

**THE EFFECT OF THE VOLUNTARY ADOPTION OF INTEGRATED REPORTING  
ON THE COST OF EQUITY: ENFORCEMENT PERSPECTIVE**

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**Abstract**

Integrated Reporting <IR> is an initiative that encourages companies to analyze their business models in a holistic way. The process involves active consideration of financial and non-financial perspectives to understand all capital generated, maintained and destroyed by a company over time. It allows companies to understand their activities while considering all factors used or affected and their entire context, causing the concept of Integrated Thinking to become ingrained in company culture. Based on Systems Theory, the integrated analysis of financial and non-financial aspects can lead to different conclusions than those from separate analyses due to the connections and interrelations between such aspects. The application of Integrated Thinking may have two main advantages for a company: 1) an improvement in its management processes, especially with respect to non-financial capital, and 2) a decline in information asymmetry. Therefore, based on Voluntary Disclosure Theory, these two factors may have economic benefits for an organization. Thus, this research investigates how the cost of equity relates to <IR> disclosure and the impact of enforcement on this relationship. A global sample of 25,311 firm-year observations from 2010 to 2017 was analyzed employing a method considering two dimensions (Voluntary Adoption of <IR> and Time). The results indicate that <IR> disclosure is negatively related to the cost of equity. The results are robust after controlling for several firm- and country-level factors and for industry. Further analyses show that this negative effect is more prevalent for companies operating in high enforcement environments. This study contributes to the literature on Integrated Reporting by showing how it relates to the cost of equity considering a global sample of voluntary adopters. The study also analyses the impact of institutional factors on this relationship, employing a robust method of analysis that differentiates it from other studies.

**Key words:** Financial Disclosure; Integrated Reporting; Cost of Equity; Enforcement; Voluntary Adoption.

## 1. INTRODUCTION

Integrated Reporting <IR> is an initiative that encourages companies to analyze and disclose their value creation processes by taking into account the following six capitals: financial, manufactured, intellectual, human, social and relationship, and natural (International Integrated Reporting Council IIRC, 2013).

A company engaged in such an initiative should rethink its strategy to incorporate financial and non-financial material aspects. Based on its new strategy, the active consideration of multiple integrated forms of capital will begin to incorporate the concept into decision-making and performance evaluations, eventually permeating the whole organization. This process is referred to as Integrated Thinking (Feng, Cummings, & Tweedie, 2017; IIRC, 2013; Mervelskemper & Streit, 2017). Additionally, a company should analyze its short, medium and long term perspectives while pursuing its continuity in a sustainable way (Eccles, Ioannou, & Serafeim, 2014; Jensen & Berg, 2012).

According to the principles of Integrated Reporting, from a sustainable and long term perspective, implementing business model analysis can improve financial and non-financial performance (Eccles et al., 2014) and enhance the quality, timeliness and understandability of disclosed information (Eccles & Krzus, 2010; Haji & Anifowose, 2016b).

Systems Theory states that to understand complex contexts, the analysis of individual factors is not sufficient to understand a phenomenon and it is instead necessary to analyze it as a whole (Urry, 2005). The Integrated Report is a proposal that urges organizations to perform a holistic analysis of their business models and activities, demonstrating connectivity and interdependence between capitals. As a result, users are expected to develop more favourable perceptions of an organization than those when stand-alone disclosure is employed.

Adopting Integrated Reporting is expected to have positive effects on management processes and disclosure, leading to a decline in information asymmetry. Thus, it tends to bring economic benefits to the company according to Voluntary Disclosure Theory. Among these benefits one can highlight an increase in stock liquidity and firm value (Barth, Cahan, Chen, & Venter, 2017; Plumlee, Brown, Hayes, & Marshall, 2015), an enhancement of the value relevance of disclosure (Baboukardos & Rimmel, 2016), and an increase in analysts' accuracy (Bernardi & Stark, 2018). This study specifically investigates the relationship between Integrated Reporting disclosure and the cost of equity.

Nevertheless, evidence indicates that economic benefits are observed only in specific settings such as high enforcement environments (Barth et al., 2017; Reimsbach et al., 2018; Richardson & Welker, 2001).

Based on the argumentation presented above, the research question to be investigated is: **How does the cost of equity relate to the voluntary disclosure of Integrated Reporting and how enforcement affect this relationship?**

To address this question, a global sample of 25,311 firm-year observations, from 2010 to 2017 was analyzed employing a method considering two dimensions: 1) Treatment: voluntary adopters of Integrated Reporting were compared to a control group selected using a PSM (Propensity Score Matching) procedure and 2) Time: both groups were compared in the periods before and after adoption. The results indicate that Integrated Reporting disclosure is negatively related to the cost of equity. The results are robust after controlling for several firm- and country-level factors and by industry. Further analyses show that this negative effect is more prevalent for companies operating in high enforcement environments.

This study fills a gap in the literature, because existing literature focuses on the effect of financial and economic information on the cost of equity (Christensen et al., 2013; Daske et al., 2008; Francis, Nanda, & Olsson, 2008) and the effect of sustainability, environmental and CSR information on the cost of equity (Bauer & Hann, 2010; Chava, 2014; Dhaliwal et al., 2012; Jung, Herbohn, & Clarkson, 2016; Ye & Zhang, 2011). However, the presentation of integrated financial and non-financial information and its effects must be further investigated.

Initial evidence of economic benefits related to Integrated Reporting disclosure was gathered mainly from South African companies. This is due to the fact that, since 2010, the Johannesburg Stock Exchange (JSE) has made this form of disclosure compulsory for all listed companies. Results indicate that Integrated Reporting disclosure is value relevant for investors (Baboukardos & Rimmel, 2016), positively associated with analysts' accuracy (Bernardi & Stark, 2018; Zhou, Simnett, & Green, 2017), positively related to stock liquidity and firm value (Barth et al., 2017), and negatively related to the cost of capital (Zhou et al., 2017). Contradicting this last result, Barth et al. (2017) presented evidence showing that Integrated Reporting is not correlated with the cost of equity. Faced with these mixed results on the relationship between Integrated Reporting and the cost of equity, the present research further investigates this relation.

A global sample of voluntary adopters of Integrated Reporting was also analyzed to verify if economic benefits expected from the mandatory adoption of Integrated Reporting are also present in other countries. The importance of this question lies mainly in the different effects that can ensue from voluntary adoption (Daske et al., 2008; Doukakis, 2014). This study contributes to literature on financial and non-financial disclosure by introducing a theoretical discussion of Systems Theory.

In terms of institutional factors, this is one of first studies to investigate the effect of law enforcement at the country level to better understand the economic benefits of Integrated Reporting. This institutional factor helps provide a more detailed view of how integrated disclosure affects companies, thus contributing to the Integrated Reporting and CSR literature. Findings on this relationship offer new insights to the users and preparers of information and to regulators in particular. This can in turn aid in identifying new mechanisms that support Integrated Reporting initiatives, which may provide beneficial to society at large (Bae & Goyal, 2009; Cheung, Tan, & Wang, 2018; Chih et al., 2010).

This study's contributions also extend to the methodological approach employed. A robust method was used to analyze the economic benefits of <IR> while controlling for both "Treatment" and "Time".

## 2. LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

### *2.1 Integrated Reporting and Cost of Equity*

The economic benefits expected from <IR> adoption are related to an improvement in management, which results from the implementation of Integrated Thinking. Economic benefits also occur due to an increase in transparency and a reduction in information asymmetry. In other words, the purpose of Integrated Reporting is to provide a broader understanding of an organization's actions and perspectives (Barth et al., 2017).

The reduction of information asymmetry and improvement in the management of financial and non-financial aspects of a company can be related to a reduction in the cost of equity. The cost of equity is based on the stock price, which represents investors' expectations

on a company's future performance. According to the semi-strong form of efficient markets, a stock price reflects all public information available about a company (Scott, 2012). It represents investors' predictions about future earnings, cash flow and dividends. Therefore, when Integrated Reporting increases the quality of a company's disclosure and improves the risk management and performance of financial and non-financial capital, a negative relationship between Integrated Reporting disclosure and the cost of equity is expected.

It is also possible to argue that engagement in Integrated Reporting may have no effect on the cost of equity. Investors and lenders may consider the information presented in an integrated report to be the same as those previously presented in other company disclosures or that it is not useful (Lodhia, 2015; Steyn, 2014). In addition, users may not identify substantial changes in the decision-making process (Ruiz-Lozano & Tirado-Valencia, 2016; Solomon & Maroun, 2012). Therefore, the adoption of an integrated report would have no effect on the cost of capital. Alternatively, the integration of information may lead to an increase in complexity, which can lead to a less efficient decision-making process (Lodhia, 2015) and a decline in understanding of information presented (Bucaro, Jackson, & Lill, 2017; Reimsbach, Hahn, & Gürtürk, 2018).

We expect Integrated Reporting disclosure to be negatively related to the cost of equity. This argumentation is supported by Voluntary Disclosure Theory and empirical evidence showing that voluntary disclosure, CSR disclosure, and an increase in non-financial performance are related to a lower cost of equity (Botosan, 2006; Leuz & Verrecchia, 2000; Plumlee et al., 2015; Sierra-García et al., 2015; Zhou et al., 2017).

Based on prior literature, Integrated Reporting disclosure is expected to be negatively related to the cost of equity, leading to this study's first hypothesis as follows:

**H1:** Integrated Reporting disclosure is negatively associated with the cost of equity.

Therefore, further research on economic benefits related to Integrated Reporting disclosure is necessary to explore other factors that may affect this relationship such as institutional factors, which are discussed in the next section.

## ***2.2 Integrated Reporting, Cost of Equity and Enforcement***

The relationship between Integrated Reporting and the cost of equity is affected by institutional factors that influence the preparation of information and its users' perceptions regarding disclosure. Thus, this study investigates the role of law enforcement as an institutional factor that influences these relationships.

Law enforcement in a country affects the ways in which companies respond to mandatory and voluntary demands (Bhattacharya & Daouk, 2009; Leuz, Nanda, & Wysocki, 2007). Even though voluntary initiatives are essentially not based on regulations, companies in countries with strong legal systems are pressured to actually implement proposals rather than just adopting the initiative as a label (Christensen, Hail, & Leuz, 2013; Daske, Hail, Leuz, & Verdi, 2008). Additionally, such companies are subjected to more mechanisms that punish misstatements (Casey & Grenier, 2015). Furthermore, there is evidence that companies operating in countries with stronger levels of law enforcement exhibit more ethical behaviour (J. L. Campbell, 2007; Chih, Chih, & Chen, 2010; Leuz et al., 2007). Therefore, in these countries, Integrated Reporting disclosure is expected to be more aligned with its framework and to generate stronger economic benefits (Bhattacharya & Daouk, 2009; Dhaliwal,

Radhakrishnan, Tsang, & Yang, 2012; Frías-Aceituno, Rodriguez-Ariza, & García-Sánchez, 2013). Therefore, Hypothesis 2 can be stated as follows:

**H2:** The negative relationship between Integrated Reporting disclosure and the cost of equity is stronger in countries with stronger levels of law enforcement.

### 3. METHOD

The research question to be investigated is “How does the cost of capital relate to Integrated Reporting disclosure and how do law enforcement affect this relationship?” To address this question, an archival approach based on Differences-in-Differences research design was adopted. This method has been used in several accounting studies (Ball et al., 2015; H. A. Hong, Hung, & Lobo, 2014; Sun, Cahan, & Emanuel, 2011) in an attempt to analyze the effect of a given event in two dimensions: “treatment” and “time”. “Treatment” discriminates between individuals undergoing treatment and “Time” discriminates between periods before and after treatment.

Therefore, companies that adopted Integrated Reporting (**IR**) are compared to a matched group defined by a Propensity Score Matching procedure. Additionally, two groups are compared pre- and post-adoption (**POST**). This effect is isolated in the interaction term (**IR \* POST**).

The following section specifies the econometric models used to test the hypotheses, the sample selection process, and the definition of variables.

#### 3.1 Econometric Specification

In order to test the relationship between Integrated Reporting disclosure and the cost of equity (H1), we regressed the cost of equity with three dummy variables: firms adopting Integrated Reporting (**IR**), the pre- and post-adoption periods (**POST**), and their interaction (**IR \* POST**). Furthermore, we considered firm-, country- and industry-level control variables. The regression model used is as follows:

$$\text{Cost of equity} = \alpha + \beta_1 \text{IR} + \beta_2 \text{POST} + \beta_3 \text{IR} * \text{POST} + \sum \text{FirmControls} + \sum \text{CountryControls} + \sum \text{IndustryControls} + \varepsilon$$

Equation 1. Model 1 analysis of the relationship between the cost of equity and <IR>.

Model 1 identifies the relationship between Integrated Reporting disclosure and the cost of equity for the period after adoption compared to the period before adoption and compared to a control group. The model allows the cost of equity for the group adopting Integrated Reporting (**IR = YES**) in the period after adoption (**POST = YES**) to be compared to the cost of equity in the period before adoption and to a control group defined by the Propensity Score Matching procedure.

The cost of equity is measured by the CAPM. The control variables used are described in the appendix.

Equation 2 was used to analyze the impact of Enforcement (H2) on the relationship between Integrated Reporting disclosure and the cost of equity.

$$\text{Cost of equity} = \alpha + \beta_1 \text{IR} + \beta_2 \text{POST} + \beta_3 \text{IR} * \text{POST} + \beta_4 \text{IR} * \text{Enforcement} + \beta_5 \text{POST} * \text{Enforcement} + \beta_6 \text{IR} * \text{POST} * \text{Enforcement} + \sum \text{FirmControls} + \sum \text{CountryControls} + \sum \text{IndustryControls} + \varepsilon$$

Equation 2. Model 2 analysis of the impact of enforcement on the relationship between the cost of equity and <IR>.

Model 2 is used to identify the role of law enforcement in the relationship between Integrated Reporting disclosure and the cost of equity for the period after adoption relative to the period before adoption and to a control group. As noted, this model allowed us to isolate the variance of companies adopting Integrated Reporting (IR = YES) in the period after adoption (POST = YES) while considering the level of enforcement. The interaction terms show the variance obtained through the comparison of <IR> adopters and non-adopters in both the pre- and post-adoption periods.

Only pooled OLS regressions were run with robust standard errors clustered at the firm level.

### ***3.2 Sample, Datasets, and Independent Variable***

To test our hypothesis, we used a cross-country sample of publicly listed companies that voluntarily adopted Integrated Reporting from 2010 to 2017 and a matched control group. In turn, we identified self-declared Integrated Reporting adopters. First, companies uploading their Integrated Reports to the IIRC's Examples Database (IIRC, 2017) up to February 7th, 2018 were identified. Next, companies claiming to have used Integrated Reporting ("Integrated Reporting" column = "YES") were identified from the GRI Sustainability Database (GRI, 2017) to July 2017, creating a group of all identified integrated reporting adopters (labelled **SAMPLE ALL**). All companies adopting Integrated Reporting were considered the treatment group and were controlled using value of 1 for the dummy variable (**IR**).

Financial companies were excluded from the sample, as their specific capital structure cannot be analyzed for other industries. Additionally, because South African companies listed under the Johannesburg Stock Exchange (JSE) have been required to disclose integrated reports on a "comply or explain basis" since 2010 (IoDSA, 2018; Johannesburg Stock Exchange, 2016), these companies were also excluded from the sample.

The benchmark was formed by companies selected using the Propensity Score Matching (PSM) procedure. The matching criteria included the industry and size of a company measured by a total assets log (Pimentel, 2016).

The PSM technique is defined by Tucker (2010) as a function that determines the probability of an untreated individual receiving treatment given a set of covariates. Thus, we searched for "subjects" with characteristics similar to those of companies adopting Integrated Reporting (Rosenbaum & Rubin, 1985). The PSM technique identified a group of companies that did not adopt Integrated Reporting but that had characteristics similar to companies that did such that when they were analyzed, economic benefits minimized the effects of other factors that could influence the variable of interest (Peixoto, Pinto, Lima, Foguel, & Barros, 2012). The nearest neighbor matching technique with replacement was used in a way that rendered the control group similar but not identical to other companies.

To establish the control group, all countries with <IR> adopter companies were identified and from these countries, data from all public companies available from the Eikon – Thomson Reuters Database were collected, resulting in 287,600 firm-year observations. Therefore, **SAMPLE ALL** was composed of 6,028 firm-year observations drawn from the treatment group and 25,063 firm-year observations drawn from the control group. A p-test value of 0.484 was obtained, denoting balance between the treatment and control groups.

This study focuses on the period running from 2010 to 2017, as the GRI Sustainability Database began to gather information on Integrated Reporting adopters in 2010 (GRI - Global Reporting Initiative, 2014) and the IIRC's first main publication, "Discussion Paper Towards Integrated Reporting: Communicating Value in the 21st (de Villiers et al., 2014)", was published in 2011.

The date of IIRC website was considered first (year of first disclosure available from the IIRC database found from the "View by organization" field), and when this information was not available, the year in which a company disclosed its first report using the IIRC's conceptual framework as verified in the company's website. When this information was not available, the first year in which a company presented elements that could indicate a plausible adoption of Integrated Reporting was analyzed. When this information was not available, information was gathered from the GRI's Sustainability Database (GRI, 2017). The period after adoption was controlled by the dummy variable (**POST**) with a value of 0 denoting the period preceding Integrated Reporting adoption and a value of 1 denoting all periods following adoption.

Samples taken from the IIRC's database and GRI's Sustainability Database were manually matched to the Eikon Thomson Reuters Database, from which financial and ESG information was retrieved. Firm-year observations missing relevant accounting information, needed to calculate the variables, were excluded from the sample. We excluded companies with: (a) values exceeding 100% and values of below zero for Ke (cost of equity – the CAPM) and (b) leverage values of higher than 500% or below zero. All continuous financial variables at the 1st and 99th percentiles were winsorized to reduce the likelihood of results being driven by extreme values.

### ***3.3 Dependent Variable – Cost of equity***

Regarding the cost of equity, we retrieved information from Thomson Reuters' Eikon Database to estimate the CAPM. Collected information included company-specific Beta based on returns from the previous 60 months (5 years); 10-year local government bonds used as the risk-free rate; and the expected return for local markets for the previous 60 months (5 years) all based on Albanez (2012) and Perold (2004).

### ***3.4 Enforcement***

Based on prior studies, we investigated Enforcement as an institutional factor that influences the relationship between Integrated Reporting adoption and the cost of equity.

Enforcement (**ENFORC**) represents the strength of legal enforcement systems. It is measured by the "Rule of law index" indicator made available by the World Bank. The World Bank describes the rule of law as reflecting "perceptions of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and

violence” with higher scores denoting stronger levels of legal enforcement. This proxy has been used by Daske et al. (2008), Doukakis (2014), H. A. Hong et al. (2014) and Zhou et al. (2016). We used subsamples of high and low institutional factors following Doukakis (2014), H. A. Hong et al. (2014) and Leuz et al. (2007). A country was considered to exhibit high (low) levels of legal enforcement when the its score was above (below) the median for the total sample. As such information was not unavailable for 2017, we used the index for the previous year (2016).

### 3.5 Control Variables

Based on the existing literature, we applied the most commonly used controls: leverage (**LEV**), the natural logarithm for size (**ISIZE**), the market to book ratio (**MTB**), the return on assets (**ROA**), the ESG Score (**ESG Score**), and controls for sector and country as shown in Appendix 1.

## 4. DATA ANALYSIS

### 4.1 Cost of Equity

As noted in our literature review, we analyzed the relationship between the cost of equity and Integrated Reporting disclosure. First, we present descriptive statistics for the samples. Next, we present our correlation and univariate analyses basic procedures that help us understand, step-by-step, the studied relationship. Next, we present our multivariate analyses, which follow a more robust procedure allowing for the control of multiple factors that can influence the studied relationship.

#### 4.1.1 Descriptive Statistics

Table 1 shows the sample distribution of firm-year observations for firms that adopted Integrated Reporting (treatment), for firms that did not adopt Integrated Reporting (control), and for the pre- and post-adoption periods by year. The post-adoption period starts from the actual date of adoption for the treatment group and after 2013 for the control group.

Table 1. Frequency by year for sample “ALL”

Year	Control Pre-adoption Freq	Control Post-adoption Freq	Treatment Pre-adoption Freq	Treatment Post-adoption Freq
2010	2,031		465	51
2011	2,087		392	135
2012	2,127		324	201
2013		2,141	257	272
2014		2,210	174	350
2015		2,201	85	433
2016		2,213	19	500
2017		2,220		521
Total	6,245	10,985	1,716	2,463



The observations do not show considerable variations in number by year. We can see that 201 firms had adopted Integrated Reporting before 2012, adoptions that happened even before IIRC published the framework for Integrated Reporting, showing that companies were already making an effort to integrate non-financial information with financial information. Additionally, the IIRC engaged more than 100 companies in a pilot programme to share their experiences and support the framework's development (Busco et al., 2013).

Table 2 reports the frequency of observations by country.

Table 2. Frequency by country for sample "ALL"

Country	Enforcement Level	Control Pre-adoption Freq	Control Post-adoption Freq	Treatment Pre-adoption Freq	Treatment Post-adoption Freq
Australia	High	162	279	40	122
Austria	High	42	70	15	25
Belgium	Low	38	73	27	50
<b>Brazil</b>	Low	<b>174</b>	<b>291</b>	<b>82</b>	<b>213</b>
<b>Canada</b>	High	<b>246</b>	<b>422</b>	<b>27</b>	<b>60</b>
Chile	Low	81	147	28	36
China	Low	241	522	10	12
Colombia	Low	12	20	27	45
Denmark	High	26	50	9	31
Finland	High	36	69	49	95
France	Low	214	372	60	63
Germany	High	171	292	70	92
Greece	Low	59	80	8	4
<b>Hong Kong</b>	High	<b>366</b>	<b>688</b>	<b>21</b>	<b>33</b>
<b>India</b>	Low	<b>398</b>	<b>583</b>	<b>29</b>	<b>35</b>
Italy	Low	99	153	30	43
<b>Japan</b>	Low	<b>1,100</b>	<b>1,896</b>	<b>425</b>	<b>384</b>
Korea; Republic	Low	308	548	41	55
Luxembourg	High	16	30	20	12
Malaysia	Low	92	222	9	17
Mexico	Low	42	88	78	85
The Netherlands	High	43	73	65	86
New Zealand	High	31	59	15	57
Oman	Low	3	8	2	6
Philippines	Low	81	147	22	42
Poland	Low	51	76	36	35
Russia	Low	163	255	35	42
Singapore	High	107	187	17	44
Spain	Low	54	106	62	121
Sri Lanka	Low	17	32	21	34
Sweden	High	70	167	67	84
Switzerland	High	103	165	61	89
<b>The United Kingdom</b>	High	<b>262</b>	<b>454</b>	<b>151</b>	<b>230</b>
<b>The USA</b>	High	<b>1,335</b>	<b>2,355</b>	<b>44</b>	<b>73</b>
Zimbabwe	Low	2	6	13	8
Total		6,245	10,985	1,716	2,463

Note: As enforcement is a metric measured by year, the value represented in the Score is the average of the measure for all years.

Table 2 shows the frequency of firm-year observations by country. The countries with the highest number of companies are the U.S.A. and Japan, with Japan presenting the highest

number of Integrated Reports (384) followed by the United Kingdom (230) and Brazil (213). For levels of Enforcement measured from the World Bank’s rule of law index, Denmark, Finland and Sweden present the highest scores while Zimbabwe, Russia and Mexico exhibit the lowest scores.

Table 3. Sample ALL - Descriptive statistics for <IR> adopters (treatment) and non-adopters (control).

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
	N	Control mean	sd	N	Treatment mean	sd
Ke CAPM	16,440	<b>0.0888</b>	0.0759	4,023	<b>0.0810</b>	0.0657
LEV	17,230	86.15	86.27	4,179	82.37	76.99
ISIZE	17,230	23.50	2.509	4,179	24.18	2.817
ROA	17,230	4.062	6.140	4,179	4.532	5.921
MTB	16,611	1.922	1.902	4,083	2.119	1.924
ESG Score	5,992	<b>52.71</b>	17.97	2,319	<b>65.80</b>	14.23
ENFORC	17,230	1.182	0.763	4,179	1.175	0.824
TRUST	15,816	70.39	22.00	3,914	69.49	29.59
STAKELAW	15,776	13.08	5.045	3,821	15.47	5.157

Note: *Ke CAPM*: Cost of equity measured by CAPM; *Lev*: Leverage determined by the level of company indebtedness; *ISize*: Size measured by the natural logarithm of total assets; *MTB*: Market-to-Book ratio (market value/book value) determining company tangibility; *ROA*: Return on Assets denoting company’s profitability; *ESG Score*: Environmental, Social and Governance Score proxy for Integrated Reporting quality and CSR performance; *Enforc*: Enforcement measure representing legal enforcement system strength proxied by the “Rule of law index”; *Trust*: Trust measure determining overall perceptions of citizen trust in a country drawn from the World Values Survey; *Stakelaw*: Stakeholder Orientation measure determining the legitimation of multiple stakeholders demanding action and information from companies as proxied by the legal environment to protect employee rights.

From Table 3, it is possible to verify that the treatment group has a lower average cost of equity relative to the average of the control group, which is in line with the prediction of H1. Table 3 show that firms that adopted Integrated Reporting have a higher ESG Score than that of the control group both before and after adoption, and this outcome is in line with Lai et al. (2016). This indicates that companies are not adopting Integrated Reporting as a legitimation tool in response to poor ESG performance. By the same token, measures of size, leverage and profitability also indicate that firms are not adopting Integrated Reporting as a legitimacy tool. Data presented in Table 3 indicate that these factors are not pressuring companies to engage in the initiative, as they exhibited lower degrees of leverage, were larger in size and presented higher levels of profitability even before adoption (C. H. Cho & Patten, 2007), corroborating the results of Lai et al. (2016).

#### 4.1.2 Correlation and Univariate Analyses

Table 4 shows Pearson correlations for the main variables of interest. The cost of equity (Ke CAPM) is negatively related to ENFORC \* IR \* POST, serving as initial evidence supporting H1, which states that in environments of stronger enforcement, the adoption of Integrated Reporting is associated with a decrease in the cost of equity. The cost of equity is also negatively related to the ESG Score, a proxy for Integrated Reporting quality, providing initial evidence of the fact that Integrated Reporting quality is associated with a reduction in

São Paulo, 29 a 31 de Julho de 2020

the cost of equity. It can also be observed that Ke CAPM is positively related to Leverage, Size, and MTB and negatively related to profitability.

Table 4. Correlation Matrix Ke CAPM – Sample ALL

	1	2	3	4	5	6	7	8	9
1 ke CAPM	1								
2 ir_post	-0.0411*	1							
3 enforc_ir_post	-0.0423*	<b>0.914***</b>	1						
4 lev	0.0509**	<b>-0.0115</b>	-0.0653***	1					
5 lsize	0.00946	<b>0.0950***</b>	0.0754***	0.0563***	1				
6 roa	-0.0664***	<b>0.0198</b>	0.0417*	-0.207***	-0.0372*	1			
7 mtb	0.0671***	<b>0.0266</b>	0.0360*	0.201***	-0.195***	0.440***	1		
8 Esg_score	-0.129***	<b>0.272***</b>	0.245***	-0.00741	0.201***	0.0822***	0.0995***	1	
9 Enforcement	-0.0812***	<b>-0.0684***</b>	0.119***	-0.114***	-0.280***	0.0134	0.0349*	-0.0165	1

\* p < 0.05, \*\* p < 0.01, \*\*\* p < 0.001

In Table 5, results of the univariate analyses illustrate patterns of the cost of capital for both treatment and control groups for periods preceding and following the adoption of Integrated Reporting.

Table 5. Univariate analysis – Sample ALL

		N	Ke CAPM
<b>Panel A – Treatment Pre-adoption versus Control Pre-adoption</b>			
TREATED PRE IR	(1)	1,624	0.07129
CONTROL PRE IR	(2)	5,803	0.06319
Difference	(1) – (2)		<b>0.00810</b>
One sided p-value			0.0001
<b>Panel B - Treatment Post-adoption versus Control Post-adoption</b>			
TREATED POST IR	(1)	2,399	0.08752
CONTROL POST IR	(2)	10,637	0.10276
Difference	(1) – (2)		<b>-0.01523</b>
One sided p-value			0.0000

The results of univariate analyses show that before the adoption of Integrated Reporting, the treatment group had a higher average cost of equity than the control group. The period after adoption, however, shows a lower average cost of equity. Such results provide preliminary support for H1, which states that the adoption of Integrated Reporting is associated with a decrease in the cost of equity.

#### 4.1.3 Integrated Reporting and the Cost of Equity

Hypothesis 1 predicts that the cost of equity will decrease after companies adopt Integrated Reporting disclosure.

Table 6. IR and the cost of equity – Sample ALL (H1)

VARIABLES	(1) Ke CAPM 1	(2) Ke CAPM 1	(3) Ke CAPM 1	(4) Ke CAPM 1	(5) Ke CAPM 1
IR	0.0183*** (0.0022)	0.0170*** (0.0023)	0.0164*** (0.0023)	0.0163*** (0.0023)	0.0285*** (0.0031)

VARIABLES	(1) Ke CAPM 1	(2) Ke CAPM 1	(3) Ke CAPM 1	(4) Ke CAPM 1	(5) Ke CAPM 1
POST	0.0413*** (0.0018)	0.0408*** (0.0018)	0.0409*** (0.0018)	0.0407*** (0.0018)	0.0572*** (0.0026)
IR * POST	<b>-0.0257***</b> <b>(0.0031)</b>	<b>-0.0253***</b> <b>(0.0031)</b>	<b>-0.0253***</b> <b>(0.0031)</b>	<b>-0.0252***</b> <b>(0.0031)</b>	<b>-0.0412***</b> <b>(0.0039)</b>
ESG Score					-0.0002*** (0.0001)
LEV		0.0000*** (0.0000)	0.0000*** (0.0000)	0.0000** (0.0000)	0.0000* (0.0000)
ISIZE		0.0011*** (0.0004)	0.0011*** (0.0004)	0.0012*** (0.0004)	0.0006 (0.0007)
ROA				-0.0002 (0.0001)	-0.0002 (0.0002)
MTB			0.0014*** (0.0004)	0.0016*** (0.0004)	0.0008 (0.0005)
Constant	0.0384*** (0.0067)	0.0130 (0.0105)	0.0128 (0.0105)	0.0114 (0.0105)	0.0232 (0.0159)
Observations	20,463	20,463	20,308	20,308	8,225
R-squared	0.2880	0.2895	0.2929	0.2930	0.3555
Country FE	YES	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES	YES

Note: Standard errors are robust and clustered at the firm level in parentheses.

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Table 6 shows negative and statistically significant results for the interaction of Sample ALL companies that disclosed Integrated Reporting after disclosure, confirming H1 and consequently allowing us to infer that the adoption of Integrated Reporting is associated with a decrease in the cost of equity. This evidence differs from what has been reported for South African companies, which show no effect of the mandatory adoption of Integrated Reporting on the cost of capital (Barth et al., 2008). We show evidence demonstrating that the voluntary adoption of Integrated Reporting is negatively related to the cost of equity, which corroborates the evidence provided by García-Sánchez and Noguera-Gámez (2017).

The results of the first four tests consider more than 20,300 observations. The number of observations is greatly reduced when the ESG Score is included (8,200), as this index considers a wide range of variables and in cases of missing material data, the ESG Score is not calculated (Thomson Reuters, 2017).

The ESG Score is also negative and statistically significant, but the coefficient's magnitude is small, indicating that the quality of Integrated Reporting is related to an additional decrease in the cost of equity yet probably does not have a significant impact from an economic perspective.

Specifically about the control variables, leverage is positive and statistically significant in its association with the cost of equity, but as predicted in the literature, its coefficient is also small considering that companies with higher levels of indebtedness are committed to paying a specific return to capital regardless of performance (Botosan, 2006; Ng & Rezaee, 2015). In the presence of the other variables, MTB and ISIZE yield positive and statistically significant coefficients, indicating a relationship to the cost of equity in accordance with past studies (Botosan, 2006; El Ghouli et al., 2011; Fama & French, 1996). Finally, the ROA is not statistically significant.

Table 7 shows the test results controlled by all three institutional factors (Enforcement, Trust and Stakeholder Orientation) for countries where companies of the Sample ALL group maintain their headquarters.

Table 7. IR, cost of equity and enforcement – Sample ALL (H2)

VARIABLES	(1) Ke CAPM 2	(2) Ke CAPM 2	(3) Ke CAPM 2
IR	0.0293*** (0.0031)	0.0300*** (0.0031)	0.0186*** (0.0024)
POST	0.0586*** (0.0027)	0.0628*** (0.0028)	0.0477*** (0.0019)
<b>IR * POST</b>	<b>-0.0423***</b> <b>(0.0040)</b>	<b>-0.0442***</b> <b>(0.0040)</b>	<b>-0.0285***</b> <b>(0.0033)</b>
ESG Score	-0.0002*** (0.0001)	-0.0002*** (0.0001)	
LEV	0.0000* (0.0000)	0.0000*** (0.0000)	0.0000*** (0.0000)
ISIZE	0.0005 (0.0007)	0.0005 (0.0007)	0.0012*** (0.0004)
ROA	-0.0002 (0.0002)	-0.0001 (0.0002)	-0.0001 (0.0001)
MTB	0.0008 (0.0005)	0.0005 (0.0005)	0.0012*** (0.0004)
<b>ENFORC</b>	<b>-0.0363***</b> <b>(0.0126)</b>	<b>-0.0359***</b> <b>(0.0136)</b>	<b>-0.0338***</b> <b>(0.0094)</b>
<b>TRUST</b>		<b>0.0024***</b> <b>(0.0002)</b>	<b>0.0025***</b> <b>(0.0001)</b>
<b>STAKELAW</b>		<b>-0.0149***</b> <b>(0.0009)</b>	<b>-0.0148***</b> <b>(0.0007)</b>
Constant	0.0876*** (0.0267)	0.0864*** (0.0267)	0.0568*** (0.0196)
Observations	8,225	7,783	18,806
R-squared	0.3567	0.3727	0.3139
Country FE	YES	YES	YES
Industry FE	YES	YES	YES

Note: Standard errors are robust and clustered at the firm level in parentheses.

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Models 1 to 3 of Table 7 shows a negative relationship between the cost of capital and the adoption of Integrated Reporting for the companies' Integrated Reporting in the post-adoption period relative to the pre-adoption period and to the control group after controlling for Enforcement and two other institutional factors (Trust and Stakeholder Orientation).

Additionally, considering a sample of 18,806 firm-year observations, we found no change in sign or statistical significance when excluding the ESG Score from model. While these results are preliminary actually support hypothesis H2, we investigate this further regarding the law enforcement in the study.

#### 4.1.3 Integrated Reporting, the Cost of Equity and Enforcement

According to Liang and Renneboog (2017), enforcement serves as a company's strongest predictor of CSR efforts. Therefore, Hypothesis 3a predicts that companies that

adopted Integrated Reporting and operating in countries characterized by high levels enforcement have a more substantial decrease in the cost of equity than companies operating in low enforcement environments.

Table 8. IR, cost of equity and Enforcement – Sample ALL (H2)

VARIABLES	(1) Ke CAPM ENF2	(2) Ke CAPM ENF2	(3) Ke CAPM ENF2	(4) Ke CAPM ENF2
IR	-0.0027 (0.0046)	-0.0057 (0.0047)	0.0073 (0.0079)	-0.0045 (0.0083)
POST	-0.0142*** (0.0021)	-0.0153*** (0.0022)	-0.0088* (0.0048)	-0.0146** (0.0067)
IR * POST	-0.0009 (0.0045)	0.0000 (0.0046)	-0.0110 (0.0083)	0.0028 (0.0095)
ENFORC	-0.0950*** (0.0082)	-0.0966*** (0.0082)	-0.0894*** (0.0122)	-0.0979*** (0.0132)
IR * ENFORC	0.0197*** (0.0032)	0.0203*** (0.0031)	0.0157*** (0.0050)	0.0232*** (0.0052)
POST * ENFORC	0.0489*** (0.0016)	0.0491*** (0.0016)	0.0482*** (0.0031)	0.0523*** (0.0042)
<b>IR * POST * ENFORC</b>	<b>-0.0232*** (0.0030)</b>	<b>-0.0233*** (0.0030)</b>	<b>-0.0222*** (0.0052)</b>	<b>-0.0312*** (0.0059)</b>
ESG Score			-0.0002*** (0.0001)	-0.0002*** (0.0001)
LEV		0.0000** (0.0000)	0.0000** (0.0000)	0.0000*** (0.0000)
ISIZE		0.0013*** (0.0004)	0.0008 (0.0007)	0.0008 (0.0007)
ROA		-0.0002 (0.0001)	-0.0002 (0.0002)	-0.0001 (0.0002)
MTB		0.0012*** (0.0004)	0.0006 (0.0005)	0.0003 (0.0005)
TRUST				0.0023*** (0.0002)
STAKELAW				-0.0140*** (0.0009)
Constant	0.1872*** (0.0160)	0.1614*** (0.0182)	0.1654*** (0.0264)	0.1785*** (0.0270)
Observations	20,463	20,308	8,225	7,783
R-squared	0.3360	0.3404	0.3856	0.3914
Country FE	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES

Note: Standard errors are robust and clustered at the firm level in parentheses.

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Table 8, Model 4, considers 7,783 firm-year observations and explains 39.14% of the variance in the cost of equity. Interaction term IR \* POST \* ENFORC is negative and significant (p < 0,01), indicating that companies operating in high enforcement countries show a more substantial decrease in the cost of equity after the adoption of Integrated Reporting.

Furthermore, we partitioned our sample into two groups based on whether they were in countries characterized by high or low levels of enforcement and based on whether they achieved values above or below the mean of the sample as executed by Daske et al. (2008), H.

A. Hong et al. (2014) and Zhou et al. (2016). Additionally, we analyzed the first (low enforcement) and forth (high enforcement) quartiles.

Table 9. IR, cost of equity and High and Low Enforcement – Sample ALL (H2)

VARIABLES	(1) Ke CAPM HENF 1	(2) Ke CAPM LENF 1	(3) Ke CAPM Q4ENF 1	(4) Ke CAPM Q1ENF 1
IR	0.0377*** (0.0036)	0.0076 (0.0049)	0.0068* (0.0036)	-0.0047 (0.0075)
POST	0.0784*** (0.0027)	0.0235*** (0.0046)	0.0405*** (0.0027)	-0.0309*** (0.0048)
<b>IR * POST</b>	<b>-0.0576***</b> <b>(0.0042)</b>	<b>-0.0064</b> <b>(0.0067)</b>	<b>-0.0204***</b> <b>(0.0040)</b>	<b>0.0073</b> <b>(0.0078)</b>
LEV	0.0001*** (0.0000)	-0.0000* (0.0000)	-0.0000 (0.0000)	-0.0000 (0.0000)
ISIZE	0.0002 (0.0010)	0.0015 (0.0010)	0.0009 (0.0010)	0.0002 (0.0013)
ROA	-0.0002 (0.0002)	0.0000 (0.0004)	-0.0000 (0.0002)	-0.0009** (0.0004)
MTB	-0.0004 (0.0006)	0.0033*** (0.0011)	0.0015* (0.0008)	0.0021 (0.0013)
ESG Score	-0.0002** (0.0001)	-0.0001 (0.0001)	0.0000 (0.0001)	-0.0002 (0.0001)
ENFORC	-0.1953*** (0.0151)	0.1536*** (0.0179)	-0.1270*** (0.0154)	0.0561** (0.0267)
Constant	0.3661*** (0.0348)	-0.1843*** (0.0356)	0.2333*** (0.0360)	0.1783*** (0.0316)
Observations	5,537	2,688	2,581	1,234
R-squared	0.4391	0.3425	0.3642	0.4609
Country FE	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES

Note: Standard errors are robust and clustered at the firm level in parentheses.

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Table 9, Model 1 shows the effect of Integrated Reporting adoption in a High Enforcement environment for a sample of 5,537 firm-year observations and identifying countries as above or below average. For companies that adopt Integrated Reporting, the cost of capital decreases by 0.0576 for Integrated Reporting in the post-adoption period, a result that is statistically significant at the 1% level. The model 1 can explain 43.91% of the variance in the cost of equity. A similar interpretation can be applied to Model 3 when considering companies operating in countries within the top quartile for Enforcement (Highest Enforcement).

Model 2 presents our analysis of the cost of equity for 2,688 firm-year observations drawn from a Low Enforcement environment. Here, R-squared is valued at 0.3425, but the coefficients for interaction IR \* POST and for the IR coefficient are not significant. This indicates that the reduction in the cost of capital in the post-adoption period for companies that adopted Integrated Reporting is only observable for companies operating in a High Enforcement environment (Chih et al., 2010; Dhaliwal et al., 2012; Frías-Aceituno et al., 2013). It should be noted that the interpretation of model 4 is similar.

### 5. FINAL REMARKS

Integrated Reporting is a process that provides integrated financial and non-financial information about companies. In essence, this report includes medium- and long-term perspectives based on Integrated Thinking concept. Such information should be considered during the decision-making process and consequently in the company's disclosure practices (Barth et al., 2017; Bernardi & Stark, 2018; IIRC, 2013).

One of the main purposes of Integrated Reporting is to provide information to financial capital providers, leading to a more efficient allocation of capital by virtue of a better understanding of companies' perspectives through time (IIRC, 2013). Thus, companies that adopt Integrated Reporting disclosure may observe a decrease in information asymmetry, thereby improving their multiple capital management systems. These factors can result in economic benefits for such companies. This research analyzes the relationship between Integrated Reporting disclosure and the cost of equity.

We analyzed a global sample of 25,311 firm-year observations for 2010 to 2017. Sample ALL included 4,876 firm-year observations for Integrated Reporting disclosers and 20,435 firm-year observations for the control group. The treatment group was composed of companies that disclosed their reports to the IIRC's Integrated Reporting Examples Database, and companies that self-declared Integrated Reporting disclosures to the GRI Sustainability Database. The control group was defined using the Propensity Score Matching (PSM) matching procedure, which included companies that published Integrate Reporting and similar companies that did not disclose through <IR>. The nearest neighbor criterion with replacement and sector and size variables were used for the PSM procedure.

We adopted a research design based on differences-in-differences to compare companies that disclose Integrated Reporting in periods before and after adoption, thus keeping individual variations constant. In addition, we compared the treatment group to a control group for the periods before and after treatment, allowing us to control other environmental variations that may affect the cost of capital.

From our literature review, we hypothesized (H1) that Integrated Reporting disclosures and the cost of equity are negatively related. Our results support this hypothesis and are robust when considering firm- and country-level controls. The evidence presented in this study differs from the results given by Barth et al. (2017), which show no evidence of a relationship between Integrated Reporting and the cost of equity. It does, however, corroborate the findings of García-Sánchez and Noguera-Gámez (2017) and Zhou et al. (2017).

We further investigated these results and found evidence demonstrating that enforcement is an institutional factor that plays an important role in the relationship between Integrated Reporting disclosure and the cost of equity. After analyzing a subsample of high and low enforcement environments, only companies operating in high enforcement environments showed a lower cost of equity after the adoption of Integrated Reporting, which is in line with the findings of Chih et al. (2010), Dhaliwal et al. (2012) and Frías-Aceituno et al. (2013).

The first limitation of this study concerns the metrics used to proxy Integrated Reporting Disclosure. Therefore, based on information collected from the Integrated Reporting Examples and GRI Sustainability Databases, we used a dummy variable to indicate whether a company had adopted Integrated Reporting. This information did not discriminate



the degree of disclosure compliance with the framework nor did it control which companies had actually applied Integrated Thinking concept.

As the literature has not reached a consensus on the best proxy for the cost of equity, we estimated the cost of equity using the CAPM, which is the most popular model, especially among executives. Nonetheless, we encourage further investigations using other metrics, e.g., Gebhardt, Lee and Swaminathan (2001), Claus and Thomas (2001), Ohlson and Juettner-Nauroth (2005) and Easton (2004), to analyze the robustness of results.

Furthermore, several observations considered included missing data, specifically regarding the ESG Score variable. In spite of that, we analyzed the results by considering variables individually, in turn allowing us to examine the consistency of our results. This helped us ensure that the missing data did not introduce biases that could result in spurious results.

The period for the analysis was set to 2010 to 2017. Additionally, all proxies used in the model were approximations that allowed us to measure the theoretical constructs.

Future research should develop a measure of quality for Integrated Reporting to evaluate, among other things, connectivity between information presented, materiality, and long-term orientation information. A critical gap in the Integrated Reporting literature relates specifically to the evaluation of the connectivity and interdependence of capitals. Other studies could also investigate how much economic benefit is related to each of the following factors: strategic changes, changes in the decision making process, changes in a company's performance and, finally, changes in presentation format.

To isolate effects, it would likely be interesting to formulate experiments, although archival approaches that can help to understand this relationship could also be considered.

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### APPENDIX 1 – Descriptions of variables

Variable	Description	Source
<i>Ke CAPM</i>	Cost of equity measured by the CAPM.	EIKON
<i>IR</i>	Dummy variable; 1 when the company is an <IR> adopter and 0 otherwise.	IIRC Database GRI Database
<i>Post</i>	Dummy variable; 1 when an observation is related to post <IR>-adoption period and 0 otherwise.	IIRC Database Company website
<i>Lev</i>	Leverage; level of company indebtedness.	EIKON
<i>lSize</i>	Size; measured by the natural logarithm of total assets.	EIKON
<i>MTB</i>	Market-to-book ratio (market value/book value) denoting company tangibility.	EIKON
<i>ROA</i>	Return on Assets representing company's profitability.	EIKON
<i>ESG Score</i>	Environmental, Social and Governance Score measured by Integrated Reporting quality and CSR performance.	EIKON
<i>Enforc</i>	Enforcement measure representing legal enforcement system strength proxied by the "Rule of law index".	World Bank Database
<i>Trust</i>	Trust measure; overall perceptions of trust levels among citizens of a country as measured by the World Values Survey.	Nanda and Wysocki (2011)
<i>Stakelaw</i>	Stakeholder Orientation measure; legitimization of multiple stakeholders to demand action and information from companies proxied by the legal environment to protect employee rights.	Dhaliwal et al. (2014)
<i>Country</i>	Dummy variables indicating the location of a company's headquarters.	EIKON
<i>Industry</i>	Dummy variables indicating the a company's core industry.	EIKON

Figure 1. Descriptions of variables