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DOES MANDATORY INTEGRATED REPORTING AFFECT STOCK PRICES? AN EMPIRICAL STUDY ON THE JOHANNESBURG STOCK EXCHANGE

ZORUNLU ENTEGRE RAPORLAMA HİSSE SENEDİ FİYATLARINI ETKİLER Mİ? JOHANNESBURG BORSASI ÜZERİNE AMPİRİK BİR ÇALIŞMA

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Abstract

Integrated Reporting (IR) is one of the new reporting phenomena that has gained widespread attention over the last decade because of the growing demand for non-financial forward-looking information. It combines financial and non-financial information such as governance and social information under one report. Even though this implementation framework has been published, there is a need to address its effects on share prices and earnings per share ratio from an analytical perspective. In this paper, we have adopted a panel data analysis to test the effects of mandatory IR implementation on companies listed in the Johannesburg Stock Exchange. The connection was established through a panel data analysis on two separate models composed of financial ratios, between the years of 2007 and 2016 using a dummy variable starting from 2011 to incorporate the commencement of mandatory IR. We conclude that compulsory Integrated Reporting has a statistically meaningful relationship with both the share price and earnings per share ratio of companies.

Keywords: Integrated reporting, Stock price valuation, Earnings per share, Johannesburg Stock Exchange

JEL Classification: G10, G15, G18, M40, M48

Özet

Entegre Raporlama kurumsal dünyada son birkaç yıl içinde finansal olmayan geleceğe dönük verilerin raporlaması hususunda artan talepten dolayı dikkati çeken yeni raporlama olgularından biridir. Bu raporlama finansal ve finansal olmayan yönetişim ve sosyal öğeleri tek bir rapor altında bir araya getirmektedir. Uygulama çerçevesinin yayınlanmış olmasına rağmen hisse senedi fiyatları ve hisse başı kazanç üzerindeki etkisi ve uygulanabilirliğinin ele alınması gerekmekte olup literatürde henüz analitik bir çalışma mevcut

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değildir. Bu çalışmada panel veri analizi ile zorunlu Entegre Raporlamanın, Johannesburg Borsasında hisse senetleri işlem gören firmaların üzerindeki etkileri araştırılmıştır. Bu ilişki, 2007 ve 2016 yılları arasındaki finansal oranlarla oluşturulan iki farklı modele panel veri analizi ve 2011 yılından itibaren gölge değişken kullanılarak uygulanmasıyla elde edilmiştir. Elde edilen sonuçlar Entegre Raporlama zorunluluğunun hisse senedi fiyatları ve hisse başı kazanç ile istatistiksel olarak anlamlı bir ilişki içinde olduğunu göstermektedir.

Anahtar Kelimeler: Entegre raporlama, Hisse senedi değerlemesi, Hisse başı kazanç, Johannesburg Borsası

JEL Sınıflandırma: G10, G15, G18, M40, M48

1. Introduction

In the last decade, the perception of "value" in the business world has been in an ever-evolving stage. As a result of this, the market valuation of organizations started to be more composed of intangible assets in comparison to tangible assets. Along with this shift in the understanding of "value" the dynamics of the global economy started to change.

The main reason behind the increasing demand for non-financial information and metrics regarding social and environmental impacts (Stewart, 2015) is the shift in the market capitalization of S&P 500 companies to become more intangible asset-weighted (Eccles, Serafeim, & Krzus, 2011). Accordingly, the days where the financial performance of an organization is the mere measure of worth has passed (Burke & Clark, 2016). Figure 1 presents the shift of market valuation components from tangible assets to intangible assets in a striking manner. As it can be read from Figure 1, Intangible Assets represented only %17 of the total market valuation of the S&P companies back in 1975 whereas in 2015 it grew to become %84.

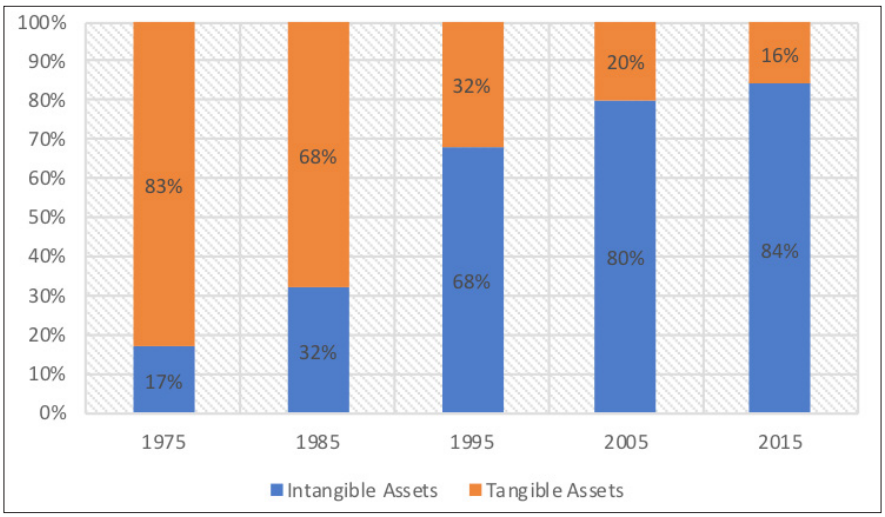

Figure 1: Components of S&P 500 Market Value (Ocean Tomo, n.d.)

Thus, it is safe to say that influence of intangible assets on competitiveness has increased and their effective management became a crucial component to address for sustainable value creation process of organizations. In this manner, Eccles and Serafeim (2013) define sustainability as "…in terms of a company's strategy and the relationship between this strategy and the society that grants companies their license to operate". Consequently, they point out that a sustainable strategy should create value for both the organization and the society (Eccles & Serafeim, 2013).

Considering these developments, organizations started to voluntarily publish corporate sustainability reports that communicate non-financial information. However, due to lack of regulation and guidance, these reports fell short of meeting expectations and merely became supplements to the annual financial reports (Eccles & Krzus, 2010).

The call to vary Corporate Reporting and disclosure of non-financial information found an answer when in 2010 International Integrated Reporting Council (IIRC) was founded and introduced the Integrated Reporting (IR) framework in 2011 (Havlová, 2015). IR became the logical consequence of the call for non-financial information disclosure and corporate responsibility issues (Marin-Garcia & Tomas, 2016).

2. Integrated Reporting in South Africa

The corporate governance in South Africa during the early 1990s was at a minimal level. Mainly, large corporations were family owned and an emphasis on corporate governance was not existent (Schulschenk, 2012). The establishment of Institute of Directors in Southern Africa (IoDSA) in 1992, which was commissioned by the King Committee, marks the beginning of Corporate Governance studies in South Africa since the sole purpose of this institutions was to promote corporate governance studies to launch the Southern African economy in the global context (Eccles, Serafeim, & Armbrester, 2012).

The committee has issued its first report King I in 1994, which has outlined that a focus of a company should shift from maximizing book value to maximizing economic value while considering needs and expectations of all the stakeholders (Schulschenk, 2012). In 2002, following the World Summit on Sustainable Development in Johannesburg, the first king code was revised and King Code II was published (King Comittee, 2002). In addition to the first code, King Code II has introduced concepts of risk management and sustainability. This report indicated that companies should not be operating with the solitary purpose of financial profit but should also consider its economic, environmental and social outcomes (King Comittee, 2009).

Along with IIRC, which has published the integrated reporting framework, the King Report on Governance for South Africa became a separate formation that undertook this concept (Marin-Garcia & Tomas, 2016). The step towards compulsory reporting was taken with the King Code III in 2010 (IoDSA, 2013). Accordingly, in 2010 Johannesburg Stock Exchange modified its listing requirements to include the recommendations put forward by the King III report. Consequently, 450

listed companies were obliged to issue an integrated report for the prospective fiscal years in place of the annual financial and sustainability reports (Eccles et al., 2011).

3. Literature Review

This paper examines the relationship between IR, share price valuations and earning per share through financial ratios derived from corporations listed on the South African Johannesburg Stock Exchange. To be able to test this relationship we have utilized two different econometric panel data models with IR function being the dummy variable.

IIRC strongly argues that components of IR framework will maximize the effectiveness of capital distribution in the financial markets by ensuring better quality information disclosure to prospective investors. Under this context, we predict that both share price valuation and earnings per share ratio are positively associated with the IR reporting presence of corporations.

One of the important changes that have already begun is the increasing demand and emphasis on non-financial information. Demand regarding disclosure of non-financial information containing Environmental, Social, and Governance (ESG) performance from the investors has been growing (Eccles et al., 2011). However, in the current form of financial reporting, which can be considered as the main source of decision making for investors, the value of intangible assets like human capital, brand value, natural resources, R&D and intellectual capital is not present.

Pursuantly, traditional corporate financial reporting structure was challenged as an inefficient and a non-satisfactory tool following the global economic crisis. The main emphasis was that the current form of financial reporting only provides information about the past and investors were looking for prospective outlook as well (Flower, 2015). Heretofore, with John Elkington's concept of triple bottom line, emphasis on organization's impact on social, economic and environmental areas gained widespread attention during the late 1990s and early 2000s (Dumay, Bernardi, Guthrie, & Demartini, 2016).

Under this context there have been many studies that have analyzed and examined the non-financial reporting undertaken by corporations (Maas, Schaltegger, & Crutzen, 2016) and it has been determined that reporting of non-financial capital utilized by corporations such as human and natural should be reported in a manner which underlines how they are being utilized to support long-term corporate sustainability (Beck, Dumay, & Frost, 2017). The long-term sustainability of a company, from a financial point of view, can be expressed as the ability to continuously maximize wealth for its shareholders.

This idea of full disclosure supports the theory of full efficiency in the decision-making process of investors. Accordingly, in the ever-changing global markets, only the investors who possess all of the data during the decision-making process may succeed (Fărcas, 2015). Possession of full data in return, will correct the stock price valuations and ensure the fair distribution of the capital

(Rikanovic, 2005). It has been determined that there is an empirical relationship between investors of a stock and the volatility of that stock. Accordingly, long-term institutional investors prefer to buy stocks of companies which provide frequent, meaningful and transparent disclosures (Bushee & Christopher, 2000).

The main research agenda of financial economics has always been the estimation of stock prices and stock price returns. Accordingly, it has been widely accepted that stock price valuation has predictable components (Kothari & Shanken, 1997; La Porta, 1996). There has been a lot of studies supporting these results, Ang and Bekaert (2006) have concluded that stock price predictability is more efficient and short-term rather than long-term.

In a fully efficient capital market, all stock prices should reflect the available information in a full and objective manner at fair value. Even though there have been a lot of studies that prove the viability of this theory, there has been an increasing number of studies that aim to prove its invalidity. The main reason behind these studies is that the price-earnings ratios reflect the future investment decisions (Basu, 1977). Even though Kendall (1953) has determined in his study that stock prices oscillate over time, Kendall's other progenitor studies on efficient markets focused on using past data to estimate future stock prices (Lewellen, 2004).

The current literature for stock prices indicates a variance between the intrinsic value of a stock and its market price. This variance acts as an input for the decision-making process of the investors (Ou & Penman, 1989). Accordingly, analysts rely heavily on the expected rate of growth on revenue while neglecting the intrinsic value of stocks (Easton, 2004). The current consensus is that there exists a positive and linear relationship between past earnings and stock prices (Molodovsky, 1955).

The current studies mainly rely on predictive regression models to estimate the stock prices (Gupta & Modise, 2012). Even though there are certain econometric challenges concerning predictive regression models (Gregory Mankiw & Shapiro, 1986; Kirby, 1997), the general accord is that they are effective to be used in future stock price estimation modelings (Campbell, 1999).

As of yet, there has not been any empirical study on the effects of Integrated Reporting on stock prices and earnings per share ratio. However, Baboukardos and Rimmel's (2016) study showed a positive relationship between mandatory IR and market capitalization of companies listed in the Johannesburg Stock Exchange.

The existing literature includes different studies that examine the relationship between Earnings Per Share and Stock Price Valuation with different independent variables. However, there has not been any study that used IR as a dummy variable to measure its effect.

4. Research and Empirical Study

4.1. Data and Limitations

We have used 10 years of data observations derived from the 30 companies listed in Table 1 below for the years between 2007 and 2016. We have excluded companies that have not been traded on the stock exchange for a continuous 10-year period due to bankruptcy, merger or corporate split. Additionally, we are aware that there might have been effects of the 2008-2009 financial global crises on the data and this effect should be carefully evaluated and tested separately.

Table 1: Industrial Distribution of the Companies used in the Empirical Study

Industry	**Number of Companies**
Industrial Metals & Minerals	6
Retail	5
Precious Materials & Minerals	2
Real Estate	2
Communication Services	2
Basic Materials	2
FMCG	2
Energy	1
Holding	1
Production of Medical Drugs	1
Consumer Cyclical	1
Production of Paper & Related Products	1
Production of Cosmetics	1
Production of Tobacco-Related Products	1
Healthcare	1
Insurance	1
Total	**30**

Data used in the empirical study is composed of financial information derived from the websites of the companies listed below for the years between 2007 and 2016. The use of special accounting periods is common in South Africa and accordingly, the fiscal year of the company may end and start either in March, June, September or December.

The banking and finance industry has been excluded from this study. Sector-specific financial ratios should be considered for this particular industry in the prospective studies. The effects of IR on stock prices and earnings per share of financial institutions should be evaluated with a separate study.

Table 2: Research Sample

No #	Company Name	No #	Company Name
1	Kumba Iron Ore	16	MTN Group Ltd
2	Oceana Group LTD	17	Nampak Ltd
3	Liberty Holdings LTD	18	Netcare Ltd
4	Sasol Ltd	19	Sappi Ltd
5	The Foschini Group Ltd	20	Telkom SA SOC Ltd
6	Truworths International Ltd	21	Woolworths Holdings Ltd
7	Anglo American Plc	22	Tiger Brands Ltd
8	AngloGold Ashanti Ltd	23	African Rainbow Minerals Ltd
9	Aspen Pharmacare Holdings Ltd	24	BHP Billiton Plc
10	Barloworld Ltd	25	British American Tobacco Plc
11	Exxaro Resources Ltd	26	Imperial Holdings Ltd
12	Gold Fields Ltd	27	Northam Platinum Ltd
13	Impala Platinum Holdings Ltd	28	Clicks Group Ltd
14	Intu Properties Plc	29	Pick n Pay Stores Ltd
15	Massmart Holdings Ltd	30	Distell Group Ltd

Additionally, financial ratios utilized in the study are listed in Table 3. The calculation details of the ratios can be observed from the table. The data used to calculate these ratios, independent variables in our model, is derived from the audited financial statements that are disclosed for investors for the years between 2007 and 2016. The dependent variables for our models are Earnings Per Share and Stock Price Valuation. These dependent variables are posted in two different models.

Table 3: Financial Ratios used as Independent Variables

No #	Variable Name	Symbol	Calculation
1	Earnings Per Share	EPS	Net Income / Outstanding Shares
2	Net Earnings Margin %	NEM	Net Income / Sales Revenue
3	Operating Margin %	OPM	Net Operating Income / Sales Revenue
4	Return on Assets %	ROA	Net Income / Total Assets
5	Return on Equity %	ROE	Net Income / Shareholder's Equity
6	Year over Year Growth	YYG	(Current Year Revenue – Previous Year Revenue) / Current Year Revenue
7	Current Ration	CUR	Current Assets / Current Liabilities
8	Financial Leverage	FIL	Total Debt / Total Assets
9	Quick Ration	QUR	(Current Assets – Inventory)/ Current Liabilities
10	Debt/Equity Ratio	DEB	Total Debt / Shareholder's Equity
11	Receivables Turnover	RET	Sales Revenue / Average Total Receivables
12	Inventory Turnover	INV	Cost of Goods Sold / Average Inventory
13	Asset Turnover	AST	Sales Revenue / Average Total Assets
14	Mandatory Integrated Reporting	EZR	
15	Stock Price	HSF	

4.2. Research Hypothesis and Models

The main hypothesis of this study is founded on the positive relationship between mandatory IR disclosure and firm valuations, which is represented through "Earnings per Share" and "Stock Price Valuation" variables. In this context hypothesis zero (H_0) should be empirically tested and verified.

Main and the null hypothesis of the study are presented below;

H_0: Financial Ratios have no effect on Earnings per Share and Stock Price Valuations of Companies.

H_1: Financial Ratios have an effect on Earnings per Share and Stock Price Valuations of Companies.

In order to test these hypotheses, the research models below are used;

1. *Research Model:* $EPS_{it} = \beta_0 + \beta_1 NEM_{it} + \beta_2 OPM_{it} + \beta_3 ROA_{it} + \beta_4 ROE_{it} + \beta_5 YYG_{it} + \beta_6 CUR_{it} + \beta_7 FILL_{it} + \beta_8 QUR_{it} + \beta_9 DEB_{it} + \beta_{10} RET_{it} + \beta_{11} INV_{it} + \beta_{12} AST_{it} + \beta_{13} EZR_{it} + \varepsilon_{it}$

2. *Research Model:* $HSFit = \beta_0 + \beta_1 NEM_{it} + \beta_2\ OPM\ it + \beta_3 ROA_{it} + \beta_4 ROE_{it} + \beta_5 YYG_{it} + \beta_6 CUR_{it} + \beta_7 FILL_{it} + \beta_8 QUR_{it} + \beta_9 DEB_{it} + \beta_{10} RET_{it} + \beta_{11} INV_{it} + \beta_{12} AST_{it} + \beta_{13}\ EZR_{it} + \varepsilon_{it}$

Subsequently, some of the financial ratios utilized in this study are calculated using the same denominator, which may suggest multicollinearity between independent variables and correlation problems. In the light of these, a factor analysis is adapted to determine multicollinearity between variables. High multicollinearity variables will be tested to form composite independent variables to eliminate the correlation problem.

The factor analysis is completed with IBM SPSS 23.0 version. Principal components method and varimax rotation techniques are adapted to carry out the factor analysis. The main objective of this technique is to group the independent variables under a limited number of composite variables as possible.

KMO and Bartlett tests are used to determine sample adequateness of the study and suitability of the data matrix to the rotation technique before factor analysis is implemented. The related statistics of these tests are presented below in Table 4.

Table 4: KMO and Bartlett Test Statistics

Kaiser-Meyer-Olkin Measure of Sampling Adequacy		,597
Bartlett's Test of Sphericity	Approx. Chi-Square	1252,567
	Df	66
	Sig.	0,000

The statistical results suggest that Kaiser Meyer sample adequacy statistics is below 0,5 and that the sample size is satisfactory. Additionally, it has been observed that the Bartlett test statistics is statistically meaningful at a %95 confidence level.

Consequently, the scree plot graph is used to determine the proper number of factors for the factor analysis process.

The scree plot graph can be observed in Figure 2.

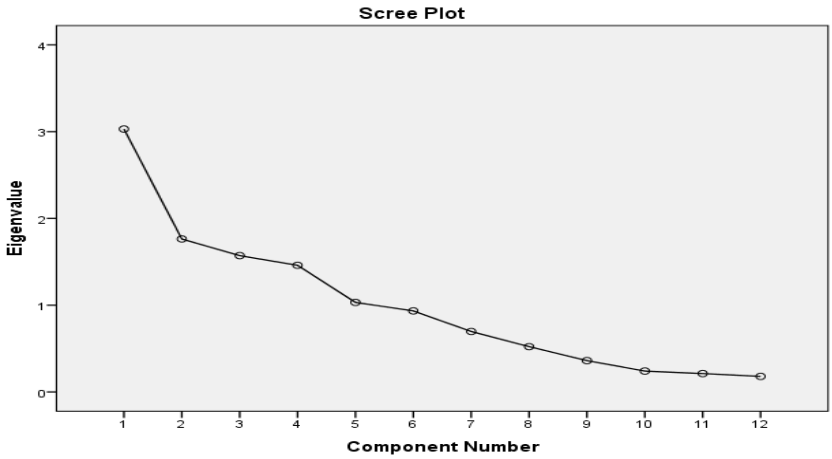

Figure 2: Factor Analysis Scree Plot Graph

Once the graph is examined it can be observed that the Eigenvalue rate decreases after the fifth factor. Accordingly, it can be stated that a 5-factor disposition would be favorable for the factor analysis. Before deciding on the number of factors to be used variance rates can be evaluated as well. The variance rates that can be explained by a number of factors are illustrated below in Table 5.

Table 5: Expounded Variance Rates

Factor	Primary Eigenvalue			Derived Weighted Sum of Squares			Rotated Weighted Sum of Squares		
	Tot.	% Var.	Cum %	Tot.	% Var.	Cum %	Tot.	% Var.	Cum %
1	3,03	25,248	25,248	3,03	25,248	25,248	1,968	16,396	16,396
2	1,763	14,692	39,939	1,763	14,692	39,939	1,954	16,281	32,677
3	1,571	13,091	53,031	1,571	13,091	53,031	1,891	15,755	48,432
4	1,46	12,163	65,193	1,46	12,163	65,193	1,782	14,847	63,28
5	1,032	8,598	73,791	1,032	8,598	73,791	1,261	10,511	73,791
6	0,934	7,781	81,573						
7	0,697	5,806	87,378						
8	0,522	4,349	91,727						
9	0,361	3,008	94,736						
10	0,241	2,006	96,742						
11	0,212	1,764	98,506						
12	0,179	1,494	100						

As it can be observed from the Table first and second factors are able to account for %16 of the total variance. Additionally, third and fourth factors can account for %15, whereas the fifth factor can account for %10 of the variance. In total five factors can account for %74 of the total variance. The total being above %70 is a favorable rate for factor analysis.

The five-factor structure and inter independent variable grouping with factor loads can be observed in Table 6.

Table 6: Rotation Factor Matrix

	Component				
	1	2	3	4	5
ROE	0.781				
ROA	0.762				
YYG	0.632				
OP		0.936			
NM		0.902			
QUR			0.918		
CUR			0.913		
DEB				0.886	
FILL				0.775	
RET					
AST					0.595
INV					0.561

Based on factor loads presented below, each factor has a load more than 0,5 and the first factor is composed of 3 independent variables whereas the rest of the factors are composed of 2 independent variables. Factors and independent variable couplings are presented in the Table below.

Table 7: Factor Independent Variable Couplings

Factor	Independent Variable
F1	ROE
	ROA
	YYG
F2	OP
	NM
F3	QUR
	CUR
F4	DEB
	FILL
F5	AST
	INV

The models are updated based on the factor structure explained above are as follows;

$$EPS_{it} = \beta_0 + \beta_1 F1_{it} + \beta_2 F2_{it} + \beta_3 F3_{it} + \beta_4 F4_{it} + \beta_5 F5_{it} + \beta_6 EZR_{it} + \varepsilon_{it}$$

$$HSF_{it} = \beta_0 + \beta_1 F1_{it} + \beta_2 F2_{it} + \beta_3 F3_{it} + \beta_4 F4_{it} + \beta_5 F5_{it} + \beta_6 EZR_{it} + \varepsilon_{it}$$

4.2.1. Cross-Sectional Dependency Evaluation

The independent variables are tested for cross-dependency before determination of stationarity of independent variables through unit root tests. These are important to understand the structure of the data and the further methods that will be implemented for unit root tests. The existence of cross-sectional dependency has a great impact on the end results (Breusch & Pagan, 1980; Pesaran, 2004). Cross-sectional dependency has an impact on unit root tests and panel cointegration tests that will be realized. Since this study involves 10 years with 300 observations in total, is not eligible for long-term co-integration relationship and relation of causality analysis. We have adopted the Pesaran CD test to further evaluate cross-sectional dependency and the existence of stationarity, in order to avoid non-stationarity in the unit root tests. The Pesaran CD test is appropriate where *t* is smaller than *n* (Pesaran, 2004). The Pesaran CD test statistics are presented in Table 8.

Table 8: Pesaran CD Test Statistics

Variable	Pesaran CD Statistic	d.f	p
EPS	986.056	435	0.000*
HSF	1442.055	435	0.000*
F 1	668.448	435	0.0027*
F 2	558.7891	435	0.0043*
F 3	347.258	435	0.0021*
F 4	857.058	435	0.001*
F5	966.3411	435	0.0026

Based on the results of the Pesaran CD test, all null hypothesis, which states that inter-variable independency exists, is rejected. In this model, the companies that form the panel have cross-dependency for all the independent variables. Accordingly, a change in one of the companies that form the model will affect the same variable in other companies as well.

4.2.2. Unit Root Tests

We have adopted four different unit root tests based on the cross-sectional dependency results of the Pesaran CD test. The unit root statistics are reported under the Table 9, whereas, the categorized time graphics of the independent variables are shown in Figure 3.

Table 9: Unit Root Tests

Variable	Levin, Lin & Chu t		Im, Pesaran and Shin W-stat		ADF – Fisher Chi-square		PP – Fisher Chi-square	
	Statistic	p value	Statistic	p value	Statistic	p value	Statistic	p value
EPS	-11.571	0.000	-1.647	0.049	76.858	0.070	64.353	0.327
D(EPS)*	-10.461	0.000	-4.885	0.000	132.368	0.000	244.269	0.000*
HSF	-1.872	0.030	0.878	0.812	62.404	0.390	56.914	0.589
D(HSF)*	-4.744	0.000	-2.321	0.010	93.021	0.004	183.694	0.000*
F1*	-8.022	0.000	-3.003	0.001	101.601	0.000	133.477	0.000
F2*	-50.849	0.000	-7.492	0.000	90.811	0.000	102.379	0.000
F3*	-7.373	0.000	-2.864	0.002	99.159	0.000	138.320	0.000
F4	0.120	0.548	0.370	0.644	61.008	0.439	106.293	0.000*
D(F4)*	0.386	0.005	-1.778	0.037	93.230	0.003	312.565	0.000
F5	-0.494	0.310	1.180	0.881	51.941	0.761	92.100	0.004
D(F5)*	-6.344	0.000	-2.832	0.002	103.384	0.000	235.279	0.000

D(X): First Differencing of Variable X. * Represents statistical significance at a %95 confidence level.

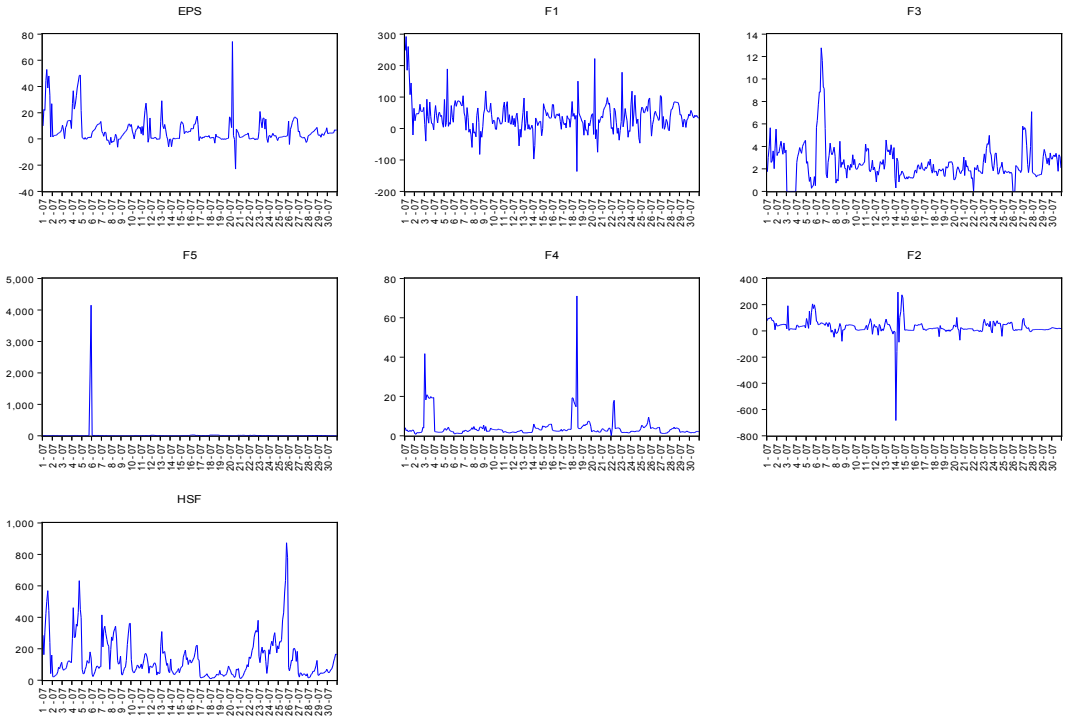

Figure 3: Unit Based Categorized Time Graphs

The null hypothesis for unit root tests is that the series don't have a unit root whereas the alternative hypothesis is that the series contains at least one unit root, which means non-stationarity. Since all

the series have cross-dependency it would be safer to evaluate unit root existence with four different unit root tests. For the unit root test presented in Table 10, if the majority test accepts the non-existence of unit root in the series, it has been acknowledged that the series does not have a unit root. In the case of equalization or existence of tests that reject the null hypothesis in the majority, series are subjected to differencing and unit root tests are re-run.

As it can be observed from Table 9, the variables EPS, HSF, F4, and F5 are not stationary at surface level. However, after the first differencing they became stationary. Rests of the variables are stationary as is. The models are updated based on the first differencing of said variables. The updated models are presented below.

$$d(EPS)_{it} = \beta_0 + \beta_1 F1_{it} + \beta_2 F2_{it} + \beta_3 F3_{it} + \beta_4 d(F4)_{it} + \beta_5 d(F5)_{it} + \beta_6 EZR_{it} + \varepsilon_{it}$$

$$d(HSF)_{it} = \beta_0 + \beta_1 F1_{it} + \beta_2 F2_{it} + \beta_3 F3_{it} + \beta_4 d(F4)_{it} + \beta_5 d(F5)_{it} + \beta_6 EZR_{it} + \varepsilon_{it}$$

Lastly, before the model estimation is made, we need to determine whether to use a random-effects model or a fixed effect model. We have adopted the Hausman test and its statistics to determine the estimation model to be used. The Hausman test statistic hypothesis is;

H_0*: Random effects model is more efficient than the fixed effects model,*

H_1*: Fixed effects model is more efficient than the random effects model.*

Hausman test statistics are presented in Table 10.

Table 10: Hausman Test Statistics

Model	Chi-square value	d.f	p value
1. Model	30.366	6	0.000*
2. Model	4.455	6	0.615

The Hausman statistics showed that for the first model fixed effects model would be more efficient whereas for the second model random effect model is more efficient. Accordingly, for the first model H_0 is rejected although it is accepted for the second model.

4.2.3. Model Estimations

During the model estimations it has been observed that all models have heteroscedasticity problem and in solution, all estimations were made in white process. The examination of Heteroscedasticity Wald test is adopted for fixed effects model and Levene Brown & Forstyhe tests for the random effects model.

For the assumption of non-autocorrelation Baltagin Wu LBI test is adopted for fixed effects model and Lagrange Multiplier test for random effects model. We have not observed any non-autocorrelation and accordingly made no further resolution.

4.2.3.1 First Model Estimation

$$d(EPS)_{it} = \beta_0 + \beta_1 F1_{it} + \beta_2 F2_{it} + \beta_3 F3_{it} + \beta_4 d(F4)_{it} + \beta_5 d(F5)_{it} + \beta_6 EZR_{it} + \varepsilon_{it}$$

The estimation results of the first model with fixed effects model are presented in Table 11.

Table 11: First Model Estimation Results

Variable	Coefficient	Standard Error	t-statistics	p value
F1	0.084	0.010	8.179	0.000*
F2	0.009	0.006	1.396	0.163
F3	0.507	0.399	1.272	0.204
F4	0.117	0.089	1.320	0.187
F5	0.000	0.001	0.242	0.808
EZR	1.46	0.730	2.00	0.004*
R-Square	0.24	Adjusted R-Square	0.22	
F	15.777	F (p)	0.0000*	

Dependent Variable = d(ESP), * Represents statistical significance at %95 confidence level

Based on the F probability value, it can be said that the model is statistically significant. The independent variables of the model can account for %22 of the changes in the dependent variable. Once the variables are evaluated one by one it can be concluded that the F1 independent variable, which is composed of ROA, ROE and YYG ratios, and the EZR (mandatory IR), has statically significant and positive effect on the dependent variable of EPS. In other words, it can be stated that mandatory IR has a statistically significant effect on the dependent variable of Earnings Per Share.

4.2.3.2. Second Model Estimation

$$d(HSF)_{it} = \beta_0 + \beta_1 F1_{it} + \beta_2 F2_{it} + \beta_3 F3_{it} + \beta_4 d(F4)_{it} + \beta_5 d(F5)_{it} + \beta_6 EZR_{it} + \varepsilon_{it}$$

The estimation results of the second model with random effects model are presented in Table 12.

Table 12: Second Model Estimation Results

Variable	Coefficient	Standard Error	t-statistics	p
F1	0.525	0.124	4.236	0.000*
F2	0.013	0.079	0.166	0.867
F3	0.121	4.892	0.024	0.980
F4	1.059	1.074	0.986	0.324
F5	0.001	0.017	0.880	0.379
EZR	3.09	1.696	0.954	0.000*
R-Sqaure	0.34	Adjusted R-Square	0.32	
F	6.344	F (p)	0.0000*	

Dependent Variable = d(HSF), * Represents statistical significance at %95 confidence level

Based on the F probability value, it can be said that the model is statistically significant. The independent variables of the model can account for %32 of the changes in the dependent variable. Once the variables are evaluated one by one it can be concluded that the F1 independent variable, which is composed of ROA, ROE and YYG ratios, and the EZR (mandatory IR), has statically significant and positive effect on the dependent variable of HSF. In other words, it can be stated that mandatory IR has a statistically significant effect on the dependent variable of Stock Price Valuations.

5. Conclusion

Interest in the disclosure of non-financial information has been steadily growing after the downfall of the global financial crisis in 2008. The introduction integrated reporting framework introduced a holistic report, which combines financial and non-financial information, as well as including forward-looking information of a company. The adaptation of IR requires a corporate-wide change to create value for all stakeholders to promote corporate sustainability.

In this paper, we have adopted a panel data analysis to test the effects of mandatory IR implementation on companies listed in the Johannesburg Stock Exchange from a financial point of view. The connection was established through a panel data analysis on two separate models composed of financial ratios, between the years of 2007 and 2016 using a dummy variable starting from 2011 to incorporate the commencement of mandatory IR. This study aims to provide evidence regarding the connection between IR and financial viability of a company for a continuous period of 10 years.

The results of this study show parallel results with Gupta and Modise's (2012) work that had statistically showed meaningful relationships between long-term stock price-dividend and price-earnings ratios. The results have proved the validity of H_1 hypothesis. Additionally, findings support the conclusions derived by Baboukardos and Rimmel (2016). The F1 variable being statistically meaningful for both models is in line with the findings of (Jitmaneeroj, 2017). Moreover, our results are in parallel with the existing studies in the literature on stock pricings by Rapach and Wohar (2005) and Campbell and Schiller (1988).

Lastly, both models show statistical meaningfulness for the use of IR on stock prices and earnings per share ratios of the companies. The empirical results are important in a time where the validity, practicality, and effectiveness of IR are being largely criticized. As the sole reason of IR is to promote corporate sustainability in the long-term, empirical studies need to be repeated as larger data sets start to form.

As a conclusion, this empirical study provides initial evidence on the effects of mandatory integrated reporting implementation on stock price valuations and earnings per share. The results support the argument of IIRC regarding promoting long-term corporate sustainability. Even though the current format of IR is in an ever-changing status based on stakeholder's demand for information, the results illuminate prospective results of this newly established reporting structure.

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