

Does Organizational Characteristics Significantly Moderate The Relationship Between Market Information Risk And Price Discovery For Stocks Listed at the Nairobi Securities Exchange?

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Abstract

The aim of the study was to determine the moderating effect of organizational characteristics on the relationship between market information risk and price discovery for stocks listed at the Nairobi Securities Exchange. Organizational characteristics may dictate the amount of information available in the market place and this has an impact on market players' level of participation and eventually price discovery through generated trading activity. The results therefore supported the sub hypothesis that ownership concentration has a significant moderating influence on the relationship between market information risk and price discovery for stocks listed at the Nairobi securities exchange. The value of the interaction term had a significant influence thus confirming a moderation effect of ownership concentration. The value of the interaction term between market information risk and stock return volatility was found to be significant and supported the hypothesis that stock return volatility has a significant moderating influence. The value of the interaction term based on the composite variable had a significant influence and confirmed moderation effect of Organizational characteristics and this leads to rejection of the null the hypothesis that Organizational characteristics has a no significant moderating influence. The results show that organizational characteristics are significant in moderating market information risk and price discovery relationship. Market microstructure frictions play a central role in shaping the platform for influencing behaviour of participants and price evolution. The findings of this study are expected to guide managerial practitioners in the NSE firms to appreciate the integration of the organizational characteristics in the face of a challenging economic environment. It is recommended that other market microstructure studies should be undertake using other measures of price discovery Information Share and Variance Ratio especially for cross listed stock.

Key Words: Market Microstructure, Organizational characteristics, stock Return Volatility, Ownership concentration, Market Information Risk, Price Discovery, Stocks Listed at NSE

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1.0 Introduction

In traditional asset pricing models, information asymmetry plays no role as documented by Asmar & Ahmad (2011) who by introducing the concept of market microstructure, asserts that microstructure models differ from traditional financial models by recognizing that legitimate information about companies' fundamentals may be unequally distributed between, and differently interpreted by a seemingly rational market participants. The discipline of economics which gave birth to financial economics and modern day finance posits that price is a point of intersection of supply and demand whereas neoclassical finance views price as being the intrinsic value of a security on which all market participants agree. Economics and traditional finance cannot explain how in the short term equilibrium prices arise because it does account for reality of frictions brought about by information asymmetry and stock market structure in place. The market microstructure regularities are a function of divergent participant's future expectations about return distribution and the fact that information arrive randomly thus paving way for market microstructure which best explains price discovery process as an economic function of an exchange (Barclay and Hendershott, 2008; Schwartz et al., 2010).

Organizational unique characteristics like nature of ownership structure and idiosyncratic volatility herein referred to as market information risk, may dictate the amount of information available in the market place which impacts market players' level of participation and eventually price discovery through generated trading activity. As such, intraday research in stock markets is critical due to the existence of regularities that contest the efficient market hypothesis. Market microstructure make it impossible for market participants to have homogeneous expectations about the future distribution of stocks returns which imply that traders attach a different value to a stock and this is eventually reflected when orders are placed (Agarwal, 2009). Organizational characteristics are internal factors that are likely to play a significant role in influencing the behaviour of market participants with respect to placement of orders as pointed out by Charumati (2012). Organizations vary in terms of their unique features as enshrined in their policies and which could either attract foreign capital or domestic investors leading to varying ownership structures. The specific organizational features have a potential of influencing the return process

through shaping behavioural tendencies of active stock market players or indeed any other indicator of performance in an organization.

The speed and efficiency of price discovery process is partly a function of the degree of stock market efficiency implying that the ability of a stock market to price securities appropriately is partly attributed to market design, trading mechanism and the process in place for matching and executing buy and sell orders generated by traders during the preopen or continuous trading period. Besides design, intraday characteristics in respect of weighted price contribution, bid ask spread, trading activity and stock return volatility, arise from either operational or stock informational market inefficiency. This study therefore focused on the continuous trading period of the market design as opposed to pre-open period which is usually preceded by trading halt after the market closes. The theoretical and empirical literature reviewed in chapter two of this study show market design as having a significant effect on the behaviour of prices, spreads, trading volume, and volatility (Schwartz, 2010).

Boeher and Kelly (2009) noted that investors with concentrated ownership can be classified as quasi-insiders and are usually more informed with firm specific information. Bauwhede and willekens (2008) identify size and leverage as common firm attributes, Jensen and Meckling (1976) identify ownership structure as a key internal feature. Furthermore, Eng and Mak (2003) have identified such characteristics as industry type, growth opportunities, and analysts following an organization, stock price performance, profitability, ownership concentration, stock volatility, audit fee, and leverage. These organizational specific features may have an impact on level of trade participation and therefore influencing the dynamic price negotiation process simply because, the level of investor participation might influence the intensity of trading activity in a given interval during the continuous trading period.

Glosten and Harris (1988) noted that bid-Ask spread captures information risk because it contains adverse selection problem. Furthermore, as pointed out by Madhavan et al., (1997), the absence of this risk means that price contains all relevant information and as such presence of risk is captured in the bid-ask spreads of stocks. Information asymmetry and hence MIR is not directly observable. However, the field of market microstructure has formulated probability of

informed trading, earnings forecast error, and bid ask spread as proxies for estimating MIR as documented in Glosten and Harris (1988) and Madhavan et al. (1997). Stoll (1989) offers some insight on the components of bid-ask spread which include; order processing costs, inventory holding costs and adverse selection costs. This perspective by Stoll (1989) is true and limited to a dealer market unlike an agency market scenario like the Nairobi Securities Exchange.

1.2 Research Problem

Price discovery as an important function of any exchange is undoubtedly one of the understudied and less understood in most emerging stock markets both in terms of its nature and underlying mechanisms that drive the process as noted by Subrahmanyam and Titman (2001) and Chen et al. (2007). This study seeks to contribute to knowledge through empirical evidence by undertaking to establish the nature of the price evolution process in Kenya and how organizational characteristics moderate the relationship between variation in information content of stocks and short term equilibrium prices.

As pointed out by Bauwens and Gilt (2000), microstructure issues include the structure and the design of the market, the formation and discovery of prices as well as the costs of timing, disclosure of information and behaviour of market participants. These items which constitute market microstructure have enormous implication for price discovery. Furthermore, Stock markets vary from one country to another as well as from time to time in terms of design, structure and shape which translates to unique microstructure characteristics. Bakeart and Harvey (2003) noted that there are limited empirical studies on large-section of emerging markets, including Kenya, which could largely be attributed to lack of intraday data which is the standard form of data in the analysis of price discovery process. This methodical aspect and dilemma has now been resolved with the adoption of electronic trading for placing and submitting orders at the NSE. The capital markets regulator introduced new trading rules in the year 2013 which potentially changed the shape and structure of the exchange. This study has helped shed more light by contributing to emerging market microstructure literature by not only investigating the nature of price evolution but also the role of organizational characteristics in the process for stocks listed and trading at NSE.

Locally, Ngugi (2002) did a study on institutional changes at NSE and its impact on trading activity and liquidity whereas Agatha (2013), focused on effect microstructure changes on market efficiency at the NSE. Empirical studies have attempted to offer an explanation on price discovery but the debate is inconclusive due to the divergent views of the scholars. For example, there is no consensus on how ownership concentration, an indicator of organizational characteristics impact market information risk as documented in Stoll (2000) and Brockman et al. (2009).

1.3 Research Question

The question that the research sought to answer was whether organizational characteristics had moderating effect on the relationship between market information risk and price discovery for stocks listed at the Nairobi Securities Exchange.

1.4 Research Objective

The objective of the study was to determine the moderating effect of organizational characteristics on the relationship between market information risk and price discovery for stocks listed at the Nairobi Securities Exchange

2.0 Literature Review

In this section, the author presents a discussion and synthesis of theories, empirical literature and a presentation of conceptual framework showing the relationship between the variables of the study.

2.1 Theoretical Review

In this section two theories are presented; The Market microstructure theory and efficient capital markets theory.

2.1.1 Market Microstructure Theory

Inventory and information based models constitute the two paradigms in the theoretical framework of market microstructure theory. Inventory models represent a strand of market microstructure theory that investigate the uncertainty in the flow of orders placed by market participants and inventory risk as well as the problem of optimization by suppliers of liquidity and immediacy in the market. There are three perspectives under the inventory paradigm arising from research and literature of three groups of authors; Garman (1976) model, Stoll (1978) model, Ho and Stoll (1981) model and Cohen et al., (1981) model. The critique of inventory based models posits that it has undergone lopsided development due to the dominance of information based approaches to the study of intraday price discovery and adverse selection. The models fail to provide a road map and succinct prediction of how the activities of traders with different strategies and information play out and its implications for market information risk, and price formation. Information based theories has its origins in a paper published by Bagehot (1971) where the market makers are faced with liquidity-motivated transactions especially transactions based on inside information and as such trading entails the cost of information asymmetry. The information based models attempt to explain the behaviour of market participants based on asymmetric information and largely are classified as sequential, strategic and synthetic trade models. A critical consideration in empirical market microstructure literature is an in-depth synthesis of information content of trades. The information based models include Copeland and Galai (1983), Glosten and Milgrom model (1985), Easley and O'Hara (1987), Easley, Kiefer and O'Hara (1996, 1997) and Kyle (1985). It is important to note from the outset that, competitive micro structure models are extension of the Glosten and Milgrom (1985) sequential trading model. The information based trading models and specifically Glosten and Milgrom (1985) and Kyle (1985) form the theoretical anchorage of this study largely because of the limitations of inventory based models and other information based models as presented in the synthesis that follows.

2.1.2 Efficient Markets Theory

Fama (1970) formulated the efficient capital markets theory and noted that markets are populated by homogeneous agents that act in a rational expectations environment where prices fully reflect

all the available information and any change in any information set should be reflected immediately into the price dynamics. The theory posits that prices follow a random walk process and therefore any information available for predicting the stock prices is already incorporated in the prices and error term being only source of uncertainty. However, Grossman and Stiglitz (1980) discuss the problem of possible information heterogeneity in agents' price expectations and therefore trading activity in any market could be seen as largely heterogeneous. Gouree and Hommes (2000) while investigating bounded rationality listed three factors that cast doubt on the efficient capital market theory. Heterogeneity of participants, and secondly is the fact that participants may not follow rational expectations and as such may derive their expectations based on their beliefs. Lastly, other participants could follow price movements in the market. The theory is important but was not applicable in the current study largely because it is limited in its explanation of how information gets incorporated into prices. Furthermore, it does not appreciate the reality of stock markets where trading protocols in place and other frictions brought about by nature of market microstructure in place drive behaviour of traders.

2.2 Empirical Literature Review

Boeher and Kelly (2009) noted that investors with concentrated ownership can be classified as quasi-insiders and are usually more informed with firm specific information. This category of investors seems to significantly facilitate timing and process of price discovery besides being catalysts for such other factors as the density of trading activity. Bauwhede and willekens (2008) identify size and leverage as common firm attributes, Jensen and Meckling (1976) identify ownership structure as a key internal feature. Furthermore, Eng and Mak (2003) have identified such characteristics as industry type, growth opportunities, and analysts following an organization, stock price performance, profitability, ownership concentration, stock volatility, audit fee, and leverage. These organizational specific features may have an impact on level of trade participation and therefore influencing the dynamic price negotiation process simply because, the level of investor participation might influence the intensity of trading activity in a given interval during the continuous trading period.

Amihud, Mendelson and Murgia (1990) in a study of the impact of market microstructure on return volatility and its value on price discovery process in the Milan Stock Exchange. Call auction and continuous are the two dominant clearing mechanisms. The researchers report varying degrees of volatility with the opening transaction in the continuous market registering highest volatility and efficient price discovery compared to opening the market with the call transaction. The trading and matching mechanism in an exchange whether call auction or continuous uninterrupted trading is critical in the evolution of trading activity, volatility, bid ask spreads and indeed price discovery.

Eun and Sabherwal (2003) sought to establish whether international cross-listings of stocks contribute to the price discovery of those stocks and particularly the extent of price contribution by U.S stocks exchange on non-US securities listed on the exchange. They used a sample of 62 TSE listed securities of which 38 are cross-listed at NYSE, 3 in AMEX and 21 on NASDAQ over a period of six months, from February to July, 1998. The data utilized in the study was regularly spaced mid-point bid and ask quotes over a ten minute interval and analysed using the error correction model. They find that prices on TSE and US exchanges are non-stationary with a unit root meaning that they are cointegrated price adjustments due to cross-market information flows that take place in both exchanges but the US exchange adjusts more. The US exchange contribution to price discovery increases as the proportion of medium-sized trades in US relative to TSE.

Murinde (2006) investigated microstructure characteristics of selected African capital markets and their impact of institutional changes or reforms on market efficiency, liquidity and volatility. The studied exchanges were Nigerian Stock Exchange, NSE and Johannesburg Stock Exchange. The study found that with institutional changes, market efficiency and liquidity improved while volatility reduced in the three exchanges. The researcher proposes a model for investigating institutional changes and microstructure characteristics pre and post reforms and it impacts stock efficiency, liquidity and volatility. This was an event study which focused on temporal aspect of introduction of reforms at a given point in time with little attention on potential frictions that the

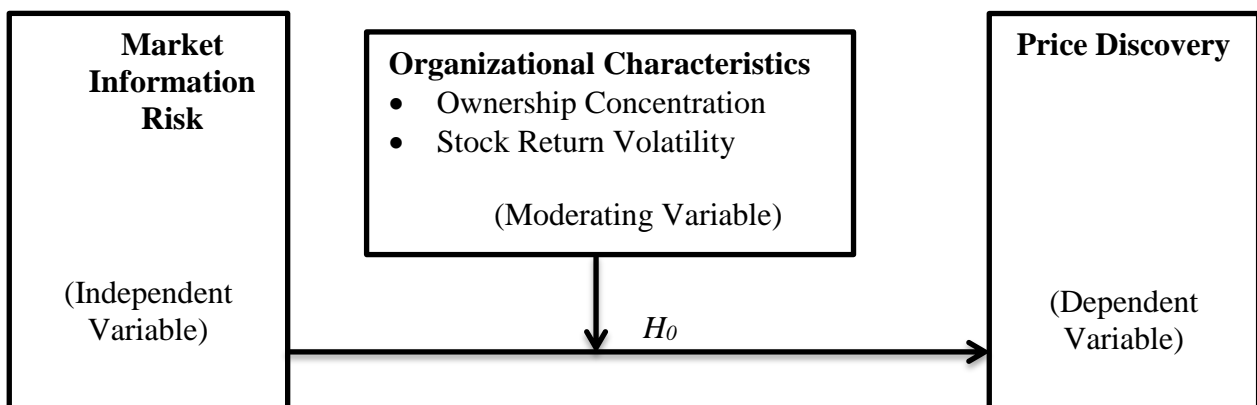
institutional changes may have brought and which could have had an impact on price market information risk, price discovery and level of participation by investors.

Nguyen and Darne (2018) studying forecasting and risk management in the Vietnam Stock Exchange with the application of GARCH-type models, which capture short and long memory and the leverage effect, estimated from both raw and filtered return and the data sample covering two VSE indexes, the VN index and HNX index during the period 2007 – 2015 with the empirical results revealing that the multivariate fractionally integrated asymmetric power Arch (FIAPARCH) model is the most suitable model for the VN index and HNX index and that ownership concentration acts as a control variable where market information risk creates major deviations in price discovery.

Rupande, Muguto and Muzindutsi (2019) in a study on investor sentiment and stock return volatility as evidenced from the Johannesburg Stock Exchange over a period spanning July 2002 to June 2018 show that there is a significant connection between investor sentiment and stock return volatility which shows that market information risk and organizational characteristics in terms of ownership concentration and stock return volatility can significantly explain the pattern of stock returns and eventually prices of the stocks on the Johannesburg Stock Exchange.

2.3 Conceptual Framework

This study contributes to the debate by providing an empirical evidence of variables of study interact as shown in the diagram that follows.



Based on the conceptual framework and reviewed empirical evidence, the following hypotheses were formulated and subsequently tested.

- H₀₁: There is no significant moderating effect of organizational Characteristics (Based on the composite) on the relationship between market information risk and price discovery;
- H₀₂: There is no significant moderating effect of Ownership concentration on the relationship between market information risk and price discovery
- H₀₃: There is no significant moderating effect of Stock return volatility on the relationship between market information risk and price discovery

3.0 Research Methodology

3.1 Introduction

In this chapter, the research methodology adopted in answering the research questions is presented.

3.2 Research Design

As noted by Cooper & Schindler (2003), the objective of descriptive research design is mainly description of characteristics associated with a population, estimates of proportions of a population that have these characteristics and eventually discovery of association among variables. In this study, correlational descriptive research design was adopted and the choice was guided by the research objective, nature of data, study variables, and method of data analysis.

3.3 Population

The study targeted the NSE listed companies from all sectors of the economy in Kenya which were sixty six. These companies source new long term capital from the capital markets by issuing equity or fixed income securities. In this study, the focus was on stocks and not fixed income securities which include bonds and preference stock and which are issued by listed firms. The unit of analysis therefore is stocks listed at the NSE and involved investigating all stocks listed and trading at the NSE. This was therefore a census study.

3.4 Data Collection

Empirical investigations of price discovery largely focus on short –term periods, as evidenced in the empirical review of literature. This study used historical data that was obtained through observation and real time recording during the continuous trading session using Microsoft excel sheet. This was instrumental in obtaining data from data vendors, and online trading agents through live screens recordings. The intra-day data used was both quote and transactional based. Data on ownership concentration was obtained from published books of accounts for companies whose stocks trade at the NSE. The period for this study was six months (January to June, 2019) and secondary data of each stock was obtained for each interval. The focus was the continuous trading period at the NSE as from 9.30 a.m to 2.30 p.m.

3.5 Operationalization of study variables

In microstructure research, most of the concepts are not observable and as such constructs are measured through operationalization. As noted by Bryman (2012), a meaningful way to understand a construct is to consider how other researchers operationalized the same in their work as presented in the sections that follow.

3.5.1 Price Discovery

In this study, intraday Weighted Price Contribution was utilized as proxy for price discovery over the sixty minute interval in the spirit of Barclay and Warner (1993), Cao et al. (2000), Barclay and Hendershott (2003, 2008), Huang (2020) and Ellul et al (2005) . WPC captures the contribution of different periods within a day to the price discovery.

$$WPC_{i,k} = \frac{\sum_{t=1}^T \frac{|r_{i,t}|}{\sum_{t=1}^T |r_{i,t}|} * r_{i,t,k}}{r_{i,t}}$$

Where,

$r_{i,t}$ = Return on stock i on day t. This was computed using the open - to - close weighted average volume price

$r_{i,t,k}$ = Return on stock i in interval k on day t (for $k = 1, 2, 3, 4 \& 5$) and ($t = 1 \dots T$).

The returns were computed using transaction (trading) prices in each interval

$\frac{r_{i,t,k}}{r_{i,t}}$ = Measures the contribution of the return in the kth interval relative to the

open - to close return $r_{i,t}$, on day t

$\frac{|r_{i,t}|}{\sum_{t=1}^T |r_{i,t}|}$ = This term weights the relative importance of information, over the

T day sample period of the open - to - close return on each trading day t.

3.5.2 Market information risk

The field of market microstructure has formulated probability of informed trading, earnings forecast error, and bid ask spread as proxy measure for estimating MIR as documented in Glosten and Harris (1988) and Madhavan et al. (1997). Market information risk was measured at each interval using bid – ask spread by obtaining the best inside quote as per Abhyankar et al., (1977, 2001) and Llorente et al. (2002).

$$BAS = \frac{ASK_{i,k} - BID_{i,k}}{\left(\frac{ASK_{i,k} + BID_{i,k}}{2} \right)}$$

Where,

BAS = Bid - Ask Spread

BID = Buying Price in the inside quoted

ASK = Selling price in the inside quote

i = Stock

k = Interval

3.5.3 Organizational characteristics

Based on the empirical literature, two types of firm specific characteristics that would affect the magnitude of the relationship between MIR and PD used in the study are ownership concentration and stock return volatility. Camerton-Forde and Rydge (2006) in a study of Australian listed firms used top twenty shareholders, large shareholders measured by Herfindahl

- Hirschman Index (HHI) , number of shareholders and insider ownership as proxies for ownership Concentration. Naes et al. (2011), Karuiths and Onyuma (2011) used HHI as a proxy for ownership concentration. Among the listed proxies, HHI establishes how concentrated a firm’s shareholding is, as noted by Chin (2010). Furthermore, this index measures ownership concentration as the sum of the squared ownership state for each of the shareholders in the company thus offering a means of including all shareholders in a single concentration measure. HHI index was used in this study as proxy for the ownership concentration. The index was estimated as follows;

$$HHI= S_1^2+S_2^2+\dots+S_n^2$$

Where;

Sn= the market share percentage of firm expressed as whole number

N= number of firms

As noted by Reilly and Brown (2003), either variance or standard deviation of stock returns is often utilized as a measure of volatility. Stock return volatility was quantified using Standard deviation of closing quote mid-points.

$$R_{i,t} = \log_e \frac{M_{i,k,t}}{M_{i,k,t-1}}$$

Where,

$R_{i,t}$ = Mid - Quote Return

$$M = \frac{\text{Bid} + \text{Ask}}{2}$$

3.6 Data Analysis and Analytical Models

As suggested by Sekaran (2006) and Zikmund et al. (2013), data analysis entails the application of various procedures with the aim of determining consistent patterns and summarizing the relevant outcomes.

3.6.1 Market information risk and price discovery

A simple linear regression analysis was used to determine the relationship between market information risk and price discovery for stocks listed at the Nairobi Securities Exchange. Hypothesis one of this study was that market information risk has a significant effect on price discovery. The following linear regression model was used to test the first hypothesis of the study.

$$PD = a + \beta \text{MIR} + \varepsilon \dots \dots \dots \text{Equation 1}$$

where;

PD = price Discovery

a = constant in the equation

β = Regression coefficient

MIR = Market Information Risk

ε = Random error term that accounts for unexplained variation

The relationship was determined based on the predictive ability of the model using “F” statistic, coefficient of determination, and the significance of regression coefficient using “t” statistic and *p-values* at 95% level of confidence.

3.6.2 Market information risk, organizational characteristics and price discovery

Hierarchical multiple regression analysis was used to test for change in the coefficient of determination and the significance of the coefficients β_1 and β_4 in equations 2 and 3 respectively.

The following models aided in the testing of the presence or absence of moderation.

$$PD = a_1 + \beta_1 \text{MIR} + \varepsilon_1 \dots \dots \dots \text{Equation 2}$$

$$PD = a_2 + \beta_2 \text{MIR} + \beta_3 \text{Orgc} + \beta_4 \text{MIR} * \text{OCH} + \varepsilon_2 \dots \dots \dots \text{Equation 3}$$

Where;

PD = Price Discovery

MIR = Trading Information Risk

OCH = Organizational characteristics

β_2 = coefficient relating MIR to PD when Orgc = 0

β_3 = coefficient relating orgc to PD when MIR = 0

β_4 = coefficient of the interaction term (TIR * Orgc)

β_1 = Coefficient of the predictor variable MIR on the outcome PD

a_1, a_2 = Equation intercepts

$\varepsilon_1, \varepsilon_2$ = Residual in the equations

4.0 Data Analysis, Results and Discussion

The objective of the study was to establish whether the magnitude and direction of effect of market information risk on price discovery depended on organizational characteristics.

4.1 Ownership Concentration, Market information risk and Price Discovery

The test for moderation was done through stepwise regression analysis method. In step one; market information risk was regressed against price discovery. In step two, market information

risk was regressed on ownership concentration. In step three the interaction term between MIR and OC was introduced (MIR*OC).

H: Ownership concentration significantly moderates the relationship between market information risk and price discovery.

The results of the analysis of the three models are as presented in table 1.

Table 1: Regression results on the Moderation of ownership concentration on the relationship between market information risk and price discovery

Model Summary ^d											
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson	
					R Square Change	F Change	df1	df2	Sig. F Change		
1	.542 ^a	.294	.292	1.55588	.294	163.923	1	394	.000		
2	.544 ^b	.296	.293	1.55532	.002	1.286	1	393	.258		
3	.552 ^c	.304	.299	1.54830	.008	4.568	1	392	.033	1.132	
a. Predictors: (Constant), Market information risk											
b. Predictors: (Constant), Market information risk, Ownership concentration											
c. Predictors: (Constant), Market information risk ,Ownership concentration interactions											
d. Dependent Variable: Price discovery											
ANOVA ^a											
Model		Sum of Squares	Df	Mean Square	F	Sig.					
1	Regression	396.817	1	396.817	163.923	.000 ^b					
	Residual	953.779	394	2.421							
	Total	1350.596	395								
2	Regression	399.927	2	199.964	82.664	.000 ^c					
	Residual	950.669	393	2.419							
	Total	1350.596	395								
3	Regression	410.877	3	136.959	57.132	.000 ^d					
	Residual	939.719	392	2.397							
	Total	1350.596	395								
a. Dependent Variable: Price discovery											
b. Predictors: (Constant), Market information risk											
c. Predictors: (Constant), Market information risk, Ownership concentration											
d. Predictors: (Constant), Market information risk Ownership concentration interactions											
Coefficients ^a											
Model		Unstandardized Coefficients		Standardized Coefficients		Collinearity Statistics					
		B	Std. Error	Beta	t	Sig.	Tolerance	VIF			
1	(Constant)	2.653	.152		17.407	.000					
	Market information risk	.511	.040	.542	12.803	.000	1.000	1.000			

2	(Constant)	2.667	.153		17.449	.000		
	Market information risk, Ownership concentration	.518	.040	.549	12.842	.000	.981	1.019
3	(Constant)	2.767	.159		17.382	.000		
	Market information risk, ownership concentration interaction	.530	.041	.562	13.073	.000	.960	1.041
a. Dependent Variable: Price discovery								

The result in Table 1, on the moderating effect of ownership concentration on the relationship between market information risk and price discovery was done using three steps. In model one (1), the result shows that the association between market information risk and price discovery was strong and significant ($R = .542^a$, $R^2 = 0.294$, $F = 163.923$, $P\text{-value} < 0.05$) with the model having sound predictive ability. The results show a positive and a significant relationship between MIR and PD. The R^2 of .294 indicate that 29.4% variation in PD is accounted for by MIR. In model two (2), market information risk and ownership concentration was regressed against price discovery which was positive and significant ($R = .544^a$, $R^2 = .296$, $F = 82.664$, $P\text{-value} < 0.05$) but moderately significant. The overall model based on F-statistic is significant. The R^2 was .296 which implies that 29.6% variation in PD is explained by predictor variables considered in the model and which are OC and MIR. Coefficient of determination (R^2) in model 2 is 0.002 larger than the one derived in model 1. In the third (3) model, the moderating effect of organizational characteristics (ownership concentration denoted as OC), on the relationship between MIR and PD was tested through the introduction of the interaction term (MIR*OC). The coefficient of determination (R^2) is .304 which means that MIR, OC and the interaction term explain 30.4% variation in the dependent variable. The model output, ($R = .552^a$, $R^2 = 0.304$, $F = 57.132$, $P\text{-value} < 0.05$) is strong and significant, suggesting presence of moderating effect in the third model after the interaction term is introduced. The value of the interaction term (MIR * OC) had a significant influence ($\beta = .530$, $t = 13.073$, $P < 0.05$) thus confirming a moderation effect

of ownership concentration. The results therefore supported the sub hypothesis that ownership concentration has a significant moderating influence on the relationship between MIR and PD.

4.2 Stock return Volatility, Market information risk and Price Discovery

In order to determine whether stock return volatility is a moderator, the tests were done through stepwise regression analysis method.

H: Stock return volatility significantly moderates the relationship between market information risk and price discovery.

The results of the analysis of the three models are as presented in table 2 below.

Table 2: Regression results on Moderation of stock return volatility on the relationship between market information risk and price discovery

Model Summary									
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. Change
1	.542 ^a	.294	.292	1.55588	.294	163.923	1	394	.000
2	.565 ^b	.320	.316	1.52897	.026	14.989	1	393	.000
3	.574 ^c	.330	.323	1.52150	.010	2.934	2	391	.054
a. Predictors: (Constant), Market information risk									
b. Predictors: (Constant), Market information risk, Stock return volatility									
c. Predictors: (Constant), Market information risk_ Stock return volatility interaction									
ANOVA ^a									
Model		Sum of Squares	Df	Mean Square	F	Sig.			
1	Regression	396.817	1	396.817	163.923	.000 ^b			
	Residual	953.779	394	2.421					
	Total	1350.596	395						
2	Regression	431.858	2	215.929	92.366	.000 ^c			
	Residual	918.738	393	2.338					
	Total	1350.596	395						
3	Regression	445.442	4	111.361	48.104	.000 ^d			
	Residual	905.154	391	2.315					
	Total	1350.596	395						
Coefficients ^a									
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.			
		B	Std. Error	Beta					
1	(Constant)	2.653	.152		17.407	.000			

	Market information risk	.511	.040	.542	12.803	.000
2	(Constant)	2.216	.188		11.818	.000
	Market information risk	.457	.042	.484	10.960	.000
	Stock return volatility	.202	.052	.171	3.872	.000
3	(Constant)	2.324	.194		11.990	.000
	Market information risk, Stock return volatility interaction	.472	.043	.500	11.077	.000

a. Dependent Variable: Price discovery

In model one the result shows that the association between market information risk and price discovery was strong and significant ($R = .542^a$, $R^2 = 0.294$, $F = 163.923$, $P\text{-value} < 0.05$). In model two, market information risk and stock return volatility was also positive and significant ($R = .565^a$, $R^2 = .320$, $F = 92.366$, $P\text{-value} < 0.05$) which was strong and significant. In model three ($R = .574^a$, $R^2 = 0.330$, $F = 48.104$, $P\text{-value} < 0.05$) which is strong and significant, suggesting a moderating effect in model three after an interaction term is introduced. The value of the interaction term (MIR * SRV) had a significant influence ($\beta = .472$, $t = 11.077$, $P < 0.05$) thus confirming a moderation effect of stock return volatility therefore supports the hypothesis that stock return volatility has a significant moderating influence on the relationship between MIR and PD for stocks at the NSE. The results show that organizational characteristics proxies have a significant moderating effect on the relationship between market information risk and price discovery. Ali (2018) argued that the poor quality financial reports have led to a mismatch between the inherent values of shares and the book values hence contributing to market information inefficiencies which adversely affect market discovery as controlled by ownership concentration. The findings of the study were that a change in relevance, understand ability and Timeliness of market information leads to an increase in stock prices while an increase in stock return volatility as a measure of ownership structure leads to an increase in price discovery.

5.4.1 Moderating Effect of Organizational Characteristics on the Relationship between Market Information Risk and Price Discovery

Based on the ideas proposed by Ley (1972), that a composite variable should ideally be meaningful to the context and objective of the study guided by the discipline and predetermined algorithm. In this regard, combination of stock return volatility and ownership concentration using the averaging method was done to create a composite which permitted the creation of a

variable that allowed investigation of overall moderation effect. This was achieved through testing the following hypothesis;

H₀₃: There is no significant moderating effect of organizational Characteristics on the relationship between market information risk and price discovery

The results of the analysis of the three models are as presented in table 3 below.

Table 3: Regression results on Moderation of Organizational Characteristics on the Relationship between Market Information Risk and Price Discovery

Model Summary ^d										
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.543 ^a	.295	.293	1.55695	.295	164.142	1	393	.000	
2	.546 ^b	.298	.294	1.55542	.003	1.775	1	392	.184	
3	.601 ^c	.361	.356	1.48601	.063	38.473	1	391	.000	1.412
a. Predictors: (Constant), market information risk										
b. Predictors: (Constant), market information risk, Organizational characteristics										
c. Predictors: (Constant), market information risk_ Organizational characteristics, interactions										
d. Dependent Variable: Price discovery										
ANOVA ^a										
Model			Sum of Squares	df	Mean Square	F			Sig.	
1	Regression		397.896	1	397.896	164.142			.000 ^b	
	Residual		952.672	393	2.424					
	Total		1350.568	394						
2	Regression		402.191	2	201.095	83.120			.000 ^c	
	Residual		948.377	392	2.419					
	Total		1350.568	394						
3	Regression		487.149	3	162.383	73.535			.000 ^d	
	Residual		863.419	391	2.208					
	Total		1350.568	394						
a. Dependent Variable: Price discovery										
a. Predictors: (Constant), Market information risk										
b. Predictors: (Constant), Market information risk, Organizational characteristics										
c. Predictors: (Constant), Market information risk_ Organizational characteristics, interactions										
Coefficients ^a										
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics			
		B	Std. Error	Beta			Tolerance	VIF		
1	(Constant)	2.652	.153		17.385	.000				
	Market information risk	.513	.040	.543	12.812	.000	1.000	1.000		
2	(Constant)	2.919	.252		11.598	.000				

	Market information risk, Organizational characteristics	.510	.040	.540	12.748	.000	.998	1.002
3	(Constant)	2.006	.282		7.114	.000		
	Market information risk, Organizational characteristics interaction	.435	.040	.460	10.837	.000	.906	1.103
a. Dependent Variable: Price discovery								

In model one, the result shows that the association between market information risk and price discovery was strong and significant ($R = .542^a$, $R^2 = 0.294$, $F = 164.142$, $P\text{-value} < 0.05$). In model two ($R = .546^a$, $R^2 = .298$, $F = 83.120$, $P\text{-value} < 0.05$) which was positive and significant and in model three ($R = .601^a$, $R^2 = 0.361$, $F = 73.535$, $P\text{-value} < 0.05$) which is strong and significant, suggesting a moderating effect in model three after an interaction term is introduced. The value of the interaction term (MIR * OCH) had a significant influence ($\beta = .435$, $t = 10.837$, $P < 0.05$) thus confirming a moderation effect of OCH and this leads to rejection of the null the hypothesis that OCH has a no significant moderating influence on the relationship between MIR and PD for stocks at the NSE. The results show that organizational characteristics are significant in moderating market information risk and price discovery relationship.

5.2 Discussion of Findings

The objective of the study was to find out the moderating effect of organizational characteristics on the relationship between market information risk and intraday price discovery. Both ownership concentration and stock return volatility which are the indicators of organizational characteristics significantly moderated the relationship between market information risk and price discovery. This study provides significant support for the role of organizational characteristics in this relationship. Notably, ownership concentration accelerated the price discovery for stocks listed at the NSE during the considered sample period. It appears from the findings that concentrated ownership in stocks enhance the efficiency of price evolution largely because block holders can evaluate intrinsic values of stocks more randomly that sparsely distributed shareholding. Holden and Subrahmanyam (1992) suggested that the concentrated ownership exert aggressive and intensive competition for profitable trading opportunities which

allows prices to incorporate information at a high speed. This is also affirmed by Boehmer and Kelley (2009) who suggested that as the cost of acquiring information becomes fixed and the benefits of information are increasing, highly concentrated stocks become more attractive. The concentrated ownership has the capacity to implicitly monitor stocks through gathering of information relevant for appropriate pricing of managerial decisions and hence efficiency of the price evolution process (Bushee, 1988).

Murinde (2006) found that with institutional changes, market efficiency and liquidity improved while volatility reduced in the three exchanges. The researcher proposes a model for investigating institutional changes and microstructure characteristics pre and post reforms and its impacts on stock efficiency, liquidity and volatility. The results further support the political theory on firms ownership structure which contends that institutional investors and large-scale individual investors could overcome the incentive for passivity that arises because each holds a fraction of the shares in any one firm, become influential shareholders and monitor corporate managers. A large bank, insurer, mutual fund, or pension fund could hold sizable stakes in very large corporations and still be reasonably diversified. Shareholders will not always choose apathy. They will act when their private gain from monitoring exceeds their private cost. Thus any corporate actions or legal rules that prevent shareholders from owning large stakes all reduce oversight. Both shareholders gain from the preferred voting outcome, and the likelihood that his vote will be decisive increases in proportion to the number of shares owned. A shareholder who owns a thousand shares is more likely to cast a decisive vote than a shareholder who owns a single share (Mugo and Onyuma 2011).

5.3 Conclusions

The objective of the study was to establish the moderating effect of organizational characteristics on the relationship between market information risk and price discovery. Organizational characteristics were measured by ownership concentration in terms of institutional and individual stocks. To establish the moderating effect, Hierarchical Multiple Regression Analysis model was employed and results revealed that the proxies for organizational characteristics which were ownership concentration and stock return volatility had a statistically significant moderating

effect on the relationship between market information risk and price discovery for stocks listed at NSE.

The objective of the study was to establish the moderating effect of organizational characteristics on the relationship between market information risk and intraday price discovery. The proxies for organizational characteristics were ownership concentration (OC) and stock return volatility (SRV). Hierarchical Multiple Regression Analysis was used to assess the moderation effect. The result was computed using three steps. In model one the result shows that the association between market information risk and price discovery was strong and significant. In model two it was moderate and significant and in model three was strong and significant, suggesting a moderating effect in model three after an interaction term is introduced. The value of the interaction term (MIR * OC) and (MIR * SRV) had a significant influence thus confirming a moderation effect of organizational characteristics and consequently supporting the hypothesis that organizational characteristics has a significant moderating influence on the relationship between MIR and PD for stocks at the NSE.

5.4 Contributions of the Study Findings

The results of this study add to existing knowledge in the area of price discovery for stocks listed at NSE in three main ways: First and foremost, this study has contributed to empirical literature on market microstructure of an emerging market, NSE. The first major contribution is the determination of the relevant factors that are important in defining price discovery for stocks listed at the Nairobi Securities Exchange. Although various indicators including bid-ask spread were used to operationalize market information risk, results of panel data analysis indicate that stocks are relying more on trading activity information with examining the effect of trading mechanisms on stock price behaviour using data from a thin market and the impact of continuous trading system versus fixing system on liquidity, volatility, pricing error and order flows. The results and findings of the study as presented invaluablely provide a basis and direction for future research.

5.4 Suggestions for further Research

This study considered ownership concentration and stock return volatility as moderating variables. There are other firm specific features that would have a potential of influencing behaviour of market participants hence moderating the relationship between market information risk and price discovery. These organization characteristics include but not limited to size, leverage, ownership structure, industry type and profitability. A study can be conducted to establish by incorporating the mentioned variables. Furthermore, an investigated can done to establish the role played by foreign investors in terms of how transactions initiated by foreign participants help the market adjust quickly hence speeding the price discovery process.

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