder relationships and how the organization has responded to key stakeholders' legitimate needs and interests (No disclosure=0, Limited disclosure=1, Adequate disclosure=2)		
31	4.31	The linkages between past and current performance, and between current performance and the organization's outlook (No disclosure = 0, Limited disclosure = 1, Adequate disclosure=2)		
32	4.32	KPIs that combine financial measures with other components or monetizing certain effects on the capitals (No disclosure=0, Limited disclosure=1, Company specific and innovative disclosure=2)		
		Subtotal (Content Element 6)		
		%(Content Element 6)		

Table Continued

	Content Element 7	Outlook		
33	4.35	Organization's expectations about the external environment (No disclosure=0, General disclosure=1, Organization specific disclosure=2)		
34	4.35	Organization's preparedness for the future uncertainties (No disclosure=0, Disclosure=1)		
35	4.37	Potential implications on future financial and other capitals (No disclosure=0, Partial Disclosure=1, Adequate Disclosure=2)		
36	4.38	Ways for outlook: lead indicators, KPIs or objectives, relevant information from recognized external sources, and sensitivity analyses (No disclosure=0, General disclosure=1, Organization specific disclosure=2)		
37	4.38	Comparisons of actual performance to previously identified targets further enable evaluation of the current outlook (No disclosure=0, Disclosure=1)		
		Subtotal (Content Element 7) %(Content Element 7)		
	Content Element 8	Basis of Preparation and Presentation		
38	4.41	A description of the reporting boundary and how it has been determined (No disclosure= 0, Disclosure=1)		
39	4.41	Frameworks and methods used to quantify or evaluate material matters (No disclosure= 0, Disclosure=1)		
40	4.42	Brief description of the process used to identify relevant matters, evaluate their importance and narrow them down to material matters (No disclosure=0, Limited disclosure=1, Adequate disclosure=2)		
41	4.42	Identification of the role of those charged with governance and key personnel in the identification and prioritization of material matters (No disclosure=0, Disclosure=1)		
42	3.21	Impact of material matters on the organization's value creation process (No disclosure=0, Limited disclosure=1, Adequate disclosure=2)		
43	3.20	Stakeholder engagement in materiality determination (No disclosure=0, Disclosure= 1)		

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