

CAPITAL MARKETS REVIEW

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The Effects of Market Strength, Information Asymmetry, and Industrial Characteristics on Malaysian Firms' CAR During COVID-19 Pandemic

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Abstract: Research Question: Would the COVID-19 pandemic induce investment opportunities or threats for companies listed at Bursa Malaysia? **Motivation:** This study investigates whether the market strength and information asymmetry experienced during a crisis and industrial characteristics have an impact on shareholders' abnormal returns. **Idea:** The study uses market strength as measured by trading volume and information asymmetry as measured by bid-ask spread aims to suggest potential investment opportunities in different categories of industries for investors. **Data:** The study uses data of 620 companies listed on Bursa Malaysia, collected from 16 Mar 2020 to 9 Jun 2020. The data were divided into 3 event windows based on the government's Movement Control Order (MCO) announcements. **Method/Tools:** The event study method is used to calculate the cumulative abnormal returns (CAR) as the dependent variable. Multiple regression analysis with hierarchical model specifications were used in assessing the impact of the explanatory variables on the dependent variables. **Findings:** The findings suggest that during periods of uncertainty, firm characteristics such as larger and older firms are at a disadvantage compared to smaller and younger firms. In terms of market characteristics, the study shows that Increased trading volume has greater returns to investors. However, the bigger bid-ask spread associated with higher abnormal returns reflects the inefficiency of the stock market. This study also found that in the month following the announcement of the first MCO, the CAR of firms in vulnerable industries reduced by an extra 5% compared to firms who were not classified as vulnerable industry category. As the MCO prolonged, the CAR of firms in vulnerable industries fell by an extra 9.5% compared to other firms listed in Bursa Malaysia. The negative impact on the vulnerable industries shows glooming prospects of those firms. **Contributions:** Market reactions to pandemics and MCOs are negative especially at the beginning period. The strength of the market, information asymmetry, and industrial characteristics have a strong influence on the abnormal returns during the observed periods. The study also shows that historical financial track records are not good predictors of a firm's prospects during this unprecedented COVID-19 pandemic.

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Keywords: Pandemic, Malaysia, market strength, information asymmetry, event study, vulnerable industries.

JEL Classification: F010, G140

1. Introduction

Since its outbreak in early 2020, empirical evidences have documented the devastating impact of the novel corona virus (COVID-19) pandemic on the global economy and the stock markets. The aftermath of the pandemic and its spill-over effect is also reported to damage labour supply, goods and services. To curb the spread of the virus, Malaysia has implemented phases of Movement Control Order (MCO) since 18 March 2020 where only essential services were allowed to operate with restricted hours and minimum number of employees. Only the identified ten essential services namely the Food; Water; Energy; Communications and Internet; Security and Defence; Solid Waste and Public Cleansing Management and Sewerage; Healthcare and Medical including dietary supplement; Banking and Finance; E-commerce and Logistics are allowed to operate. While businesses and offices that were categorized as non-essential had to temporarily suspend their operations. The list of essential services has been expanded to 15 sectors in the third phase of MCO from 15 April 2020 until 28th April 2020.

On 19 March 2020, FBM KLCI fell to its lowest in the last 10 years, at 1,219.72 points (Abdul Aziz, 2020). The implementation of MCO had induced investors into panic selling at the early stages of the MCOs. The reactions from the market were negative due to uncertainties but when the spread of the virus was contained in the subsequent MCOs, the market returns were positive (Song *et al.*, 2021a). The KLCI rebounded to 1575.2 at the end of the study period when CMCO was implemented. Several studies have been conducted to quantify the impact of the COVID-19 pandemic as well as actions taken by the government to minimise the spread of infection. The stimulus packages that channelled liquidity into the economy had created stimulated profitability seeking and volatility in the stock market. The increase in market strength as measured by the volume traded and liquidity is largely contributed by the participation of retail investors during the MCO 2 in April 2020 onwards (Surendran, 2020; Fitzgerald, 2021). The Malaysian market is known as a semi-strong form efficient market which during a period of uncertainty, may experience higher information asymmetry between the investors and the managers and potential moral hazard. For instance, the large controlling shareholders who are common in Malaysian public listed firms may possess information asymmetry advantages that allow them to realize the abnormal profits before the market adjusts its share prices to their real value (Demsetz, 1986). Chen and Poon (2007) have shown that capital markets that face higher information asymmetry are illiquid and less developed which is reflected in the wider bid-ask spread and induces higher transaction costs.

During the pandemic, some industries such as tourism and transportation are vulnerable due to the lockdown while other industries such as health care sectors thrive. However, whether the pandemic would induce profit opportunities or threats in different industries during the crisis period and how to market strength and information asymmetry would impact the shareholders' returns is still yet to be ascertained. Similarly, whether firms' past financial health would change the impact of the market and industry's influence on shareholders' returns is also yet to be concluded. Since Malaysia is one of the most affected emerging markets from the pandemic, this study attempts to answer the questions raised, that whether the market strength and information asymmetry experienced during the crisis, industrial and firm characteristics have an impact on shareholders' abnormal returns, and provide empirical evidence for potential investment opportunities for investors.

This study finds that trading volume and bid-ask spread have a significant positive impact on the CAR while firms in the industries classified as vulnerable have a significant negative impact. Firms' past financial performance has no effect on the CAR during the pandemic indicating past performance is unable to explain firms' resilience during a crisis.

The rest of the paper flows as follows: First, we review the related literature followed by describing the data used for the analysis. After which, we analyse the impact of the explanatory variables on the cumulative abnormal returns CARs. Finally, we conclude the paper with suggestions to both investors and policymakers.

2. Literature Review

The COVID-19 pandemic has severely affected the stocks market worldwide. In a study on the COVID-19 outbreak, Liu *et al.* (2020) found 21 leading stock market indices among major affected countries fell quickly after the virus outbreak. Countries in Asia are found to experience more negative abnormal returns as compared to other countries. The adverse stock indices' abnormal returns confirmed investors' pessimistic sentiment on future returns and fears of uncertainties.

From a developing country perspective, such as Malaysia, the capital market is also not spared from this pandemic. Documented studies mentioned that the successful enforcement of the MCOs has led to the flattening of the COVID-19 curve (Abdul Rashid, 2020). Song *et al.* (2021b) found the negative cumulative average abnormal returns (CAAR) of stock at Bursa Malaysia during the early stage of MCO reflected the panic and uncertainty posed by the pandemic. However, significant positive CAAR after MCO 3 and MCO 4 as the government has channelled stimulus packages into the economy and allowed almost all sectors to resume their business (Anis, 2020). The relaxation of the MCOs and the huge amount of stimulus packages have provided large liquidity in the market and increased the market strength. The benchmark index, FTSE BM KLCI has rebounded from a low of 1219 on 19 March 2021 to 1575 on 9 Jun 2020.

While many recent kinds of literature have examined the impact of the COVID-19 pandemic on the stock markets returns, scant studies have examined the impact of the market strength and information asymmetry which was prevalent during the pandemic, and industrial characteristics, as well as firms' financial strength on the abnormal returns.

2.1 Market Strength and Information Asymmetry - Volume and Bid-Ask Spread

Volume measures the number of shares traded during a specific period. It indicates the overall activities of stocks and a sign of market strength. It is usually used by investors to identify momentum and confirm a trend in the market. Rising market with increased volume are typically viewed as bullish, strong, and healthy. When trading volume increases, the demand of shares will be more than the supply of shares and thus the prices would generally move up and vice versa if volume decreases (Lee and Rui, 2002). If the trading volume is high, market liquidity would also increase which will facilitate better order execution. A liquid stock can be sold in the market easily without much little impact on the stock's price, thus with lower transaction costs.

Studies have shown that capital markets that face higher information asymmetry are illiquid and less developed (Chen and Poon, 2007) which is reflected in the wider bid-ask spread. During a pandemic crisis, Hong *et al.* (2021) suggested that market inefficiency creates profitable opportunities for traders and speculators. This can be seen from the stimulus packages that pumped liquidity into the economy which has created stimulated profitability seeking and volatility in the stock market. When the market is volatile, especially during a period of uncertainty, the bid-ask spread may be much wider. Bid-ask spread is also widely used as a proxy to measure information asymmetry (Attig *et al.*, 2006;

Chu and Song, 2010). For instance, a wider bid-ask spread may be observed to most low-priced securities because either they are new or small in size, and have less analyst coverage. The asymmetry of information tends to be higher also in firms with concentrated ownership (Chu and Song, 2010). This is because controlling shareholders possess information asymmetry advantages that allow them to realize the abnormal profits with bigger bid-ask spread before the market adjusts its share prices to their real value (Demsetz, 1986).

Będowska-Sójka and Echaust (2020) found that the bid and ask prices of Closing Percent Quoted Spread (CQS) is superior to other proxies such as Percent Effective Spread, Percent Price Impact, Percent Realised Spread, and Percent Quoted Spread. They also found that even though the spreads are higher for small stocks as compared to the big ones, the size of the company has no impact on the nature of dependency between a benchmark and a proxy.

Amihud and Mendelson (1986), and Saleemi (2021) on the other hand, observed the relation between security returns and the percentage of bid-ask spreads. They found that gross returns increase with the spread. Le and Gregoriou (2020) also found that securities whose yields are more sensitive to liquidity shocks (wider bid-ask spread) relate to the higher returns. Thus, their findings suggest that the liquidity cost must be priced in returns due to the pandemic-related uncertainty. However, Leirvik *et al.* (2017) demonstrated that the stock market returns are not explained by the market liquidity and liquidity cost. This is supported by Saleemi (2021) who found that if the period is analysed during the pandemic-related restrictions, the liquidity cost was found to be negatively but insignificantly related with yields on the DJI index. The above discussion indicates that there is no unified standard to elucidate the relationship between bid-ask spread and asset returns. Thus, this study aims to investigate and confirm the hypotheses that the volume and bid-ask spread, the indicators of market strength and proxy for information asymmetry or efficiency of a market, affects the stock returns during the pandemic-related uncertainty in an emerging market.

H₁: There is a relationship between trading volume and abnormal returns.

H₂: There is a relationship between bid-ask spread and abnormal returns.

2.2 Firms' Industrial Characteristics

The COVID-19 outbreak has adversely impacted firm performance and it is more intense for firms in the industries that are considered vulnerable. In their study on firm-level exposure to epidemic diseases, Hassan *et al.* (2020) argued that the COVID-19 crisis manifests itself at the firm level is a simultaneous shock to both demand and supply. Using listed companies in the US and 80 other countries that were affected by the spread of COVID-19, supply and financing-related concerns are relatively more salient in regions where the spread of COVID-19 is less contained. It is also observed that overwhelmingly pessimism associated with COVID-19 exists significantly across heterogeneous firms and sectors. Firms most pessimistic (have negative sentiment) are in the transportation sector since that industry was being hit hard by cancelled air routes and closed borders. Technology firms are the least pessimistic, buoyed by the working-from-home orders issued by many governments and the much-needed investments in software and hardware solutions (Hassan *et al.*, 2020).

Country-specific studies on the impact of the pandemic have also grown since the first COVID-19 outbreak was detected in Wuhan, China. Using a sample of listed firms in China, Xiong *et al.* (2020) highlighted vulnerable industries such as transportation, hotel and tourism, real estate, and construction, food and beverage retail, postage warehouse, and

video entertainment, tend to have significantly lower cumulative abnormal returns (CAR) around the COVID-19 outbreak. The intensification of the pandemic is also being thought to cause a long-term impact on its tourism industry due to cancelled events and flights (Hoque *et al.*, 2020). The highly infectious COVID-19 is expected to thwart the tourism and hospitality sector further, which raises questions about its current challenges and future survival (Kaushal and Srivastava, 2021). Based on data from 185 countries, Škare *et al.* (2021), also reiterated that the outbreak has proven to have a more destructive impact on the travel and tourism industry than previous other crises. This also negatively affects the insurance industry due to the cancellation of travels, events, and other economic losses (Babuna *et al.*, 2020). Gu *et al.* (2020) meanwhile, revealed that the manufacturing industry also tends to incur negative effects of the COVID-19. Their study on 34040 Chinese enterprises in Suzhou, found this industry to have the greatest negative effect while industries such as construction, information transfer, computer services and software, and health care and social work were positively impacted. Meanwhile, Song *et al.* (2021a) also shed light into the drivers of restaurant firms' stock returns during the COVID-19 shock. Using 795 firm-year observations obtained from U.S restaurants' annual reports and other databases, the results showed firms with strong past firm-level characteristics and internationalized are more resilient to stock declines reacting to COVID-19 than otherwise similar firms.

In the case of Malaysia, Lee *et al.* (2020) used the market indices in understanding the impact of the COVID-19 on different sectors and revealed that the stock market performance was adversely affected by the increasing numbers of COVID-19 cases. Except for the Real Estate Investment Fund (REIT) index, the study found the main Kuala Lumpur Composite Index (KLCI) and other sectoral indices to be significantly volatile during the pandemic outbreak. The tourism industry in Malaysia is also not spared from the adverse effect of the pandemic. Foo *et al.* (2021), found that this communicable disease has adversely impacted the flow of tourists from around the world, with cancelled flights and accommodation bookings due to worries about the virus. The number of tourists declined tremendously since the Malaysian government banned and imposed travel restrictions.

Online business or e-business may be less affected by the coronavirus but studies have found that this industry is also not out of the list. Hasanat *et al.* (2020) conducted a survey study on the COVID-19 on e-business in Malaysia and found that they are severely affected. This is because Malaysia relies on many merchandise products from China and major retailers were temporarily locked down, particularly during the MCO period. As the economy recovers and with only selected MCOs, CMCOs and RMCOs, this industry is expected to recover faster as consumers adapt themselves to the new normal of working from home (WFH) and purchase online.

In light of the past literature, we hypothesize that stock returns in vulnerable industries, such as tourism and travel, manufacturing, construction, restaurants and food services, and banking tend to be significantly negatively affected.

H₃: Abnormal returns of firms belonging to vulnerable industries are negatively impacted by the COVID-19 pandemic.

2.3 Firm Fundamental Financial Characteristics

A strong fundamental has long been regarded as a key indicator on firm sustainability and growth potential. The COVID-19 outbreak could amplify firm pre-crisis weaknesses where firms with strong internal characteristics are expected to cushion their performance from the devastating effect of the pandemic. In their survey study on firm-level expectations and behaviour towards COVID-19 response, Buchheim *et al.* (2020) used a sample of 6000

German firms across all sectors of the economy, observed that financially weak firms, as measured by their pre-crisis business situation, are harder hit initially and expects more difficulties in their businesses outlook and managerial mitigation strategies.

Ding *et al.* (2021) did an examination on firm immunity to the COVID-19 pandemic using corporate data across 61 countries. Their study revealed that the pandemic-induced drop in stock returns was milder among firms with stronger pre-2020 finances. These include firms with more cash and undrawn credit, less total and short-term debt, and those with a larger profit. Firms with global supply chains and customer locations, large corporations and government-controlled firms, also tend to be less affected by the COVID-19 outbreak. Song *et al.* (2021a) meanwhile found larger-sized firms, having more leverage and cash flows, but with less ROA, are more resilient to stock declines reacting to COVID-19 than otherwise similar firms. Dividend as another firm financial characteristic did not reveal any significant moderating effect on the association between COVID-19 and U.S restaurant stock returns.

Narang *et al.* (2020) reiterated that pre-shock firm-specific characteristics play an important role in shaping the stock market response to the COVID-19 outbreak. The results of their OLS regression on BSE 500 firms, found that beta, book-to-market (BM) ratio, market capitalization, and age are found to be significant determinants of CARs during the downfall period. Small, high beta, loser, and low profitability firms have experienced a greater price decline than big, growth, low beta, winner, and high profitability firms during the pandemic period. On the other hand, Xiong *et al.* (2020) observed that Chinese listed firms having higher profitability and growth opportunity, higher combined leverage, and less fixed assets are less affected by COVID-19.

In the case of Malaysia, Khatib and Nour (2021) revealed that all firm characteristics, namely, performance (ROA and ROE), dividend, liquidity, and leverage are significantly impacted by the COVID-19. However, a further analysis does not provide strong evidence on the difference between pre and post COVID-19 periods. Using OLS regression, the study used a sample of 188 listed non-financial firms from the Malaysian market covering a period of two years (2019-2020). The MCO imposed in March through May 2020, not only restricts people's movement but affects companies' financial profits and significantly the stock returns as well.

In line with the above literature and the context of Malaysia's stock market, we use the historical financial health of the firms such as the current ratios, retained earnings, debt ratios, and return on assets (ROA) as a robustness check on the consistency of our results. Thus, we hypothesize that:

H_{4a-d}: Firm historical financial characteristics do have an impact on firm stock returns amidst the COVID-19 pandemic.

3. Methodology

3.1 Data

This study investigates the effects of market strength, information asymmetry, industry, and firm financial characteristics on the stock returns at Bursa Malaysia. Based on the available information of market, industry, and financial data from the Thomson Reuters DataStream database, an initial sample of 635 public listed companies was identified after eliminating those from the utilities and banking sectors. A further screening shows that 12 companies have incomplete financial data and four new (age fewer than 3 years) companies with an abnormally high beta of more than 10. These companies were excluded and thus left 619 companies in the final sample.

The market data was collected from 16 Mar 2020 to 9 Jun 2020 and were divided into 3 event windows based on the government's MCO announcements. Period 1 starts from 16 Mar 2020 to 15 April (After 1 month of MCO 1), Period 2 from 16 April 2020 to 9 Jun 2020 (MCO 3 until CMCO), and Period 3 from 16 March to 9 Jun (MCO 1 until CMCO).

The selected period allows the analysis of the effects of the independent variables on the firms' CARs in Malaysia during the lockdown period. CARs were calculated using the event study method with the three-event windows specified. Pre-pandemic industry and firm-level financial data for the year 2020 were collected from the same database. Descriptive analysis was performed to show the distribution of the data, and regression analysis was employed to see the effects of the explanatory variables on the dependent variables.

3.2 Event Study Methodology

The event study methodology is a widely used method in measuring the abnormal stock returns around the event date (Song *et al.*, 2011; Yazi *et al.*, 2015; Song *et al.*, 2021b). It is able to detect the impact of specific events on security prices (Binder, 1988) and under certain conditions, tests using OLS produce similarly powerful results as other methodologies (Greenwald, 1983; Karafiath, 1988).

This study uses Capital Asset Pricing Model (CAPM) in estimating the required rate of returns of the stocks:

$$R(R_{it}) = R_f + \beta_{it}(R_{mt} - R_f) \quad (1)$$

where

- $R(R_{it})$ = the required rate of return of stock i on day t ;
- R_f = the daily risk-free rate derived from the average 3-months Treasury Bills for one year divided by 365 and adjusted for the inflation rate;
- β_i = the beta measurement for stock i estimated from the historical betas' average for two years before the event date and were extracted from Thomson Reuters DataStream database; and
- R_{mt} = the return of the benchmark index, KLCI on day t .

After establishing the required rate of return, the abnormal or unexpected return (AR_{it}) for each stock i on event day t is measured (the actual returns minus the required rate of returns). The effect on the rate of returns on stock i is as follows:

$$AR_{it} = R_{it} - R(R_{it}) \quad (2)$$

where

- AR_{it} = the daily abnormal returns of stock i on day t ;
- R_{it} = the actual return of stock i on day t ; and
- $R(R_{it})$ = the required rate of return for stock i on day t .

The cumulative abnormal returns (CAR) represent the total effect of the event across the window period, thus:

$$CAR_t = \sum_{i=1}^n AR_{i,t} \quad (3)$$

3.3 Regression Analysis

Multiple regression analysis was conducted to test the hypotheses by assessing the impact of the firm and market characteristics of the public listed companies on their abnormal returns for the three windows specified. The general model is specified in the equation below:

$$CAR_i = \alpha + \beta_1 \ln(TA)_i + \beta_2 (AGE)_i + \beta_3 \ln(VOL)_i + \beta_4 SP_i + \beta_5 Vind_i + \beta_6 CR_i + \beta_7 RETA_i + \beta_8 TDTA_i + \beta_9 ROA_i + \varepsilon_i \quad (4)$$

where

- CAR_i = Cumulative abnormal returns;
- $\ln(TA)_i$ = Natural log of total assets;
- AGE_i = Years of establishment;
- $\ln(VOL)_i$ = Natural log of average market volume during the window period;
- SP_i = Average percentage of closing quotes of Ask – Bid spread during the window period;
- $Vind$ = Vulnerable industries due to MCO; with dummy “1” for vulnerable industry, otherwise “0”;
- CR_i = Current ratio;
- $RETA_i$ = Retained earnings/total assets;
- $TDTA_i$ = Debt ratio; and
- ROA_i = Return on assets.

The total assets and age are used as the control variables as they might have effects on the CAR. The second group of variables consists of market variables namely the market strength as measured by volume and information asymmetry variable as measured by the bid-ask spread. The third and fourth groups of variables are the firm’s industry which was classified into the vulnerable industry and non-vulnerable industry following Xiong *et al.* (2020) and lastly firm’s financial characteristics. We use the current ratio (liquidity), retained earnings ratio (financial strength), debt ratio (solvency), and ROA (profitability) to measure the financial characteristics of the firms.

4. Findings and Discussion

4.1 Descriptive Statistics

Table 1 presents the descriptive statistics from the dataset used in this study. The total number of public listed firms in Bursa Malaysia available in Thomson Reuter was 825. However, due to incomplete information, the final number used in this study is 620 firms. Because this study utilizes three different window periods, the variables cumulative abnormal returns (CAR), market volume (VOL), and Spread were calculated separately for each window. It can be seen that the average CAR is smaller in Period 1 compared to Periods 2 and 3. While the average market volume is the smallest in Period 3, followed by Period 1 and 2. For spread, the smallest spread is in Period 2 followed by Period 1 and 3. Since the data is relatively large, the theoretical distribution of the sample mean is deemed to be distributed roughly normally following the conventional rule-of-thumb that a sample size of 30 is big enough for a normal distribution.

Table 1: Descriptive results

	N	Mean	Median	Std. Dev.	Min.	Max.
CAR ₁ (%)	631	7.90	3.32	26.55	-71.98	156.90
CAR ₂ (%)	631	9.16	2.74	30.46	-66.81	187.80
CAR ₃ (%)	631	12.91	2.40	42.58	-78.59	275.15
VOL ₁ (*000)	629	5900.66	903.07	15212.10	1.44	150162.00
VOL ₂ (*000)	627	7056.34	907.57	18356.08	1.00	178385.00
VOL ₃ (*000)	626	4248.53	600.03	12748.11	0.10	145611.00
Spread ₁ (%)	631	7.20	3.28	10.80	-43.44	81.67
Spread ₂ (%)	631	5.35	2.58	8.22	-43.31	58.13
Spread ₃ (%)	631	9.70	4.02	15.55	-66.57	129.21
Firm Size - Total Assets(*000)	631	2257674	443594	7205085	5610	101640700
Firm Age	631	20.95	21.00	8.94	2.00	48.00
Vulnerable Industry	631	0.68	1.00	0.47	0.00	1.00
Current Ratio	630	3.92	1.97	8.56	0.09	124.42
TDTA	631	19.11	15.92	17.63	0.00	136.00
RETA	631	0.12	0.17	0.37	-2.04	0.85
ROA(%)	626	1.95	2.49	9.47	-80.53	44.06

Notes: Cumulative abnormal return (CAR), Volume (VOL) and Spread for the period of 16th March – 15th April 2020 i.e. MCO 1 and 2. Cumulative abnormal return (CAR), Volume (VOL) and Spread for the period of 16th April – 9th June 2020 MCO 3 – CMCO. Cumulative abnormal return (CAR), Volume (VOL) and Spread for the period of 16th March – 9th June 2020 i.e. MCO 1 until CMCO, whole study period.

4.2 Regression Results

Three multiple regression analysis were conducted for three different window periods. The regression results are divided into four models, the first model is the base model with control variables firm size and age. The second model incorporates market variables namely, market volume and spread to represent market strength and information asymmetry. The third model incorporates industry information where dummy variable is used to measure if the firms are from vulnerable industries, and firm characteristics such as current ratio, debt ratio, retained earnings ratio, and firm performance (ROA) are presented in Model 4.

In regression analysis, if an independent variable that is very highly correlated with one or more other independent variables will result in a relatively large standard error. The regression coefficient will be unstable and will vary greatly from one sample to the next. Therefore, before performing the regression analysis, correlation analysis was employed to detect for any potential correlation between the independent variables. The results show that all independent variables in all the models for the three periods analysed exhibit very low correlation of less than 0.4. Further diagnostic test to detect for any potential multicollinearity problem among the independent variables using Variance Inflation Factor (VIF) Statistics indicates all VIF values of around 1, confirms that there is no correlation between a given explanatory variable and any other explanatory variables in the models.

In the first model (Table 2), both firm size and firm age are found to be significantly negative in affecting CAR. When additional variables are added to the equation, firm age becomes positive and insignificant. In both Model 2 and 3, market volume and spread are found to be significantly positive in affecting CAR supporting hypotheses 1 and 2. This is in line with the hypothesis that market strength increases CAR, whereby as volume increases, potential return also increases. The positive significant bid-ask spread on CAR reflects information asymmetry is prevalent in the Malaysian market as highlighted by Chu and Song (2010) and Hong *et al.* (2021). For Model 3, the industry variable is found to be negatively significant with CAR supporting hypothesis H3, while firm characteristics (H4_{a,d}) in Model 4 are found to be insignificant in affecting CAR. It indicates that the historical

financial track records of a firm are not able to explain the variance in the firms' CARs during the unprecedented pandemic period.

Table 2: Regression results for period 1: 16 March until 15 April 2020

	Model 1	Model 2	Model 3	Model 4
Constant	53.170*** [8.612]	29.804*** [8.720]	30.742*** [9.472]	30.742*** [9.472]
Firm Size	-2.924*** [0.674]	-4.450*** [0.685]	-4.074*** [0.812]	-4.074*** [.812]
Firm Age	-0.329*** [0.120]	0.001 [0.113]	0.002 [0.113]	.002 [.113]
VOL ₁		5.292*** [0.451]	4.998*** [0.475]	4.998*** [.475]
Spread ₁		0.357*** [0.069]	0.326*** [0.073]	.326*** [.073]
Vulnerable Industry			-5.022** [2.049]	-5.022** [2.049]
Current Ratio				.018 [.065]
Debt Ratio				-.041 [.115]
RETA				-3.391 [3.126]
ROA				-.044 [.114]
Dependent Variable: CAR ₁				
N	620	620	620	620
Adj. R-Square	.050	.227	.233	.231
F-Statistics	17.231***	46.435***	38.514***	21.629***

Notes: Standard errors are in parentheses. Significance at 10%, 5% and 1% levels are denoted by *, **, ***.

For the second period (Table3), regression results appear to be similar to the first period. In Model 1, both firm size and age are significant and negatively correlated to CAR. Firm age becomes positive and insignificant when other variables are included in the regression. For Model 2, firm size appears to be negatively significant to CAR while market volume and spread are positive and significant in affecting CAR. For Model 3, the industry variable is found to be negatively affecting CAR, although the result is inconclusive. This could properly suggest the indifferent market reaction towards another MCO, CMCO, or other prolonged restrictions as announced by the government. In Model 3 and 4, with very little difference to the adjusted r-square, it appears that the variable that measures firms in vulnerable industry and firms' financial specific variables such as current ratio, debt ratio, and retained earnings ratio does not improve the regression results.

When a longer period is adopted, that is, Period 3 (Table 4), the regression results still appear to be similar to the previous regression models. As indicated by the base model (Model 1), both firm size and age have a significantly negative effect on CAR in all three periods. However, the r-square for the base model is very small, indicating that more variables should be added to improve the model. When more variables are added, for firm-specific variables, only firm size is found to be negative and significant in affecting CAR. Market information such as market volume and spread, as well as vulnerable industry variables, are found to be significant in affecting CAR.

Table 3: Regression results for period 2: 16 April until 9 June 2020

	Model 1	Model 2	Model 3	Model 4
Constant	47.038*** [9.936]	25.372** [10.132]	25.910** [10.130]	24.24** [11.034]
Firm Size	-2.413*** [0.777]	-4.197*** [0.782]	-4.044*** [0.788]	-3.729*** [.930]
Firm Age	-0.304** [0.138]	0.131 [0.133]	0.125 [0.133]	.111 [.134]
VOL ₂		5.158*** [0.473]	5.111*** [0.473]	5.108*** [.501]
Spread ₂		0.384*** [0.146]	0.396*** [0.147]	.325** [.159]
Vulnerable Industry			-3.451 [2.388]	-3.641 [2.409]
Current Ratio				-.022 [.135]
Debt Ratio				-.066 [.076]
RETA				3.125 [3.663]
ROA				-.258 [.136]
Dependent Variable: CAR ₂				
N	621	621	621	621
Adj. R-Square	0.027	0.182	0.183	.184
F-Statistics	9.523***	35.487***	28.858***	16.564***

Notes: Standard errors are in parentheses. Significance at 10%, 5% and 1% levels are denoted by *, **, ***.

Table 4: Regression results for period 3: 16 March until 9 June 2020

	Model 1	Model 2	Model 3	Model 4
Constant	90.111*** [13.752]	42.343*** [13.612]	43.663*** [13.540]	41.154*** [14.687]
Firm Size	-4.972*** [1.077]	-7.243*** [1.051]	-6.840*** [1.054]	-6.237*** [1.237]
Firm Age	-0.575*** [0.191]	0.064 [0.176]	0.073 [0.175]	.039 [.176]
VOL ₃		8.896*** [0.660]	8.838*** [0.657]	8.562*** [.697]
Spread ₃		0.768*** [0.148]	0.790*** [0.148]	.677*** [.160]
Vulnerable Industry			-9.032*** [3.140]	-9.479*** [3.17]
Current Ratio				-0.009 [0.177]
Debt Ratio				-0.049 [0.101]
RETA				-1.185 [4.842]
ROA				-.327 [.178]
Dependent Variable: CAR ₃				
N	623	623	623	623
Adj. R-Square	0.06	0.277	0.288	.286
F-Statistics	19.964***	60.647***	50.743***	28.636***

Notes: Standard errors are in parentheses. Significance at 10%, 5% and 1% levels are denoted by *, **, ***.

5. Conclusion

This study investigates whether the market strength and information asymmetry experienced during a crisis, industrial and firm characteristics have an impact on shareholders' abnormal returns. The findings of this study have several implications. Firstly, during periods of uncertainty such as at the beginning of the implementation of MCO, larger and older firms are at a disadvantage compared to smaller and younger firms. The results are unlike those found by Ding *et al.* (2021) and Song *et al.* (2021a) who found larger and financially strong firms to be more resilient to stock decline due to Covid-19.

Secondly, the volume and bid-ask spread which indicates the strength of the market and information asymmetry have a strong influence on the abnormal returns. The higher the volume, the higher is the abnormal returns, consistent with the expectation that an active stock market with an increase in stock demand provides greater liquidity with lower transaction costs, generates greater returns to investors. The significant positive relationship of bid-ask spread on the CAR indicates that during the period of uncertainty, information asymmetry is even more severe given the large concentration of ownership in public listed firms in Malaysia (Chu and Song, 2014). The findings support Chen and Poon (2007) that capital markets that face higher information asymmetry are illiquid and less developed provide an opportunity for greater abnormal returns. However, the bigger bid-ask spreads and higher abnormal returns reflect the inefficiency of the stock market that might increase transaction costs and exploitation by those who possess information advantages. Thus, a more efficient surveillance system to curb unusual market activities to ensure a fair and orderly market by the Bursa Malaysia and the Securities commission is vital.

Thirdly, consistent with the efficient market hypothesis (EMH) as well as studies on the capital market reaction by Baker *et al.* (2020), and Marinč (2016), market reactions to epidemics are negative. This is to be expected because as the market absorbs negative information of the development of the pandemic and the actions of the government implementing MCO, stock prices fell reflecting uncertainties of how businesses will be impacted by this new information at the beginning period. This study extends the previous studies by adding vulnerable industry variables into the model specified. This is to extract the effect of MCO towards firms that are especially in the vulnerable industries in the event of the COVID-19 pandemic. The impact of vulnerable industry variable on stock returns is even more severe. It has a significant and negative effect on CAR in two out of three of the study periods. Besides that, this study also found that all things being equal, in the month following the announcement of the first MCO, the CAR of firms in vulnerable industries would reduce by an extra 5.0% compared to firms who are not classified as vulnerable industry category. As the MCO prolonged, based on results in Period 3, the CAR of firms in vulnerable industries fell by an extra 9.5% compared to other firms listed in Bursa Malaysia. The negative impact of the vulnerable industries on the CAR shows glooming prospects of those vulnerable firms, which require government intervention to support them to sustain their businesses.

Fourthly, this study also finds firms' financial specific variables to be insignificant when they were introduced into the regression model as a robustness check on the impact of the market variables and industry's influence on the CAR. It shows that historical financial track records are not good predictors of a firm's prospects, especially during a crisis. The results are dissimilar to findings by Khatib and Nour (2021), Liu *et al.* (2021), and Xiong *et al.* (2020) who all found firm financial variables such as profitability, leverage, growth, and liquidity to be significant in affecting CAR of public listed firms during Covid-19. With firm financial specific variables added in the equation, they do not change the results of the explanatory variables namely market strength, information asymmetry, and industry variables leading to the conclusion that during a pandemic, the market strength, information

asymmetry, and industry characteristics are significant predictors on CAR. Future research such as cross-country comparisons on the impact of liquidity and information asymmetry on CAR during the crisis is suggested.

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Board Governance, Dividend Payout and Executive Compensation in Malaysian Firms

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Abstract: **Research Question:** This study seeks to present and test how board governance mechanisms affect the relationship between a company's dividend payout and CEO compensation. **Motivation:** In the face of the significant payouts to directors and abundant literature on executive pay, there is scant evidence on board governance the relationship between executive compensation and the dividend payout policy of listed firms in emerging capital markets. The independent variable used in this study is the dividend payout ratio, which is the dividend per share divided by primary earnings per share before extraordinary items. A direct measure of the dependent variable is the total executive compensation, inclusive of fixed salaries and variable bonuses. The research is built based on these three key papers, Bhattacharyya *et al.* (2011); Smith and Watts (1992); Gaver and Gaver (1993). **Idea:** Building on Bhattacharyya *et al.* (2011), this study examines how the board governance relationship between a company's dividend payout and executive compensation in the context of a developing country. **Data:** Using a sample of 300 largest Malaysian public listed companies (PLCs) on Bursa Malaysia from 2008 until 2014. The data is from the Kuala Lumpur Stock Exchange, OSIRIS, DATASTREAM, BANKSCOPE databases, and the Malaysian Stock Performance Guide. **Method/Tools:** We test using the panel data. **Findings:** Our empirical results reveal three findings. First, our results suggest a direct relationship between dividend payout and executive compensation across all models. Our sub-sample analyses show that this phenomenon is limited to the non-government linked firms and non-family firms. Secondly, board governance shows that the Bumiputera, CEO-education, and non-executive directors are positively related to dividend payout. Lastly, the interaction between executive board compensation and the presence of Bumiputera has a negative relationship with the dividend payout. **Contributions:** The results of this study contribute to the growing scholarly work that examines board governance and the impact on dividend payout in an emerging market context.

Keywords: Executive compensation, board governance, dividend payout, Malaysia.

JEL Classification: G35, J33, N25

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1. Introduction

Higher directors' remuneration does not necessarily equate to better financial performance for many public listed companies (PLCs) in Malaysia. Despite falling revenues and profits, approximately 50 loss-making companies offered handsome windfalls to their directors. The Malaysia Asian Corporate Governance Report 2015 found that 850 PLC's executive directors' remuneration on average grew by 14.2 percent (2014: RM1.34 mil to 2015: RM1.53 mil) while non-executive 'directors' fee surged to 19.4 percent (2014: RM98,000 to 2015: RM117,000). In his annual letter to shareholders, Warren Buffet reported that U.S. companies' director's compensation has now soared to a level that inevitably makes pay a subconscious factor affecting the behaviour of many non-wealthy members.' "Think, for a moment, of the director earning \$250,000-300,000 for board meetings consuming a pleasant couple of days six or so times a 'year.'

As per Corporate Blueprint, the Malaysian Code on Corporate Governance (MCCG) introduced in 2011 transformed excellence in corporate governance and subsequently reviewed in 2012, 2017, and 2020 to promote greater internalization of corporate governance culture. It is one of the Malaysian government's priorities to increase the competitiveness of Malaysian businesses and attract foreign investments. In the MCCG 2020 report, the Securities Commission (SC) focused on ensuring the remuneration commensurate with individual and company performance; many of these companies have formalized a remuneration policy to guide the determination of incentive structures and remuneration. These developments portend well for our study's timing that focuses on corporate governance, executive compensation, and dividend payout to strengthen the management policies of PLCs. In the face of the significant payouts to directors and abundant literature on executive pay, there is scant evidence on the relationship between executive compensation and the dividend payout policy of listed firms in emerging capital markets.

Shareholders have little public success in forcing company boards to justify the 'executives' pay arrangements, and often their complaints about excessive handouts have fallen on deaf ears. Furthermore, another contentious issue reported by Wall Street Journal, dated April 29, 2021, found that 'CEO's remuneration skyrocketed in 2020. The Wall Street Journal analysed the remuneration for more than 300 S&P 500 'CEOs who had been in their roles for at least a year and found that their median pay increased from \$12.8 million in 2019 to \$13.7 million in 2020. Reddy *et al.* (2015), who did a similar study, found that remuneration for performance is weaker at a higher level of managerial ownership. They envision that both the principle-agent and administrative power explain executive pay.

Interestingly, Malaysia's political system affects the severity of agency problems between the 'stakeholders' (Benjamin *et al.*, 2016). Other studies that opine the impact of whether a listed company is government-owned or politically connected CEOs are such as Kasipillai *et al.*, 2017; Minhat and Abdullah, 2014, and Tee *et al.*, 2017. Given concentrated managerial ownership and politically connected executive directors in Malaysian PLCs, the Board of directors is prone to compensate the insider owners, which may cause the pay for performance relationship to be weak, which influences dividend payouts.

Executive director's compensation is a controversial subject that has attracted legislators, the media, and academicians in the U.S., the U.K., and Portugal (Bebchuk and Fried, 2003; Conyon and Murphy, 2000). In the context of Portuguese firms, Alves *et al.* (2016) posited that specific factors such as shareholders return, firm characteristics, CEO characteristics, and the profile of Board of directors could account for the majority of the variance in total executive remuneration. In New Zealand, Reddy *et al.* (2015) found that after controlling for firm size, performance, Industry, and year effects, the CEO's compensation inclines towards interior corporate governance features rather than external corporate governance

practices. Studies also exhibited that companies having CEOs on boards have the power to influence remaining board decisions, which causes the boards to become less expedient in monitoring compensation (Lee and Isa, 2015; Benjamin and Zain, 2015). Conyon and He (2011) documented that in the U.S., 'executives' compensation is about seventeen times higher than in China. Besides the significant differences in the U.S., China executives' pay persists even after controlling economic and governance factors.

Bhattacharyya *et al.* (2011) advanced the agency paradigm theory to expound the dividend puzzle and found that payout ratios and managerial compensations are negatively related. Furthermore, they revealed a negative relationship between dividend payout ratio and executive compensation in the U.S. and Canada due to their similarity in their corporate governance structures and legal frameworks. Building on Bhattacharyya *et al.* (2011), studies examine how the board governance relationship between a company's dividend payout and executive compensation in the context of a developing country. The results of this study contribute to the growing scholarly work that examines board governance and the impact on dividend payout in an emerging market context.

The remainder of the paper is structured as follows: Section two reviews prior literature and develops testable hypotheses. Section 3 discusses the research design, including details of the sample, models, and methodology. Section 4 presents the empirical results, and Section 5 concludes the paper.

2. Literature Review and Hypotheses Development

Malaysia has a unique institutional setting. It is a multiracial developing country with different levels of investor protection, legal regime, corporate policies, and ownership structure; hence, evidence from Anglo-American jurisdictions may not generalize to Malaysia. The Securities Commission of Malaysia released the Corporate Governance Blueprint in 2011, 2012, 2017, and 2020. The MCCG 2012 focused on strengthening board structure and composition, recognizing the role of directors as active and responsible fiduciaries. Subsequently, there was a release of MCCG, 2017 and 2020 by Bursa Malaysia. One of the significant highlights of the blueprint was on the "Boards as active and responsible fiduciaries." The design establishes a mandatory formal board charter that enables industry-led studies on directors' compensation.

2.1 Dividend Payout and Executive Compensation

The question of why companies pay dividends has continued to puzzle researchers for an extensive review of the literature (see Obradovich and Gill, 2012). Harris (2008) and Perel (2003) posit that the business ethics literature raised concerns about unethical and unreasonable compensation policies that deprive shareholders of their fair share of a company's wealth. Smith and Watts (1992) argued that, after controlling for the effects of growth opportunities and firm size, lower dividend yields correspond with higher levels of executive compensation because of the link between a firm's financing and dividend policies. Gaver and Gaver (1993) also corroborated with the findings of Smith and Watt's (1992) study at the firm level.

On the other hand, Golec (1994) study provided evidence from a real estate industry perspective. In typical wage contracts, the total compensation is associated with higher dividend yields than a discretionary-based payment. Likewise, White (1996) found a direct association between the dividend and 'executives' incentives for the oil and gas, defence/aerospace, and the food processing industries. White (1996) showed that management compensation is positively associated with higher dividend payouts, yields, and more significant annual dividend levels. White's (1996) study evidenced an association between firm characteristics and the use of compensation contracts with a dividend

provision, which led him to conclude that his results are consistent with the theory that firms' link compensation incentives to dividend payouts reduce agency conflicts shareholders and management.

The study of 1,650 public listed firms in the UK, Germany, France, Italy, Netherlands, and Spain from 2002 to 2009 by De Cesari and Ozkan (2015) found that executive stock option holdings and stock option deltas have an adverse impact on the total dividend payout and hence, implying that 'executives' compensation is not a substitute for share repurchase or dividends. In Malaysia, share repurchases are not typical, enabling us to focus solely on the dividend payout as the primary means to reduce the vertical agency conflict between shareholders and management.

Anderson *et al.* (2020) analysed data for New Zealand firms' dividend payouts over 1997–2015 and found consistent results with Bhattacharyya *et al.* (2008). Their results indicated that corporate dividend policy among New Zealand firms is most appropriate by considering the dividend payout ratio rather than the level of, or changes in, cash dividends alone. Bhattacharyya *et al.*'s (2008) study are particularly relevant as it emphasizes the advanced theory of the agency paradigm. They found that dividend payout is negatively associated with executive compensation, and these results hold when a payout is in the form of ordinary dividends or common share repurchases. Bhattacharyya *et al.* (2008) has advanced a theory based on the agency paradigm that dividends resolve agency issues of managerial compensation contracts. Therefore, we state the following hypothesis:

H₁: Ceteris paribus has a negative relationship between dividend payout and executive compensation.

2.2 Board Governance

This section outlines various elements of board governance and its linkage with the dividend policy of firms.

2.2.1 Remuneration Committee

The prior studies reviewed the literature on internal governance mechanisms. For example, Smith Committee posited that the corporate governance factors and top management remuneration had gained much interest by researchers due to the growing concerns of the authorities regarding firms' internal monitoring. Vafeas (2003), who studied the director's committee in firms, found that directors with 20 or higher years of board service are almost twice as likely to be in an affiliated profession to managers versus other directors who are more likely to serve on a firm's nominating and compensation committees. Furthermore, Kanapathippillai *et al.* (2016) found that the remuneration committee's existence and quality play a significant role in providing voluntary disclosure of remuneration actions and influences the extent of the exposure. In addition, Kanapathippillai *et al.*'s (2016) study reported that remuneration committee independence and diligence enhance the quality of remuneration committees. Alves *et al.* (2016) found that board committees¹ and the presence of the remuneration committee were positively related to the executive earnings.

In contrast, Pahi and Yadav (2019) documented that executive compensation has a significant agency problem that arises from partial contracting. The management can expropriate shareholder wealth through higher salary packages and more perks. Pahi and Yadav's (2019) studies showed that the executive committee indicates a positive but insignificant relationship with dividend policy.

¹ Such as remuneration committee, fiscal board, auditing committee, and others.

Based on the mixed evidence as to whether an independent remuneration committee helps monitor executive compensation and to link to a firm performance that in turn affects dividend payout, we state the following related hypotheses:

H₂: Ceteris paribus, there is a relationship between the remuneration committee and dividend payout.

2.2.2 CEO Education

Prior studies, such as Carpenter and Westphal (2001), argued that directors' educational background plays an essential role in facilitating the strategic decision-making process. Dragoni *et al.* (2011) posit that better-educated CEOs have more good training, substantial cognitive growth, a wealthy knowledge base, and possibly intensifying future firm performance by developing their decision-making and encouraging more relevant strategic actions. In contrast, Serra *et al.* (2016) argue that CEOs' competence indicated that there is no enhancement in performance in firms where the CEO possesses better educational qualifications.

Darmadi (2013) documented that other factor such as experience, managerial skills, networks, and skills obtained outside of formal school education also affects the relationship between directors and firm performance. In this sense, there is room for so-called "street smart" directors to play a vital role in the boardroom. These "street smart" directors may be less educated. Still, due to their long working association with the firms they work for, their knowledge of the firms' business's intricacies is also highly valued. As such, we cannot predict the direction of the relationship, so we posit the following non-directional relationship.

H₃: Ceteris paribus, there is a relationship between CEO education and dividend payout.

2.2.3 Board Independence

Each country's legal, political, and institutional environments significantly affect firms' corporate governance mechanisms favoured. The "Board composition," an integral part of the institutional environment, is ordinarily defined as the proportion of outside directors to total directors (Lee and Isa, 2015; Roy, 2015; Kesner, 1987). These researchers documented that the components of the Board are necessary to judge its monitoring effectiveness. In the Malaysian context, Abdullah (2006) reiterated that board composition is not random but based on other factors, including political considerations.

The additional factors that influence the decision of board composition in Malaysia are the size of the Board, the extent to which the directors are independent of the firm's management, the length of directors' shareholdings, CEO duality, and the presence of block shareholders. Rashidah and Roszaini (2005) argued that more independent directors' representation on the corporate Board did not limit a firm's earnings management practices. Sharma (2011) articulated that after controlling for the effects of CEO entrenchment and ownership determinants of the propensity to pay dividends, there is evidence of a positive relationship between the tendency to pay and the number of independent board members. Furthermore, numerous studies suggested the ideal board size to be in the range of seven to eight (Lee and Isa, 2015; Roy, 2015; Kesner, 1987; Rashidah and Roszaini, 2005; Abdullah, 2006). Several other studies document mixed results on the effectiveness of board size and 'firms' earnings (Lee and Isa, 2015; Roy, 2015). Therefore, we state the following hypothesis:

H₄: Ceteris paribus, there is a relationship between board independence and dividend payout.

2.2.4 Bumiputera on the Board

In Canada, Latin America, the U.K., and the U.S., ethnically diverse companies are 35 percent more likely to outperform their peers. However, unlike in developed countries, where the demand and supply for skills drive board diversity, this is not the case in Malaysia. In Malaysia, board diversity is primarily driven by the affirmative New Economic Policy (NEP) programs that require firms listed in Bursa Malaysia to reserve a minimum of 30% board seats or equity to the ethnic Malays² (Gomez *et al.*, 1999). Subramaniam *et al.* (2020) revealed that the positive relationship between executive compensation and dividend payout is more evident in politically connected firms.

The NEP, established in 1970, was used to reduce equity ownership imbalance between the various ethnic groups by increasing Bumiputera's equity ownership of firms listed in the capital market (Tan, 2004). Haniffa and Hudaib (2006) and Yatim *et al.* (2006) argued that ethnicity in Malaysia has, to a considerable extent, shaped how the country and businesses are managed due to external political intervention and internally via its Islamic cultural values. However, it is unclear whether board ethnicity affects dividend decisions and, thus, is concurrently associated with executive compensation.

Bolbol (2012), in a Malaysian study, found that the ethnicity of the Board of directors is correlated negatively and insignificantly to dividend payout. In contrast, the study by Iskandar *et al.* (2017) suggested that Bumiputera's on boards can positively impact dividend payout. Subramaniam *et al.* (2014) found that firms' growth opportunities are associated with fewer dividends payouts and that this relationship is weaker for Bumiputera ethnic-controlled firms. The result to date supports the fact that the negative association exists only for non-GLCs. Based on the overall findings, and due to the mixed results, we state the hypothesis as below:

H_{5a}: Ceteris paribus, there is a relationship between Bumiputera directors on the board and dividend payout.

In addition to the above hypothesis, we moderate the executive compensation with the Bumiputera directors on the Board to see the impact on dividend payout. We state the interaction hypothesis as below:

H_{5b}: The relationship between dividend payout and executive compensation is minimized by the effect of Bumiputera directors on the Board.

3. Research Design and Methodology

3.1 Sample Selection

The sample consists of 300 of the largest companies listed on Bursa Malaysia for the seven years 2008 to 2014, surrounding MCG reforms and their implementation during the 2012-2013 periods. The data is from the Kuala Lumpur Stock Exchange, OSIRIS, DATASTREAM, BANKSCOPE databases, and the Malaysian Stock Performance Guide. In addition, we obtained the ownership data and control variables from the OSIRIS and Bloomberg databases and company annual reports available on the Bursa Malaysia website. The variable labels, definitions, and measurements are presented in Appendix A. After eliminating the missing data, the sample size is reduced to 287 firms (See Table 1).

² Referred to as natives or Bumiputera.

The industry distribution depicts that most observations are from the properties/hotel sector (29.27 percent), closely followed by the trading and services sector (23.69 percent) and industrial product sector (22.66 percent), respectively, from the sample size. The statistical package STATA is used to conduct the data analysis.

Table 1: Sample selection criteria

Classification	No of companies	Firm year observations	Percentage (%)
Consumer product	32	224	11.14
Trading/services	68	476	23.69
Properties/hotel	84	588	29.27
Construction	11	77	3.83
Plantations	27	189	9.41
Industrial products	65	455	22.66
Total companies and firm year observations	287	2009	100

3.2 Dependent Variable

Gaver and Gaver (1993) used the dividend payout ratio and the dividend yield as two dividend policy measures. The dividend payout ratio (DIV_POUT) is the dividend per share divided by primary earnings per share before extraordinary items. The dividend yield is the dividend per share divided by the closing price per share. The dividend yield is sensitive to share prices, whereas the dividend payout is not. For this reason, the dividend payout ratio is the primary measure of the firm's dividend payout in this study, and this is consistent with other studies (Smith and Watts, 1992; Gaver and Gaver, 1993; Gul, 1999 and Adam and Goyal, 2008; De Cesari and Ozkan, 2015; and Benjamin *et al.*, 2016).

3.3 Independent Variable

A primary measure of executive compensation (EXEC_COM) is the total compensation, including fixed salaries and variable bonuses (e.g., Larcker and Balkcom 1984; Antle and Smith, 1986; Alves *et al.*, 2016; Reddy *et al.*, 2015). In the U.K. and the U.S., disclosure of executive compensation of public listed firms is regulated through the Directors Report Regulation 2002 and the Sarbanes-Oxley Act 2002. However, in Malaysia, non-mandatory detailed disclosure is encouraged through guidelines specified by the MCCG issued by the Securities Commission in 2007, revised in 2012, and the latest revision in 2020. Thus, there is no specific regulation regarding directors' executive compensation disclosures in Malaysian PLCs. Hence, the data obtained for compensation consists of the salary and bonus earned annually³.

3.4 Corporate Governance Variables

Remuneration committees play an essential role in advising the Board on matters relating to remuneration. As part of its function, the committee periodically makes recommendations to the Board on any specific decisions or actions and disclosures that the Board should consider with director remuneration (see Kanapathippillai *et al.*, 2016). In this study, the remuneration committee (REM_COM) consists of several independent directors in the remuneration committee board. Board composition (NED) refers to the number of non-executive directors who are external members of the Board. The ratio indicates the Board's

³ While compliance with the MCCG is not mandatory, amendments to the Bursa Malaysia listing rules in November 2017 means that listed companies in Malaysia would need to explain any non-compliance with governance standards in their annual report. With such requirements, the executive compensation disclosure is more detail post-2017.

independence and the extent to which insiders are not involved. Prior studies (i.e., Conyon and Peck, 1998; Nordin *et al.*, 2005; Ponnu, 2008; Lee and Isa, 2015; Benjamin and Zain, 2015) have identified external board members as non-executive have less power to control the Board of directors. One of the CEO characteristics of this study is the 'CEO's academic qualification (CEO_EDU). The criteria are indicated as zero if there is no specification of the academic qualification and one if a bachelor's degree and above. Board diversity is measured by the presence of majority Bumiputera (BUMI) directors coded as '1', and otherwise (i.e., Chinese, Indian, or others) coded as '0'.

3.5 Control Variables

We control for different firm-level variables. Board size (B_SIZE) refers to the total number of executive and non-executive directors on the Board. Prior studies suggest an association between the board size and the dividend payout performance (see Ajay, 2007; Lee and Isa, 2015; Benjamin and Zain, 2015). It makes sense, as large board members reflect the quality of corporate decision-making (Atayah *et al.*, 2021; Najaf *et al.*, 2021). CEO duality (CEO_Dual) is where the chief operating officer serves as the Board's chairman. This construct is a dummy variable, with firms scoring "1" if duality exists and "0" otherwise. Due to agency issues, the concentration of decision-making power at one point (CEO duality) would affect the dividend payout ratio (Chin *et al.*, 2021; Najaf *et al.*, 2020). The MBA ratio is the market-to-book value of assets at the end of year *t*. The computation is the total assets less total common equity and the market value of investment calculated as the share outstanding multiplied by a closing share price scaled by the total assets. Extant studies suggest that the MBA is one of the critical determinants of the dividend payout ratio. Returned earnings (RET_EAR) is the natural logarithm of retained earnings. The size (proxied as the natural log of total assets) and debt leverage (proxy as nature log of total liabilities to total assets) of the firms has a significant association with the dividend payout ratio (Najaf and Najaf, 2021). Government-linked companies (GLCs) refer to a dummy variable coded as '1' when the firm is identified as a government-link company and '0' otherwise. GLC control firms (FLY_C) refers to dichotomous variable coded '1' when the firm is recognized as a family own and '0' otherwise. A firm is categorized as a family firm if 20% or more equity ownership lies with the family or holds more board seats than any other individual or group on the Board. Institutional Ownership (INST) represents the percentage of shares held by all other institutional investors (excluding Employers Provident Fund (EPF), Lembaga Tabung Haji Angkatan Tentera (LTAT), Permodalan Nasional Berhad (PNB), Lembaga Tabung Haji (LTH), and Social Security Organization (SOCSSO) holding at least 5 percent of outstanding shares (Najaf *et al.*, 2021; Najaf and Atayah, 2021).

The ownership structure in Malaysia is highly concentrated. Hence, the relevant agency problem to analyse seems to be the one that arises from the conflicting interests of large shareholders and minority shareholders, eventually affecting the firm's dividend payout. All the variables have been winsorized at the 1 percent and 99 percentiles to avoid the effect of outliers. Furthermore, we control for the industry and year effects.

3.6 Model Specifications

The base Model tests hypotheses H1-H5 and Model 1 test hypotheses H5b, respectively. The regression model used to test the premises is as follows:

3.6.1 Base Model

$$\begin{aligned} \text{DIV_POUT}_{i,t} = & \beta_0 + \beta_1 \text{EXEC_COM}_{i,t} + \beta_2 \text{REM_COM}_{i,t} + \beta_3 \text{BUMI}_{i,t} + \beta_4 \text{NED}_{i,t} \\ & + \beta_5 \text{CEO_EDU}_{i,t} + \beta_6 \text{B_SIZE}_{i,t} + \beta_7 \text{CEO_DUAL}_{i,t} + \beta_8 \text{MBA}_{i,t} \\ & + \beta_9 \text{T_ASSETS}_{i,t} + \beta_{10} \text{LEV}_{i,t} + \beta_{11} \text{RET_EAR}_{i,t} + \beta_{12} \text{GLC}_{i,t} \\ & + \beta_{13} \text{FLY_C}_{i,t} + \beta_{14} \text{INST}_{i,t} + \beta_{15} \text{IND_DUM}_{i,t} + \beta_{16} \text{YR_DUM}_{i,t} + \varepsilon_{i,t} \end{aligned} \quad (1)$$

3.6.2 Model 1 (with interactions)

$$\begin{aligned} \text{DIV_POUT}_{i,t} = & \beta_0 + \beta_1 \text{EXEC_COM}_{i,t} + \beta_2 \text{REM_COM}_{i,t} + \beta_3 \text{BUMI}_{i,t} + \beta_4 \text{NED}_{i,t} \\ & + \beta_5 \text{CEO_EDU}_{i,t} + \beta_6 \text{B_SIZE}_{i,t} + \beta_7 \text{CEO_DUAL}_{i,t} + \beta_8 \text{MBA}_{i,t} \\ & + \beta_9 \text{T_ASSETS}_{i,t} + \beta_{10} \text{LEV}_{i,t} + \beta_{11} \text{RET_EAR}_{i,t} + \beta_{12} \text{GLC}_{i,t} \\ & + \beta_{13} \text{FLY_C}_{i,t} + \beta_{14} \text{INST}_{i,t} + \beta_{15} \text{EXEC_COM} * \text{BUMI}_{i,t} \\ & + \beta_{16} \text{IND_DUM}_{i,t} + \beta_{17} \text{YR_DUM}_{i,t} + \varepsilon_{i,t} \end{aligned} \quad (2)$$

4. Results

Table 2 provides descriptive statistics for the sample firms. The mean dividend payout (DIV_POUT) ratio is 1.33 percent, and the mean for the executive compensation (EXEC_COM) is 7.99 million per annum. The average board size (B_SIZE) is eight directors, and the number of firms with CEO duality (CEO_DUAL) is low at approximately 10 percent. The mean market-to-book ratio (MBA) is 2.32, the debt to total assets (LEV) ratio is 1.58 times, and the mean retained earnings (RET_EAR) is 8.22.

Table 2: Descriptive statistics for all sample firms for all years

Variable	N	Mean	Median	Std. Dev.	Min	Max
DIV_POUT	2,009	1.333	0.710	1.221	0.690	5.510
EXEC_COM	2,009	7.992	7.950	1.039	3.580	11.960
B_SIZE	2,009	8.429	8.000	2.206	3.000	18.000
CEO_DUAL	2,009	0.088	0.000	0.283	0.000	1.000
MBA	2,009	2.317	2.280	0.209	-2.680	4.470
T_ASSETS	2,009	7.424	7.230	1.556	2.560	13.370
LEV	2,009	1.578	1.500	0.512	1.020	8.860
RET_EAR	2,009	8.222	8.120	0.458	0.110	10.600
GLC	2,009	0.052	0.000	0.223	0.000	1.000
FLY_C	2,009	0.268	0.000	0.443	0.000	1.000
INST	2,009	6.061	0.950	11.893	0.000	75.240
REM_COM	2,009	2.180	2.000	1.190	0.000	7.000
BUMI	2,009	0.302	0.000	0.459	0.000	1.000
NED	2,009	5.740	6.000	2.240	0.000	14.000
CEO_EDU	2,009	2.143	2.000	0.676	1.000	3.000

Notes: The definition and measurement of dependent, experimental, and control variables appear in Appendix A.

The results show that the mean ownership of GLCs is approximately 5 percent, whereas the family shareholdings are roughly 27 percent. In addition, the average institutional shareholdings (INST) are about 6 percent. The remuneration committee ranges from zero to a maximum of 8 members with an average mean of 2 independent directors on the Board. The mean average of Bumiputera members is 30 percent. Furthermore, the mean percentage of non-executive directors on the Board is six members, with a maximum of 14 non-executive members. On average, there are at least two directors with a qualification of a degree and above. Refer to Appendix A for the variable labels, definitions, and measurements. Table 3 shows the correlation matrix between the variables, and multicollinearity is absent.

Table 3: Pearson correlations matrix for all sample firms for all the years

Variables	DIV_POUT	EXEC_COM	B_SIZE	MBA	T_ASSETS	LEV	RET_EAR	INST	REM_COM	NED
DIV_POUT	1.00									
EXEC_COM	0.06***	1.00								
B_SIZE	0.04**	0.29***	1.00							
MBA	0.12***	-0.04*	-0.06***	1.00						
T_ASSETS	0.03	0.42***	0.29***	-0.06***	1.00					
LEV	-0.04*	0.12***	0.02	-0.00	0.23***	1.00				
RET_EAR	0.08***	0.33***	0.18***	0.02	0.58***	0.06***	1.00			
INST	-0.04*	0.03	0.05**	0.00	0.25***	0.10***	0.11***	1.00		
REM_COM	0.05**	0.06***	0.12***	0.03	0.10***	0.03	0.06***	0.03	1.00	
NED	0.05**	0.03	0.68***	0.00	0.37***	0.05**	0.20***	0.15***	0.16***	1.00

Notes: *** Significant at 1% level, ** Significant at 5% level, * Significant at 10% level. Appendix A describes the variable labels and definitions.

Table 4: OLS Regression of dividend payout on directors compensation and control variables

Dependent variable	Model	Model	Model	Model
DIVIDEND PAYOUT	1	2	3	4
Independent Variable				
EXEC_COM	0.046** (0.019)	0.046** (0.019)	0.050*** (0.019)	0.050*** (0.019)
Control Variables				
B_SIZE	-0.082 (0.065)	-0.087 (0.065)	-0.091 (0.065)	-0.075 (0.064)
CEO_DUAL	0.034 (0.060)	0.035 (0.060)	0.051 (0.060)	0.044 (0.059)
MBA	0.527*** (0.170)	0.524*** (0.169)	0.523*** (0.166)	0.515*** (0.170)
T_ASSETS	-0.012 (0.017)	-0.012 (0.017)	-0.023 (0.017)	-0.014 (0.017)
LEV	-0.125*** (0.041)	-0.125*** (0.041)	-0.121*** (0.041)	-0.129*** (0.041)
RET_EAR	0.123** (0.055)	0.122** (0.054)	0.122** (0.054)	0.113** (0.053)
GLC	0.180** (0.086)	0.175** (0.086)	0.165* (0.087)	0.185** (0.086)
FLY_C	0.090** (0.038)	0.091** (0.038)	0.103*** (0.038)	0.098*** (0.038)
INST	0.002 (0.001)	0.002 (0.001)	0.002 (0.001)	0.002 (0.001)
Corporate Governance				
REM_COM		0.031 (0.035)		
NED			0.020** (0.009)	
CEO_EDU				0.053** (0.026)
BUMI				
EXEC_COM*BUMI				
Constant	-1.444*** (0.559)	-1.447*** (0.557)	-1.483*** (0.550)	-1.474*** (0.551)
N	2,009	2,009	2,009	2,009
R-squared	0.623	0.623	0.624	0.624

Notes: The reported *t*-statistics in parentheses are the robust standard errors adjusted for clustering by firm and year. The definition and measurement of dependent, experimental, and control variables are in Appendix A. The subscripts ***, **, and *denote the 1 and 10% significance levels, respectively.

Hypothesis 1 (H_1) states that dividend payout is negatively associated with executive compensation; however, Table 4 regression results show that dividend payout is positively and significantly associated with directors' executive compensation (Models 1-7) at $p < 0.05$ level. As shown in Table 4 (Model 1-7), higher payment leads to significantly higher dividend payout, and the basic model explains 62.3 percent of the determinants of dividend payout. This positive relationship consistently holds in (Models 1-7) that controls for board governance. Thus, our results are not consistent with the findings of Bhattacharyya *et al.* (2008), as executive compensation in Malaysian PLCs is positively associated with dividend payout and hence demonstrating a contrasting view to the advanced theory of the agency paradigm between an emerging and a developed market. Accordingly, our results do not support H_1 .

Table 4 (*continued*)

Dependent variable	Model	Model	Model
DIVIDEND PAYOUT	5	6	7
Independent Variable			
EXEC_COM	0.049** (0.019)	0.067*** (0.021)	0.071*** (0.021)
Control Variables			
B_SIZE	-0.091 (0.065)	-0.098 (0.065)	-0.101 (0.065)
CEO_DUAL	0.048 (0.060)	0.043 (0.060)	0.061 (0.060)
MBA	0.516*** (0.169)	0.506*** (0.166)	0.495*** (0.162)
T_ASSETS	-0.017 (0.017)	-0.015 (0.017)	-0.025 (0.017)
LEV	-0.123*** (0.041)	-0.121*** (0.041)	-0.123*** (0.041)
RET_EAR	0.115** (0.054)	0.117** (0.054)	0.110** (0.053)
GLC	0.155* (0.087)	0.135 (0.087)	0.133 (0.088)
FLY_C	0.097** (0.038)	0.092** (0.038)	0.110*** (0.038)
INST	0.002 (0.001)	0.002 (0.001)	0.002 (0.001)
Corporate Governance			
REM_COM			0.029 (0.036)
NED			0.017** (0.008)
CEO_EDU			0.048* (0.027)
BUMI	0.073* (0.041)	0.635** (0.300)	0.604** (0.302)
EXEC_COM*BUMI		-0.070* (0.037)	-0.070* (0.038)
Constant	-1.352** (0.557)	-1.481*** (0.555)	-1.578*** (0.541)
N	2,009	2,009	2,009
R-squared	0.623	0.624	0.626

Notes: The reported *t*-statistics in parentheses are the robust standard errors adjusted for clustering by firm and year. The definition and measurement of dependent, experimental, and control variables are in Appendix A. The subscripts ***, **, and * denote the 1 and 10% significance levels, respectively.

Hypothesis 2 (H₂) states a positive association between the remuneration committee (REM_COM) and dividend payout in Malaysian PLCs. However, the results in Table 4 (Model 3 and 7) show that the independence of the remuneration committee is not significant in influencing dividend decisions and hence does not provide support in linking the remuneration committee to the dividend distribution of Malaysian PLCs. We envisaged that as the remuneration committee is customarily made up of CEOs of a particular firm, they are influential in determining the firm's direction and their payouts to shareholders. Thus, our results do not support H₂.

Hypothesis 3 (H₃) states an association between CEO education and dividend payout, and our results indicate a positive and significant association at $p < 0.05$ level. The coefficient is 0.053, meaning that CEOs with at least a bachelor's degree tend to pay on

average 5.3 percent higher dividends than CEOs who have no university education, given that other explanatory variables are held constant. Hence, directors' compensation is commensurate with the CEO's level of education and earns higher pay with a higher dividend payout. However, on the other hand, this suggests that the CEO without postgraduate qualifications could trade off the return to shareholders with more top directors' remuneration that will directly benefit the executive directors and its senior management (Table 4 – Models 4 and 7).

We find a significant positive relationship at $p < 0.05$ level (Table 4 – Models 3 and 7). Hence, Hypothesis 4 (H_4) is supported and shows that board size or a high number of independent directors (both indicate good board governance) increases the likelihood of higher dividend payout. Hence, this study finds that non-state-controlled firms and firms with independent directors on the Board are more likely to remove CEOs underperforming.

Hypothesis H_5 states that a Bumiputera director on the Board is associated with a dividend payout of PLCs (Table 4 – Model 5). The BUMI variable is significantly and positively associated with the $p < 0.1$ level dividend payout. Nazri *et al.* (2012) opine that the government persuades Bumiputera firms to place Bumiputera directors on the firms' boards to increase the participation of Bumiputera in the corporate sector. In return, Bumiputera firms will be granted favours ' from the government in the form of loans from the banking sector at preferential prices to help them stabilize their capital base and penetrate capital markets. Under this situation, the firms are less likely to encounter financial problems when future investment opportunities arise because they will be bailout by the government. Hence, we expect Bumiputera directors' decisions to favour paying the extra cash flows as dividends to shareholders instead of Chinese directors. Thus, we conclude that the results support hypothesis H_5 , supporting the conviction that Bumiputera directors on the Board of Malaysian PLCs increase dividend payout.

Further, hypothesis H_{5a} relates to the association between dividend payout and executive compensation and how the Bumiputera directors on the Board moderate the relationship. This variable is negatively significant at $p < 0.10$ level, indicating that Bumiputera's correspond with lesser executive compensation.

4.1 Robustness Test

In the previous section, we have used dividend payout based on year-to-year. But one can argue that the dividend payout should be regressed with prior year directors' remunerations to prove causality. Furthermore, the dividend is declared after the Board approves the directors' compensation, which typically only happens after the financial year. Thus, we run the regression based on one-year ahead dividend payout against existing independent and control variables (by inserting Stata's convention for leads (F1, F2), before a variable leap it by one period/year ahead) using the following regression:

$$\begin{aligned} F.DIV_POUT_{it+1} = & \beta_0 + \beta_1 EXEC_COM_{i,t} + \beta_2 REM_COM_{i,t} + \beta_3 BUMI_{i,t} \\ & + \beta_4 NED_{i,t} + \beta_5 CEO_EDU_{i,t} + \beta_6 B_SIZE_{i,t} + \beta_7 CEO_DUAL_{i,t} \\ & + \beta_8 MBA_{i,t} + \beta_9 T_ASSETS_{i,t} + \beta_{10} LEV_{i,t} + \beta_{11} RET_EAR_{i,t} \\ & + \beta_{12} GLC_{i,t} + \beta_{13} FLY_C_{i,t} + \beta_{14} INST_{i,t} + \beta_{15} IND_DUM_{i,t} \\ & + \beta_{16} YR_DUM_{i,t} + \epsilon_{i,t} \end{aligned} \quad (3)$$

We have run several robustness tests. Firstly, as the final dividend is declared after the Board approves the 'directors' compensation, which typically only happens after the financial year-end, we run the regression based on one-year-ahead dividend payout against the existing independent and control variables regression model as shown above. We use lag one-year and lag two-year dividend payout against existing independent and control

variables. Thus, we find that both prior year and two-year dividend payout lags (not shown here for brevity reasons) have no significant results demonstrating that the executive compensation has no effects on the dividend payouts of Malaysian PLCs. The White test establishes that the variance of the errors in the regression model is constant and not significant.

Nevertheless, when we split the sample into GLC and non-GLC firms (Table 5), the correlation between remuneration and performance is weaker in state-controlled firms. Similarly, when we divide the samples into FLY_C and non-FLY_C (Table 6), the relationship between remuneration and performance is more substantial for non-FLY_C. Hence, the result shows that the increase in the executive remuneration for state control and family control has no impact on the dividend payout. We foresee this unswerving for state control firms, which may have lower corporate governance, leading to lower operating performance and lower dividend payout or none. On the other hand, family control firms may have different business operation priorities and future growth.

Table 5: OLS regression results in GLC and NON-GLC

Dependent Variable	MODEL 1	MODEL 2
DIVIDEND PAYOUT	GLC	NON_GLC
Independent Variable		
EXEC_COM	-0.113 (0.112)	0.060*** (0.020)
Control Variable		
B_SIZE	-0.339 (0.288)	-0.093 (0.066)
CEO_DUAL	-	0.063 (0.060)
MBA	0.267 (0.333)	0.497*** (0.172)
T_ASSETS	0.047 (0.121)	-0.025 (0.018)
LEV	-0.505 (0.383)	-0.109*** (0.041)
RET_EAR	-0.267 (0.269)	0.112** (0.055)
FLY_C	-	0.116*** (0.038)
INST	0.010** (0.004)	0.001 (0.001)
Corporate Governance		
REM_COM	-0.272 (0.266)	0.035 (0.036)
BUMI	-0.014 (0.246)	0.034 (0.043)
NED	0.028 (0.033)	0.021** (0.009)
CEO_EDU	-0.227 (0.187)	0.050* (0.027)
Constant	4.911* (2.626)	-1.563*** (0.559)
Number of Companies	15	272
N	105	1,904
R-squared	0.791	0.619

Notes: The reported *t-statistics* in parentheses are the robust standard errors adjusted for clustering by firm and year. The definition and measurement of dependent, experimental, and control variables are in Appendix A. The subscripts ***, **, and * denote the 1, 5, and 10% significance levels, respectively.

Table 6: OLS regression results FLY_C and NON-FLY_C

Dependent Variable	MODEL 1	MODEL 2
DIVIDEND PAYOUT	FLY_C	NON-FLY_C
Independent Variable		
EXEC_COM	0.036 (0.035)	0.072*** (0.024)
Control Variable		
B_SIZE	-0.128 (0.099)	-0.063 (0.082)
CEO_DUAL	-0.026 (0.088)	0.165** (0.080)
MBA	0.453** (0.217)	0.511*** (0.182)
T_ASSETS	-0.0119 (0.035)	-0.035* (0.020)
LEV	-0.308*** (0.086)	-0.085* (0.045)
RET_EAR	0.137 (0.114)	0.120** (0.061)
GLC	-	0.157* (0.091)
INST	0.000 (0.005)	0.001 (0.002)
Corporate Governance		
REM_COM	0.052 (0.065)	0.012 (0.044)
BUMI	-0.117 (0.081)	0.095* (0.051)
NED	0.013 (0.017)	0.018* (0.010)
CEO_EDU	0.081* (0.047)	0.045 (0.033)
Constant	-1.196 (0.927)	-1.722*** (0.646)
Number of Companies	77	210
N	539	1,470
R-squared	0.748	0.585

Notes: The reported *t*-statistics in parentheses are the robust standard errors adjusted for clustering by firm and year. The definition and measurement of dependent, experimental, and control variables are in Appendix A. The subscripts ***, **, and * denote the 1, 5, and 10% significance levels, respectively.

5. Conclusion

In developed countries, regulatory reforms and stock exchange requirements have attempted to regulate executive pay to be consistent with firm performance over the decades. For example, by stipulating that all or most of the directors on a company's Board who set compensation must be independent, each year, firms must reveal the size and structure of their top executives' compensation and the reasoning behind it. As a result, CEOs and their boards know what their peers are making, but critics say boards use that information in a dysfunctional manner to ratchet up overall pay.

Hence, dividend payout and CEO compensation are puzzling research areas as there are few studies of such a relationship, especially in a developing country context such as Malaysia. Furthermore, the advent of several corporate governance measures proposed under the MCCG makes our study comprehensive. Our results are not consistent with

Bhattacharyya *et al.*'s (2011) findings that executive compensation is negatively associated with dividend payout.

This study also shows that CEO education is commensurate with the dividend payout, an essential factor determining the dividend payout in Malaysia. Consistent with agency theory, the lower-paid CEO (compared to the higher-paid CEO with postgraduate qualifications) will endorse a lower dividend payout. However, when these CEOs receive a higher remuneration package, they will support a higher dividend payout rate. Furthermore, the additional factor influencing board composition (NEDs) in Malaysia is how the directors are independent of the firm's management. Rashidah and Roszaini (2005) posit that more independent directors' representation on the Board does not limit a firm's earnings management practices. Sharma (2011) opines that after controlling for the effects of traditional economic, CEO entrenchment, and ownership determinants of the propensity to pay dividends, there is evidence of a positive association between the tendency to pay and board independence.

Haniffa and Hudaib (2006) and Yatim *et al.* (2006) posit that ethnicity in Malaysia has, to a considerable extent, shaped how the country and businesses are managed due to external political intervention and internally via its cultural values. The political economy of Malaysia, where critical government support to the GLCs has fostered the emergence of a new class of the indigenous local capitalist class, is increasing structures of class and ethnicity (Larson and Zalanga, 2003). Our results find support for Iskandar *et al.* (2017) that Bumiputera's on boards can positively impact dividend payout. This effect may be conditional on the level of free cash flows generated by firms. Furthermore, in the interaction between executive compensation and Bumiputera, dividend payout is weaker with the existence of Bumiputera. This result has policy implications for ethnicity as an active board governance mechanism. In an emerging capital market like Malaysia, the results suggest that trying a formulaic approach to governance reform to optimize the link between executive compensation and dividends is not simple. The results show a negative and insignificant association between GLCs and executive compensation, suggesting that directors in GLCs appointed or seconded from civil service assume positions in the government pay schemes affect the link between executive pay and firm performance. On the other hand, family firms are evidence of lower executive compensation as family control reduces the vertical agency conflict between managers and shareholders.

This study's limitations include selecting only the top 300 highest capitalized Malaysian public listed companies, meaning that the study's conclusions might only be valid and applicable to large companies listed in Malaysia. The sample is also significantly influenced by its Islamic culture and associated biases. The research is in the positivist paradigm, and it should not be construed as a comment about a particular religion or race and relied mainly on a quantitative research approach. An important area for future research might be considering how shareholders' returns and executive compensations affect dividend payout in other emerging capital markets with different constitutional backgrounds, such as Chile, with a civil law jurisdiction.

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Appendix

Appendix A: Variable measurement

Variable	Descriptions
Dependent Variable	
DIV_POUT	The dividend payout ratio is the dividend per share scaled by earnings per share before extraordinary shares. The dividend payout is in the natural logarithm.
Independent Variable	
EXEC_COM	The aggregated pay of all executive directors on each firm is the sum of salary, bonus, and other cash payments
Corporate Governance	
REM_COM	The number of independent directors in the remuneration committee board.
BUMI	Dichotomous with one if BUMI, 0 if Chinese, Indian, and others
NED	The proportion of non-executive directors (NEDs) on the Board
CEO_EDU	CEO education is the academic qualification of the CEO of the firm. Criteria are indicated as 0 if there is no specification and one if a bachelor's degree and above.
Control Variables	
B_SIZE	A total number of directors on the Board of the company
CEO_DUAL	Dichotomous with one if the chairman is also the CEO of the company.
MBA	Market to book value of assets at the end of year t [(Total assets less total common equity add share outstanding multiplied by closing share price)/ total assets.]
T_ASSETS	Natural logarithm of total assets.
LEV	Natural logarithm of total liabilities over total assets
RET_EAR	Natural logarithm of Retained earnings
GLC	A dummy variable is coded as 1 when the firm is a government-link company and 0 otherwise
FLY_C	Dichotomous variable coded 1 when the firm is a family own, and 0 otherwise. A firm is categorized as a family firm if 20% or more equity ownership lies with the family or holds more board seats than any other individual or group on the Board.
INST	The percentage of shares held by all other institutional investors (excluding EPF, LTAT, PNB, LTH, and PERKESO/SOCSO) containing at least 5 percent of outstanding shares)
IND_DUM	Dummy variable coded 1 for the specific Industry, 0 otherwise.
YR_DUM	Dummy variable equals 1 for the specific year, 0 otherwise.

Impact of Governance Quality on Default Risk of Socially Responsible Firms: International Evidence

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Abstract: Research Question: Default risk problem is more prevalent during the recent covid-19 pandemic era, stopping economic activity, hurting firms, and exposing them to default risk but governance and CSR may lower this default risk problem. **Motivation:** As a result of the research work of Altman (1968), researchers have given great attention to the determinants of firms' default risk. Previous studies (Asis *et al.*, 2021; McGuinness *et al.*, 2018) mostly focus on the link between leverage and default risk, our study introduces governance quality and CSR into the debate as new factors that may mitigate default risk of firms. **Idea:** This paper investigates the impact of governance quality on default risk of socially responsible firms from developing countries. **Data:** Governance quality data are obtained from the World Governance Indicators. The firm-level data are obtained from the DataStream databases. We use a total of 466 listed firms from 15 developing countries and cover 2010 to 2017 periods. **Method/Tools:** The two-step system generalized method of moments is applied to mitigate endogeneity problem. **Findings:** Governance quality (i.e., rule of law) has a significant negative impact on firms' default risk in the full sample and three regional sub-samples (i.e., Asia, Africa and Middle-East, and Latin American Countries). The results suggest that strong governance quality appears to minimize bankruptcy costs which lower default risk of socially responsible firms in developing countries. **Contributions:** Unlike prior studies that focus more on the relationship between leverage and default risk and use single country dataset, this study focuses on the impact of governance quality on default risk of socially responsible firms, and thus contributes to an extensive body of theoretical and empirical work that focuses on firms' default risk. Secondly, this paper covers three regions (i.e. Asia, Middle East and Africa, and Latin America regions) to improve the validity and robustness of our conclusion.

Keywords: Default risk, governance quality, international evidence, socially responsible firms, GMM estimation.

JEL Classification: G32, G33

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1. Introduction

Firms going into default are inevitable outcome of an emerging economy (Cathcart *et al.*, 2020). An economy that can channel financial resources to better uses after facing adverse economic shocks has major implications for speedy recovery and efficient performance (Bernstein *et al.*, 2019). As countries rely on courts to address default problem, strong country-level governance (hence forth governance quality) could play a major role in allocating resources of defaulting firms. This default risk problem is more prevalent during the recent covid-19 pandemic era, stopping economic activity, hurting firms, and exposing them to default risk (Didier *et al.*, 2021). From Latin America to Asia to Africa, the covid-19 pandemic is causing threat of economic crisis leading to default risk.

Moreover, over the years, some developing countries have made efforts to improve governance. But, the problem of weak governance persist in some developing countries (i.e. Asia, Africa & Middle East, and Latin American countries). This problem of weak governance explains why rule of law for example remain ineffective (World Bank Report, 2020). Conversely, strong governance may reduce default risk, especially in this period of coronavirus pandemic which is exposing firms to default risk.

Our focus is also on socially responsible firms because corporate social responsibility is becoming an increasingly important metric for capital markets globally. As firms with high corporate social responsibility (henceforth CSR) performance may potentially lower default risk. CSR includes actions that further some social good beyond the interest of the firms and which is required by law (McWilliams and Siegel, 2001). Although, there are growing theoretical and empirical research that focus on the impact of CSR on firm performance (e.g., Benlemlih *et al.*, 2018) and the impact of CSR on debt maturity (Benlemlih, 2017); research on the impact of CSR on default risk is limited.

Despite the importance of the governance quality and CSR, empirical evidence focusing on the following main questions are scarce. For example, how does the governance quality affect firms' default risk? How does CSR affect default risk? Are there different effects of governance quality and CSR on default risk in Asian, Latin American, and African and Middle East countries? To answer these research questions, we must address the issue of weak governance quality that is one of the factors that encourages firms to misallocate financial resources which in turn may increase default risk. Likewise, we must address the issue of investment in CSR whether such investment may lower default risk of firms.

We find that governance quality (i.e. rule of law) has a significant negative impact on default risk. Specifically, governance quality negatively impact firms' default risk in the full sample and the three regional subsamples (i.e. the Asian, Latin American, and Africa & Middle East countries). Moreover, CSR has significant negative effect on default risk in the full sample and the Latin American and Asian sub-samples. But, CSR has insignificant impact on default risk in the Africa and Middle East sub-sample. Additionally, the lagged default probability is statistically significant indicating that previous year default risk affects the current year default risk; this confirms the relevance of dynamic model to conduct this study. The results suggest that strong governance quality minimizes inefficient utilization of financial resources and bankruptcy risk which in turn lower firms' default risk.

This paper makes incremental contribution to the finance literature. Our study is related to Cathcart *et al.* (2020), who investigate the impact of leverage and different sources of funding on default risk and Cui and Kaas (2021), who develop a tractable model in which the credit risk reflects the fundamental default risk and excess premium that captures investors' self-beliefs about credit condition. Our study is also related to Matemilola *et al.* (2019), who investigate the effect of institutional quality on corporate debt ratios. Unlike prior studies above, firstly, this paper focuses on the impact of governance quality on default risk, and thus contributes to an extensive body of theoretical and empirical work that focuses

on firms' default risk. Secondly, this paper covers three regions (i.e. Asia, Middle East and Africa, and Latin America regions) to improve the validity and robustness of our conclusion.

The remainder of the paper is structured as follows. Section 2 develops the theoretical framework, section 3 describes the data and methodology. Section 4 presents the empirical results. Section 5 gives concluding remarks.

2. Literature Review and Hypothesis Development

2.1 Theoretical Review

Weak governance quality in some developing countries encourages misallocation of firms' financial resources (Ağca *et al.*, 2013) which may increase their default risk. Governance shapes financial contracts with respect to banks. Strong governance that protect the rights of creditors improve loan availability, encourage lenders to provide reasonable debt capital to firms (Qian and Strahan, 2007), and strong governance could lower default risk.

Theoretically, in a perfect market, governance quality should not affect economic outcomes such as default risk. However, in the presence of market imperfections such as bankruptcy risk, asymmetric information, and agency conflict, financial resources may be used inefficiently; thus, governance quality become important. For instance, conflicts of interests between managers and shareholders, bondholders and shareholders, and information asymmetry may lead to inefficient allocation and utilization of firms' financial resources (Ivashina *et al.*, 2016; Aghion *et al.*, 1992).

Moreover, in the event of market imperfection, financial resources may be misallocated, especially if they are specific to the firms (Gavazza, 2011). In this paper, we argue that all else constant, strong governance quality minimizes inefficient utilization of financial resources and bankruptcy costs which in turn lower firms default risk in developing countries. Therefore, we hypothesized (H_1) that governance quality would reduce default risk of firms in developing countries.

2.2 Leverage and Default Risk

As a result of the research work of Altman (1968), researchers have given great attention to the determinants of firms' default risk. Tradeoff theory argues that firms' optimal leverage ratio depends on the trade-off between the benefits and costs of debt financing (Myers, 1984). Attaoui and Poncet (2013) contend that a small increase in the proportion of the firms' debt could increase their default. Motivated by default risk problem caused by recession or economic down turn, Cui and Kaas (2021) develop a tractable model in which the credit risk reflects default risk, and excess premium that captures investors' self-beliefs about credit condition of the United States for the 1982 to 2016 periods. Their findings reveal that credit risk and leverage increase default risk.

Likewise, Asis *et al.* (2021) research is also motivated by rising default risk in emerging markets. They use a cross-country data of firms' default to develop distress risk model specific to emerging markets. Asis *et al.* (2021) findings indicate that global financial variables predict firms' default risk in 26 emerging markets over the 1990 to 2016 periods. Motivated by the incomplete knowledge of the true model behind firm default risk, Traczynski (2017) develop a predictive model of default risk. Traczynski (2017) research work reveals that leverage is one of the most important risk factors that increase default risk across all industry sectors in the United States from 1987 to 2008. He concludes that leverage plays a central role in standard credit risk models used in academia and in industry.

McGuinness *et al.* (2018) research is motivated by the 2008 financial crisis, and the subsequent economic downturn, which led to an increase in firm exits due to bankruptcy problem. McGuinness *et al.* (2018) research findings show that leverage increase default risk of small and midium enterprises firms in 13 European countries over the 2003 to 2012

periods. Unlike previous studies discussed above that mostly focus on the link between leverage and default risk, our study introduces governance quality as new factor that impacts default risk. In this study, we argue that holding other factors constant, strong governance quality minimizes inefficient utilization of firms' financial resources and bankruptcy costs which in turn lower their default risk.

2.3 CSR and Default Risk

The literature on the default risk notes that firms' probability of default is linked with its future cash flows (Sun and Cui, 2014). If firms' future cash flow decreases due to decrease in sales, there may be a shortfall in their cash flows; hence an increase in the firms default risk (Chava and Purnanandam, 2008). Based on the stakeholder theory, firms active CSR participation maximizes the shareholders' wealth in the long-term (Jiraporn *et al.*, 2014). Socially responsible firms that cater for various stakeholders' needs usually enjoy high stock performance (Jiao, 2010) and lower costs of financing (El Ghouli *et al.*, 2011). This good relationship with various stakeholders helps firms to enjoy high customer loyalty and employee support which increase financial performance and lower default risk (Du *et al.*, 2017; McGuire *et al.*, 1988).

3. Model and Data

3.1 Empirical Model and Estimation Strategy

We specify a dynamic panel model as shown below because previous year default may affect current year default (Khan and Ahmad, 2021). Moreover, causality can go from default risk to governance quality, not vice versa.

$$DR_{ij,t} = (1 - \lambda)DR_{ij,t-1} + \lambda(\beta_1 + \beta_2 RULAW_{ij,t} + \beta_3 LEV_{ij,t} + \beta_4 CSR_{ij,t} + \beta_5 Size_{ij,t} + \beta_6 FIA_{ij,t} + \beta_7 PRF_{ij,t} + \beta_8 MB_{ij,t} + \beta_9 NoDTS_{ij,t} + \eta_i + \alpha_t + \varepsilon_{ij,t}) \quad (1)$$

Where $DR_{ij,t}$ is the default risk in current year, $DR_{ij,t-1}$ is the default risk in the previous year, λ is the adjustment parameter, α_t is the year fixed effects that captures time varying macroeconomic variables such as interest rate and gross domestic product growth rate, β is the parameter to be estimated, η_i is the unobserved firm-specific effects, and ε is the residual term. Subscript ij,t represents the firm, country, and year, respectively.

In the analysis, our empirical strategy addresses potential endogeneity of the default risk and governance quality by employing the Blundell and Bond (1998) and Arellano and Bond (1991) generalized method of moment's (GMM) instrumental variables strategy that uses internal instruments such as higher order lags of the default risk variable and the independent variables. The paper specifies a dynamic panel model to capture the dynamic relationship between default risk and governance quality because previous year default risk may affect the current year default risk and causality can go from default risk to governance quality, not vice versa. We rely on the two-step estimates because this method uses the first-step errors to construct heteroskedasticity-consistent standard errors or optimal weighting matrices (Blundell and Bond, 1998). Our empirical strategy follows a growing thread of literature that takes advantage of the GMM internal instrumental variable estimation technique to mitigate endogeneity (Khan and Ahmad, 2021; Matemilola *et al.*, 2019; McGuinness *et al.*, 2018; Awartani *et al.*, 2016).

3.2 Sample and Data

In this section, we describe our data set of default risk and governance quality which is the major variable of interest in the dynamic panel model estimation.

The dependent variable for the study is the default risk. Assessing the probability that a debtor may default his obligations at maturity is of paramount importance to creditors (Galil and Gilat, 2019; Irwin and Irwin, 2013), therefore default risk is an issue of much concern. This study uses the Altman (1968) z-score model as a proxy for the probability of default. In the first stage, the Altman (1968) z-score model is adopted to calculate the firm default risk.

We follow previous studies (e.g. Awartani *et al.*, 2016; Charalambakis and Garret, 2016) that used z-score model. The lower the calculated z-score the higher the probability that the firm will default. In the second stage, the paper uses the calculated z-score from the first stage as dependent variable, and investigate the impact of governance quality on default risk. Governance quality is the main independent variable and it is obtained from the World Governance Indicators database of the World Bank. This governance quality data set is based on information gathered through cross-country surveys and expert polls. Kaufmann *et al.* (2009) apply unobserved components model, which allow them to measure governance quality for many countries. As a measure of governance quality, we use rule of law because it appropriately captures the legal aspect of governance which is the focus of this study. Other firm-specific data used as control variables are obtained from the Thomson Reuters Datastream database.

Our sample selection was mainly based on those firms that engage in corporate social responsibility (CSR) and with complete data for the study period (i.e. 2010-2017). CSR is becoming an increasingly important metric for capital markets. As firms with high CSR performance could have the potential to lower default risk and resilient in period of economic uncertainty, as we are currently experiencing now. Additionally, the study excludes firms in the financial industry because they are heavily regulated and they have different financial statements. Also, we exclude firms with incomplete data to calculate the default risk. After all these exclusion, the final sample comprise of 466 firms engaging in CSR activities from 15 developing countries. The study utilizes firm-level variables that are commonly used by researchers in capital structure based on the trade-off theory.

Table 1: Definition of variables

Variables	Unit of Measurement
DR	Altman (1968) z-score model $Z = 1.2X_1 + 1.4X_2 + 3.3X_3 + 0.64X_4 + 1.05X_5$ Z = overall index; X_1 = working capital/total assets; X_2 = retained earnings/total assets; X_3 = earnings before interest and taxes/total assets; X_4 = market value of equity/market value of total liabilities; X_5 = sales/total assets.
CSR	ESG score calculated from Thomson Reuters DataStream
RULAW	Perceptions of the extent to which agents have confidence and abide by society rules (ranges from 0 to 100)
LEV	The ratio of total book debt of the firm to total book value of assets.
SIZE	The natural logarithm of total assets.
FIA	The ratio of property, plant and equipment (net) to total assets.
PRF	The ratio of earnings before interest, taxes, depreciation and amortization to total assets.
MB	The ratio of market value of equities + total debts to total assets
NoDTS	The ratio of depreciation to total assets

4. Results

Table 2 contains the descriptive statistics data of the study. The descriptive statistics reveal that the RULAW variable has the highest mean (52.65) followed by CSR with the second highest mean (48.85) which indicate the average values of the mean for the developing countries in the study sample. Moreover, the mean value of the RULAW falls between the minimum value (29.33) and maximum value (88.73). Conversely, fixed assets (FIA) has the lowest standard deviation with value of 0.25 followed by market-to-book ratio - MB (0.32) which suggest that they are the least volatile variable. Table 3 presents the correlation

results. The correlation coefficients among the independent variables are generally lower. Thus, there is less risk of multicollinearity among the independent variables. Moreover, rule of law (RULAW) is negatively correlated with default risk (-0.10) and statistically significant at 0.01 significance level indicating that as rule of law increases, default risk decreases. Conversely, leverage is positively correlated with default risk (0.09) and statistically significant at 0.05 significance level indicating that as leverage increases, default risk increases.

Table 2: Descriptive statistics results

	DR	CSR	RULAW	LEV	SIZE	FIA	PRF	MB	NoDTS
MEAN	1.65	48.85	52.65	0.27	18.09	0.37	0.16	0.31	0.42
MAX.	9.79	333.76	88.73	1.00	26.39	0.99	76.91	8.58	0.47
MIN.	-9.33	0.01	29.33	0.00	9.33	0.05	-15.84	0.01	0.00
SD	1.28	17.83	11.85	0.26	2.49	0.25	1.60	0.32	0.37
OBSERV.	3,968	3,968	3968	3,968	3,968	3,968	3,968	3,968	3,968

Table 3: Correlation results

	DR	LEV	Rulaw	CSR	SIZE	FIA	PRF	MB	Nodts
DR	1.00								
Lev	0.09**	1.00							
Rulaw	-0.10***	0.05**	1.00						
CSR	0.04**	0.04**	0.08***	1.00					
SIZE	0.07***	0.05	0.12***	0.12***	1.00				
FIA	0.03*	0.01	-0.05**	0.10***	0.20***	1.00			
PRF	0.11***	-0.02	0.15***	0.09***	0.02	-0.01	1.00		
MB	-0.40***	-0.06***	0.02	-0.03*	0.02	0.07***	-0.11***	1.00	
Nodts	-0.98***	-0.02	0.01	-0.02	-0.07***	0.01	-0.13***	0.40***	1.00

Notes: ***, **, and * signifies the significance levels at 1%, 5% and 10%, respectively.

The two-step system GMM is the main estimation results while the difference GMM is used as a robustness tests. The findings reveal that governance quality (i.e. rule of law) is significantly and negatively related to default risk in the full sample (see Table 4) and the three regional sub-samples (see Tables 5, 6, and 7). The significant negative impact of the governance quality on default risk is in line with Cathcart *et al.*, (2020), who investigate the impact of leverage and different sources of funding on default risk and find evidence that leverage increases default risk. As control variable, CSR is significantly and negatively related to default risk in the full sample (see Table 4) and the Latin American and Asian sub-samples (see Tables 5 and 6). But, CSR has insignificant impact on default risk in the Africa and Middle East sub-sample (see Table 7). The significant negative impact of CSR on default risk is in accordance with prior research (e.g. Hannah *et al.*, 2021; Ting, 2021; Fatemi *et al.*, 2018) findings that CSR has the ability to help build strong corporate image and reputation; thus it effectively enhance firms' performance. Additionally, the lagged default probability is statistically significant indicating that previous year default risk affects the current year default risk; this confirms the relevance of dynamic model to conduct this study.

Overall, the results suggest that all else constant, strong governance quality minimizes inefficient utilization of financial resources and bankruptcy costs which in turn lower default risk. Moreover, engaging in CSR activities enhance firms reputation and ease access to alternative sources of capital which lower debt usage, thereby lowering default risk. High CSR participation by firms is also found to create intangible assets such as good relationship with employees and customer loyalty (Bouslah *et al.*, 2016). These intangible assets would

reduce firms' default risk through decreasing penalties and fines, thereby lowering default risk.

Table 4: Results for the full sample

Variables	(1) DGMM One step (Robust)	(2) DGMM Two step (Robust)	(3) SGMM One step (Robust)	(4) SGMM Two step (Main)
L.DR	0.205*** (0.0480)	0.178*** (0.0295)	0.811*** (0.0267)	0.806*** (0.0083)
RULAW	-0.029** (0.0131)	-0.016*** (0.0050)	-0.033*** (0.0021)	-0.036*** (0.0080)
CSR	-0.009** (0.0038)	-0.007** (0.0028)	-0.010** (0.005)	-0.008** (0.0016)
LEV	2.715*** (0.4820)	2.654*** (0.3450)	1.472*** (0.3740)	1.454*** (0.0692)
FIA	0.518*** (0.113)	0.525*** (0.0651)	-0.085** (0.0432)	-0.111*** (0.0115)
PRF	3.101*** (0.4220)	3.002*** (0.1950)	0.012 (0.0355)	-0.002 (0.0149)
NoDTS	6.694*** (1.9910)	8.277*** (1.7780)	3.056** (1.3730)	3.721*** (0.4220)
MB	0.660*** (0.1580)	0.664*** (0.0311)	0.263 (0.2350)	0.255*** (0.0057)
SIZE	-0.455*** (0.0840)	-0.385*** (0.0742)	0.0189* (0.0099)	0.016*** (0.0027)
Year effects	Yes	Yes	Yes	Yes
Country effects	Yes	Yes	Yes	Yes
Observations	3,744	3,744	3,744	3,744
Number of firms	468	468	468	468
Number of instruments	69	69	123	123
AR2	0.530	0.296	-	0.886
Hansen / Difference Tests	Hansen 0.413	0.282	0.379	0.256

Notes: DR = Altman (1968) z-score mode where $Z = 1.2X_1 + 1.4X_2 + 3.3X_3 + 0.64X_4 + 1.05X_5$. CSR = ESG score calculated from Thomson Reuters DataStream database. Rule of Law (RULAW): reflects perceptions of the extent to which agents have confidence and abide by society rules (ranges from 0 to 100). The numbers in parenthesis are standard errors, except AR2 which are p-values. AR2 tests for the second order serial correlation. If the p-value >0.05, it indicates absence of no serial correlation signifying that the model is correctly specified. ***, **, and * signifies the significance levels at 1%, 5%, and 10%, respectively.

Table 5: Results for Latin America

Variables	(1) DGMM One step (Robust)	(2) DGMM Two step (Robust)	(3) SGMM One step (Robust)	(4) SGMM Two step (Main)
L.DR	-0.197*** (0.0691)	-0.165*** (0.0119)	0.448*** (0.0432)	0.443*** (0.0051)
LEV	0.764*** (0.1980)	0.606*** (0.0874)	0.056** (0.0280)	0.066*** (0.0131)
RULAW	-0.271** (0.1290)	-0.395*** (0.1310)	-0.976*** (0.2700)	-0.976*** (0.0341)
CSR	-0.030** (0.0132)	-0.014** (0.0066)	-0.053*** (0.0071)	-0.053*** (0.0014)
FIA	2.144 (2.2650)	1.397** (0.5660)	3.197*** (0.5960)	3.137*** (0.1090)
NoDTS	0.367** (0.1630)	0.369*** (0.0410)	0.137 (0.0870)	0.143*** (0.0089)
MB	-1.051** (0.4750)	-1.115*** (0.1340)	-0.285 (0.2080)	-0.299*** (0.0236)
SIZE	0.368** (0.1480)	0.303*** (0.0502)	-0.183*** (0.0228)	-0.182*** (0.0035)
PRF	-0.015 (0.0143)	-0.0133*** (0.0018)	0.009 (0.0120)	0.0089*** (0.0003)
Year effects	Yes	Yes	Yes	Yes
Country effect	Yes	Yes	Yes	Yes
Observations	856	856	856	856
Number of firms	107	107	107	107
Number of instruments	59	59	101	101
AR2	0.251	0.328	-	0.692
Hansen / Difference Hansen Test	0.325	0.240	0.351	0.465

Notes: DR = Altman (1968) z-score mode where $Z = 1.2X_1 + 1.4X_2 + 3.3X_3 + 0.64X_4 + 1.05X_5$, CSR = ESG score calculated from Thomson Reuters DataStream database. Rule of Law (RULAW): reflects perceptions of the extent to which agents have confidence and abide by society rules (ranges from 0 to 100). The numbers in parenthesis are standard errors, except AR2 which are p-values. AR2 tests for the second order serial correlation. If the p-value >0.05, it indicates absence of no serial correlation signifying that the model is correctly specified. ***, **, and * signifies the significance levels at 1%, 5% and 10%, respectively.

Table 6: Results for Asian Region

Variables	(1) DGMM One step (Robust)	(2) DGMM Two step (Robust)	(3) SGMM One step (Robust)	(4) SGMM Two step (Main)
L.DR	0.362*** (0.0809)	0.361*** (0.0208)	0.962*** (0.0236)	0.973*** (0.0098)
RULAW	-0.134*** (0.0321)	-0.125*** (0.0331)	-0.050*** (0.0195)	-0.044*** (0.0102)
CSR	-0.003*** (0.0010)	-0.003*** (0.0009)	-0.002** (0.0008)	-0.002** (0.0009)
LEV	0.066** (0.0297)	0.064*** (0.0058)	0.017 (0.0212)	0.017*** (0.0038)
FIA	0.196*** (0.0652)	0.189*** (0.0153)	0.108*** (0.0370)	0.117*** (0.0151)
PRF	0.190*** (0.0295)	0.174*** (0.0003)	0.053*** (0.0071)	0.050*** (0.0039)
NoDTS	4.124** (1.7270)	4.404*** (1.3770)	2.387** (0.9450)	1.703** (0.7430)
MB	0.388*** (0.1440)	0.335*** (0.0512)	0.262 (0.1600)	0.260*** (0.0842)
SIZE	-0.384*** (0.1050)	-0.406*** (0.0370)	-0.005 (0.0077)	-0.006** (0.0028)
Year effects	Yes	Yes	Yes	Yes
Country effects	Yes	Yes	Yes	Yes
Observations	1,984	1,984	1,984	1,984
Number of firms	248	248	248	248
Number of instruments	64	64	112	112
AR2	0.101	0.123	-	0.258
Hansen/ Difference Hansen Tests	0.299	0.682	0.310	0.690

Notes: DR = Altman (1968) z-score mode where $Z = 1.2X_1 + 1.4X_2 + 3.3X_3 + 0.64X_4 + 1.05X_5$, CSR = ESG score calculated from Thomson Reuters DataStream database. Rule of Law (RULAW): reflects perceptions of the extent to which agents have confidence and abide by society rules (ranges from 0 to 100). The numbers in parenthesis are standard errors, except AR2 which are p-values. AR2 tests for the second order serial correlation. If the p-value > 0.05, it indicates absence of no serial correlation signifying that the model is correctly specified. *** and **, signifies the significance levels at 1%, and 5%, respectively.

Table 7: Results for Africa and Middle East Region

Variables	(1) DGM One step (Robust)	(2) DGM Two step (Robust)	(3) SGMM One step (Robust)	(4) SGMM Two step (Main)
LDR	0.288*** (0.0806)	0.229*** (0.0594)	0.724*** (0.0465)	0.738*** (0.0290)
RULAW	-0.046** (0.0214)	-0.041*** (0.0094)	-0.0627* (0.0347)	-0.049*** (0.0125)
CSR	0.022 (0.0920)	0.031 (0.0454)	0.015 (0.0955)	0.001 (0.0309)
LEV	0.019*** (0.0214)	0.454** (0.0094)	1.377*** (0.0347)	1.480*** (0.0125)
FIA	0.683*** (0.2210)	0.738*** (0.0878)	0.016 (0.0640)	0.006 (0.0294)
PRF	-0.077 (0.0788)	-0.139*** (0.0476)	0.180*** (0.0543)	0.178*** (0.0216)
NoDTS	0.361** (0.1629)	0.359*** (0.0408)	0.131 (0.0855)	0.139*** (0.0080)
MB	-0.288 (0.6210)	-0.790 (0.5860)	-1.688*** (0.3650)	-1.809*** (0.1370)
SIZE	-0.570*** (0.0891)	-0.575*** (0.0901)	0.031 (0.0268)	0.032*** (0.0093)
Year effects	Yes	Yes	Yes	Yes
Country effects	Yes	Yes	Yes	Yes
Observations	904	904	904	904
Number of firm	113	113	113	113
Number of instruments	36	36	54	54
AR2	0.859	0.849	-	0.558
Hansen / Difference Hansen Tests	0.201	0.253	0.258	0.242

Notes: DR = Altman (1968) z-score model where $Z = 1.2X_1 + 1.4X_2 + 3.3X_3 + 0.64X_4 + 1.05X_5$, CSR = ESG score calculated from Thomson Reuters DataStream database. Rule of Law (RULAW): reflects perceptions of the extent to which agents have confidence and abide by society rules (ranges from 0 to 100). The numbers in parenthesis are standard errors, except AR2 which are p-values. AR2 tests for the second order serial correlation. If the p-value >0.05, it indicates absence of no serial correlation signifying that the model is correctly specified. ***, **, and * signifies the significance levels at 1%, 5% and 10%, respectively.

4. Conclusion

Over the years countries have embraced good governance but little is known whether good governance impacts default risk. The findings from the full sample show that governance quality reduces default risk of socially responsible firms in developing countries. Moreover, governance quality reduces default risk of socially responsible firms in the three regional sub-samples (i.e. Asian, Latin American, and Africa and Middle-East regions). Moreover, CSR has significant negative effect on default risk in the full sample and the Latin American and Asian sub-samples. But, CSR has insignificant impact on default risk in the Africa and Middle East sub-sample.

The finding of this research has some significant implications for managers, investors, and policymakers. Firstly, the results inform firm-managers that strong governance quality would minimize bankruptcy risk, thereby lowering default risk. Secondly, investors are informed to take governance quality into consideration when taking the decision to invest their hard-earned money as it lowers default risk. As default risk becomes lower, investors' investment would be secured. Third, the results inform policymakers to continue to strengthen governance quality. A strong governance quality minimizes inefficient utilization of financial resources. Moreover, the fear that courts would uphold rule of law make firms more prudent in managing their financial resources which in turn help lower default risk.

Additionally, managers are informed that investments in CSR may lower default risk of firms. Investors are also informed that investments in CSR lowers default risk and enhance the value of their investment in firms, especially in Asian and Latin American regions.

This research has shed light on how good governance quality at the country-level can help reduce default risk in developing countries. An avenue for future research is to disentangle the impact of legal enforcement on default risk as data becomes available. Another avenue for future research is to examine the impact of different dimension of governance quality on cost of capital and other financial performance variables.

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Appendix**Appendix A: Sample breakdown by country and firm**

No.	Country	Number of firms	Cumulative Number of Firms
1.	Brazil	56	56
2.	Chile	14	70
3.	China	54	124
4.	Colombia	10	134
5.	Egypt	14	148
6.	India	70	218
7.	Indonesia	29	247
8.	Malaysia	40	287
9.	Mexico	24	311
10.	Philippines	19	330
11.	Kuwait	11	341
12.	Qatar	12	353
13.	Saudi Arabia	12	365
14.	South Africa	77	442
15.	Thailand	24	466

Notes: This table presents the sample distribution by country and the number of firms for each country. Firms in the finance sectors (e.g. banks and insurance) are not included because their financial statements are different and they are regulated by the government.

An Empirical Study on Co-Integration and Causality Among GCC Stock Markets

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Abstract: Research Question: This research attempts to explain the integration hypothesis in both short term and long term causal relationship in the Gulf Cooperation Council countries (GCC) stock markets. **Motivation:** GCC comprises some of the fastest growing economies in the world, mainly due to an increase in oil and natural gas revenues coupled with a construction and investment boom backed by reserves. Though being significant West Asian economies, studies of their stock markets have limited presence in academic literature. Hence, an attempt is made to establish interdependency among six GCC economies as not only they are culturally similar but also their energy dependency is unique geographically. The current study extends the work of Hysaj and Sevil (2021), Matar *et al.* (2021), Assraf (2003), to incorporate daily movement in the stock markets of these countries especially during the low international crude oil price environment. **Idea:** The objective is to establish cointegration and dependency among six GCC stock markets. **Data:** The data set for this study is the official daily market index levels of the Tadawul All Share (TASI) (Saudi Arabia), the Kuwait stock Exchange (Kuwait), the Bahrain Stock Exchange (Bahrain), the Muscat Stock Exchange (Oman), and the Dubai Financial Market (UAE) from 25th January 2011 to 25th January 2018 (1738 observations) collected from individual stock market's website. **Method/Tools:** Unit root test and co-integration test are applied to assess the dependency among the time series data. In order to test the existence of relationship among the GCC markets, Vector Error Correction Model (VECM), impulse response function and variance decomposition are applied. **Findings:** The results obtained establish long run linkages among all the stock markets of GCC and asymmetric short run causality among the six markets. **Contributions:** This study will help in extending the prevailing literature on integration in various ways and directions particularly from daily movement of stock market indices. This study will also enrich the sparse literature on GCC stock markets and their causal linkages.

Keywords: Co-integration, GCC stock markets, causality, VECM.

JEL Classification: C12, C32

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1. Introduction

The Middle Eastern economies have always attracted the global attention due to their accelerated development, geographical advantage, and strategic importance of biofuels. These economies being predominantly oil driven economies have been buoyant due to continuous demand for biofuel across the globe. The financial world of these countries has also maintained its pace with the rapid development. In a short time, these markets of Gulf Cooperation Countries (GCC) have rapidly progressed to match with the established global markets. These markets not only provide avenues for portfolio diversification, but also have emerged as financial hubs which provide opportunities for traders and investors. Among academicians and practitioners, there is always an urge to understand the functioning of new markets and systems. Financial market integration is an intriguing subject recently, however, a world where greater integration is attained, poses a challenge for the investors to achieve diversification in their portfolio. There is evidence in the past that market co-movements have led to contagion effect and the financial crisis of 2008 is a classic example. Nevertheless, it was financial crisis which prompted interest in investigating linkages among prominent global markets.

There have been many researches undertaken to address the phenomenon of co-integration not only theoretically but also empirically in leading global markets of the world. Cheung and Mak (1992), derived from the weekly return series of the Asian—Pacific emerging markets, the causal relationship between these markets and the two developed markets, US and Japan for the years 1977 through 1988. They found that the US market can be considered as a ‘global factor’ and is found to lead most of the Asian—Pacific emerging markets apart from three relatively closed markets: Korea, Taiwan and Thailand. The Japanese market is found to have a less influence on the Asian—Pacific emerging markets. Arshanapalli and Doukas (1993) used developments in the theory of co-integration to provide new methods of testing the linkage and dynamic interactions among stock market movements. Their results showed that the degree of international co-movements among stock price indices has increased substantially. Sheng and Tu (2000) conducted a study of co-integration and variance decomposition among national equity indices before and during the period of the Asian financial crisis. Their study demonstrated evidence in support of the existence of co-integration relationships among the national stock indices during financial crisis, however no co-integration was observed before the financial crisis. Similarly, Yousaf *et al.* (2020) confirmed long run association between the Brazil, Russia, India, China and South Africa (BRICS) stock market using asymmetric co-integration analysis. Their research indicated that the speed of adjustment for Indian and South African stock markets is higher for positive shocks, while the relationship between the stock markets pair of Russia and South Africa is linear.

Click and Plummer (2005) considered the degree to which the five stock markets in the original Association of Southeast Asian Nations countries (ASEAN-5) are correlated as a way to assess the feasibility of policy initiatives to enhance ASEAN stock market integration and the implications for portfolio investors. Their results suggest that ASEAN’s five stock markets are integrated in the economic sense, but that integration is far from complete. Wang *et al.* (2003), examines long-run relationships and short-run dynamic causal linkages among the five largest emerging African stock markets and the US market, with particular attention to the 1997–1998 global emerging market crisis. The results derived show that both long-run relationships and short-run causal linkages between these markets were substantially weakened after the crisis. Fraser and Oyefeso (2005) studied the long-run convergence between US, UK and seven European stock markets and found evidence to suggest that while real short-run diversification gains may occur, in general they tend to be short-lived.

Post financial crisis, major stock markets of the world crashed and consequently, the study of cointegration among prominent or regional markets gained attention among researchers and practitioners. Financial crisis had significant impact on the stock markets particularly with respect to regional integration and resulted in reduction of speed of convergence (Caporale *et al.*, 2019). However, varied effect of integration among various industry and geographies at sectorial level was observed. Consequently, it became important to assess the sectorial risk spillovers and their linkages to stock market as their effect would be time-varying (Wu *et al.*, 2019).

Regional convergence studies emerged during post financial crisis period indicate that macro-economic shocks cause sudden movements in stock markets. However, whether such shocks in one market create a contagion effect on regional and prominent markets is an intriguing area of study. Al-Yahyaee *et al.* (2019) proved that US markets are known to spread the contagion on the regional markets of European countries. However, their study restricts causality of spread of shocks to European stock markets to fall of Lehman Brothers as major European economies had high exposures in the company. On the contrary, Lee (2019) showed that Asian economies have different trend regarding their integration in stock market index movement and the major economies shocks spilled over the other regional stock markets (Lee, 2019). This study suggests that Chinese stock market had been an outlier and was not in sync with any other major Asian financial markets. Similar findings were suggested by Wu (2020) that stock market integration in East and Southeast Asia is not as strong as it looks. However, other Asian stock economies showed long run integration over period of time (Mohti *et al.*, 2019). The Indian stock market showed co-integration with twenty-two stock indices from America and Europe over a period of forty-one months (Joshi *et al.*, 2021). While in case of West African countries, weak interdependence among the stock markets was revealed on one hand and interdependence was discovered in the financial markets through the Nigerian market (Emenike, 2020). In case of emerging and developing countries implementing inflation control measures, it was discovered that the Brazilian and Czech indices are not co-integrated with other markets whereas the Columbian stock exchange has co-integration relationship with other indices (Hysaj and Sevil, 2021).

Regarding the Middle East markets, Bahloul and Amor (2021) indicated that the impact of local macroeconomic and global factors differs across the twelve countries of Middle East and North Africa (MENA). Using ordinary least squares and quantile regressions the study revealed weak integration among the stock markets of MENA countries. Matar *et al.* (2021) discovered a definite co-movement between the United States' stock market and the six GCC stock markets in the long run while displaying signs of the significant disparity between the co-movements of the stock markets throughout the scales of time during economic decline. The results derived were based on wavelet coherence method and the Dynamic Conditional Correlation GARCH (DCC-GARCH). Assaf (2003) investigated the dynamic interactions among returns from six GCC countries using vector autoregressive analysis. The research reveals substantial evidence of substantial of interdependence and feedback effects among GCC stock markets. However, this study focused on weekly averaged data and did not highlight the long run and short run causality and dependency of Muscat Securities Exchange (MSX) on other GCC markets.

Besides being economically dependent on hydrocarbons, these countries share a common geography, culture, and religious faith. Over a period, these markets have emerged as an important constituent of the world economy. GCC stock markets have been an integral part in achieving portfolio diversification and hedging for international fund managers. This resulted into extraordinary growth in flow of international funds, which lead into increased the market capitalization in these countries. The governments of this region realized the

importance of unifying the gains of stock market integration and promoted cross border listing of domestic companies. They have initiated major financial reforms with an objective to regulate and liberalize financial markets across the region.

Post global crisis of 2008, these countries witnessed similar impact on their economies in the form of collapse in real estate sector, credit constraints and economic contraction (Salah, 2010). In addition to economic uncertainty, these countries witnessed political crisis triggered by Arab Spring of 2010. The fall in the crude oil prices of 2014 had downturn effect on economies of these GCC countries. These economic uncertainties spilled over its effect on their stock markets as well. All these major economic shocks were experienced from 2011 to 2018. However, these shocks had varied effects on these countries. As observed in previous literature the stock markets of GCC countries have shown substantial interdependence (Assaf, 2003), it would be interesting to study these stock markets considering the recent economic shocks.

This research also aims to extend the existing literature related to stock markets of GCC. The reader will understand dynamics of GCC stock markets for a period of seven years from 2011 to 2018. In addition, the readers will understand the interdependency and direction of movement of these stock markets. In spite of being a prominent player at the global economic stage, few research studies have attempted to observe the relationship among these stock markets. Consequently, this study intends to add to emergent literature by probing the integration hypothesis, examining, and establishing dynamic causal linkage among the stock markets of GCC.

The paper is divided in four sections. The first section includes background of the study, followed by a brief on some empirical studies conducted in the past to assess the gap in existing literature. The second section, then explains the methodology applied for the current study. Section three contains description of data, data analysis, interpretations, and key findings. The last section is the concluding section.

2. Methodology

It has been evident from past studies that the relationship among macro-economic variables is difficult to establish because economic theory is not rich enough to explain time series dynamism. This challenge limits the power of estimates and draws serious questions on the inferences derived. Hence, such difficulties lead to application of non-structured approach to model relationships among macro-economic variables and also intend to check flow of causality between variables. An attempt is made to test unit root to check whether time series data is stationary i.e. $I(1)$ at first difference and is not stationary at level. After assessing the stationarity in the time series, lag order selection criterion is assessed. It is extremely important to select an appropriate lag order in any form of auto regressive models. For the current study, focus is on application of Vector Auto Regression (VAR) or Vector Error Correction Model (VECM) to analyse the dynamic impact of random shocks long run relationship between the selected variables. VECM and VAR models are designed to use non-stationary time series that are known to be co-integrated. Co-integration is a phenomenon that may be exhibited by a group of integrated time series showing existence of long run equilibrium. For analysis of six GCC markets, testing of co-integration with the help of Johansen Co-integration test is proposed. The Johansen test, named after Soren Johansen, is a procedure for testing co-integration of variables, say k which is $I(1)$ time series. This test permits more than one co-integrating relationship based on the residuals from a single (estimated) co-integrating equation. There are two types of Johansen test, either with trace statistics or with eigenvalue. However, the inferences drawn from these two tests may slightly differ. For better understanding, trace statistics values will be given priority for the current analysis.

Consider a simple example, where series $x_{1,t}, \dots, x_{m,t}$ are individually $I(1)$ integrated of order 1 and there exists a linear combination $y_t = \beta_1 x_{1,t} + \dots + \beta_m x_{m,t} + u_t$ that is $I(0)$ (stationary), then phenomenon of co-integration is established, and the group of series $x_{1,t}, \dots, x_{m,t}$ possess co-integration. If no linear combination is $I(0)$, then there is no co-integration and the series taken together is not co-integrated. However, if the nonlinearity exist among the series at individual level, they are integrated at order 1, $I(1)$, and hence error correction model (ECM) can be used. ECM combines the long run equilibrium with short run shocks to attain equilibrium. As more than one variable has been considered in this study, VECM is used.

VECM is a model that can be used for modelling co-integrated time series. A very simple example is a bivariate VECM with no lags for two integrated and co-integrated time series $x_{1,t}$ and $x_{2,t}$.

$$\Delta x_{1,t} = \alpha_1 (x_{1,t-1} - \beta x_{2,t-1}) + \varepsilon_{1,t} \quad (1)$$

$$\Delta x_{2,t} = \alpha_2 (x_{1,t-1} - \beta x_{2,t-1}) + \varepsilon_{2,t} \quad (2)$$

It shows that the series $x_{1,t}$ $x_{2,t}$ reacts to the most recent (as of time $t-1$) disequilibrium between itself and the other series and "corrects" (given a suitable value of α_1) to reduce the disequilibrium (moves towards equilibrium). The same could be said about series $x_{2,t}$. The estimation of the equation 1.1 and 1.2 will provide residuals also referred as error correction term (ε). This will be used to check how it connects short term dynamics to long term relations.

Impulse response function and variance decomposition is applied to reassure in assessing and understanding the impact of specific market on MSX. Variance decomposition is applied to specify the quantum of information each variable contributes to the other variables in the auto-regression system of equation. It determines the extent of the forecast error variance of each of the variables can be explained by exogenous shocks to the other variables.

3. Data and Empirical Results

The data used in this study is the daily closing stock market indices of all six GCC countries. The data has been sourced from the websites of these stock markets. The sample data collected ranges from 25th January 2011 to 25th January 2018 (1738 observations). The stock markets of GCC function at different days of the week. Hence, to ensure uniformity in the analysis and to capture the long run causality, a restriction is imposed to select those days of the period, when all six markets were functional. Consequently, those observations when all six markets were not functional simultaneously have not been considered. The details of indices specific to the countries chosen are represented in the following Table 1.

Table 1: Selected countries specific stock market index

Country	Stock Market Index
Sultanate of Oman	Muscat Securities Exchange (MSX 30)
Bahrain	Bahrain All Share (BAX)
Kuwait	Premier Market-Market Cap Weighted PR (BKP)
Qatar	QE General (QSI)
Saudi Arabia	Tadawul All Share (TASI)
United Arab Emirates (UAE)	DFM General (DFMGI)

For selected stock market indices of GCC countries, daily stock market index movement is adjusted to measure the returns generated during the period of study exhibited in Figure 1. The apparent observations derived from the time series of indices reveal that the markets were highly volatile from 2011 to 2018. All the stock indices after 2011, had a fall due to

the impact of financial crisis and decline in the international oil prices. However, the governments' massive support to the economies led to a surge in the overall spirit in the stock market, which led to increase in the movement of indices across all the GCC countries. The markets showed consistent growth in the initial period of 2011. End of 2013 experienced peak movement by all the six stock markets. Bahrain stock index (BAX), Kuwait stock index (BKP) and Oman stock index (MSX) exhibited high level of volatility making new peaks and bottoms during the period of study. However, this growth in stock movement was curtailed by the sudden drop in oil prices in 2014. Major developing economies like China and India manage to control oil demand significantly, resulting in oil price slump thereby triggering stock market crash as seen prominently in the vertical fall of all the six GCC indices. Muscat Securities Exchange (MSX), Kuwait stock index (BKP) and Bahrain stock index (BAX) sustained this fall in oil prices and reverted to upward stock movement. However, Saudi Arabian index (TASI), UAE index (DFMGI), and Qatar index (QSI) could not withstand the crash and failed to show any upward movement after the crash of 2014. In nutshell, all the index movements possessed stochastic trend with not much substantial drift in their overall movement. This can help to proceed with an assumption that there is a strong relationship possible among these markets.

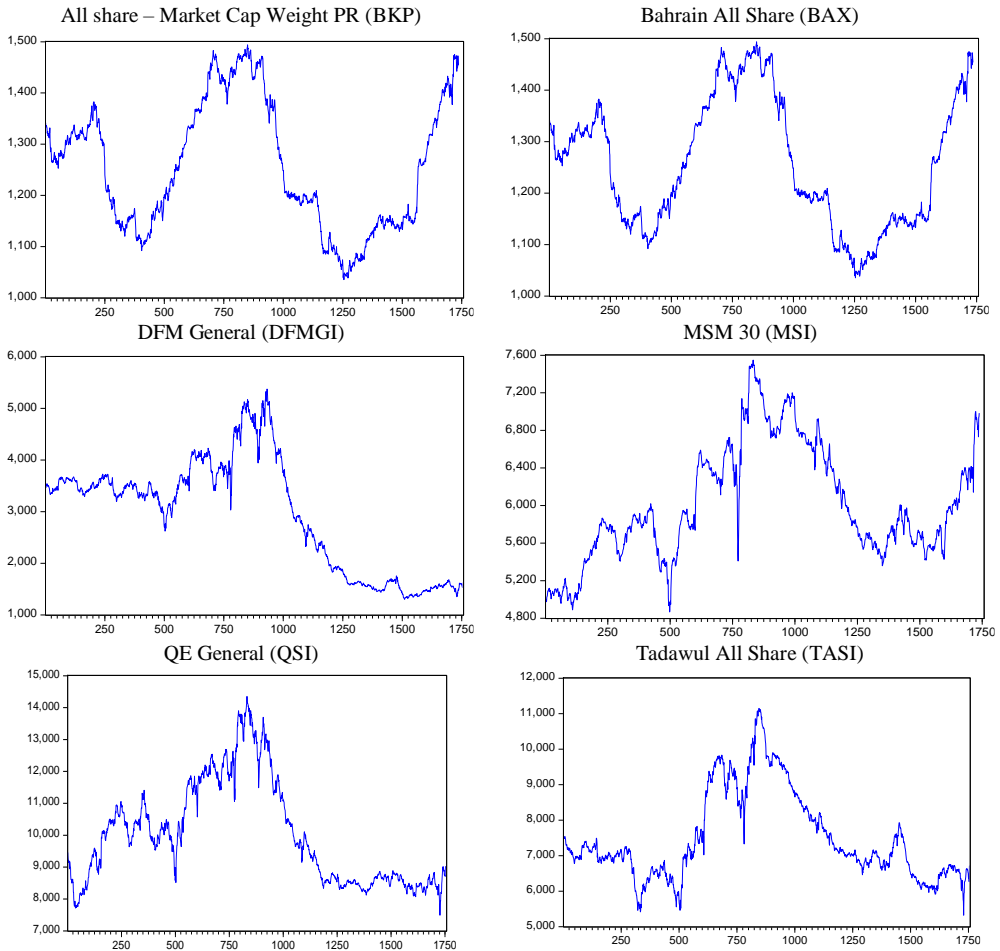


Figure 1: Daily stock index movement of GCC markets

Table 2 depicts descriptive statistics of selected stock returns. An effort is made to explain the dynamics of time series of daily stock returns individually for all the markets. The returns from the stock markets have been calculated using the log transformation process $Y_t = \ln Y_t / \ln Y_{t-1}$, where Y_t is the index at time t and Y_{t-1} is the index at time $t-1$.

Table 2: Descriptive statistics of GCC stock markets index returns

	MSX	DFMGI	BKP	QSI	BAX	TASI
Mean	2.13%	-3.29%	0.57%	0.21%	0.57%	-0.01%
Variance	0.4347	2.07158	0.21544	0.97348	0.21739	1.2672
Skewness	1.1456	0.23044	0.29802	0.60048	0.21887	0.96393
Kurtosis	17.062	7.9754	4.7341	10.2	5.1335	11.029

The summary statistics reveal that during the period, DFMGI and TASI generated negative returns. However, MSX, BKP, QSI and BAX generated positive returns. It is evident from the data represented in Table 2 that MSX with a positive return of 2.13% has outperformed its peers while DFMGI with average negative daily returns is the underperformer in the group. Moreover, DFMGI has the maximum volatility expressed as highest variance as compared to other GCC stock markets. The skewness for all the six markets has been positive. The kurtosis (K) value is positive and greater than zero ($K > 0$) which indicates the distribution of time series of daily index returns is characterized by high peak and flat tails compared to normal distribution. Such distribution is termed as Leptokurtic.

Table 3: Testing of unit root

	ADF Test		PP Test	
	At Level		At Level	
	Constant	Constant & Trend	Constant	Constant & Trend
MSX	-1.814	-1.842	-1.692	-1.693
DFMGI	0.664	0.960	0.666	0.964
BKP	-2.038	-2.277	-2.068	-2.279
TASI	-1.522	-1.537	-1.646	-1.590
BAX	-0.905	-0.740	-1.024	-0.861
QSI	-1.560	-1.918	-1.588	-1.995
	First difference		First difference	
	Constant	Constant & Trend	Constant	Constant & Trend
MSX	-20.46***	-20.46***	-30.28***	-30.27***
DFMGI	-36.75***	-36.76***	-36.74***	-36.74***
BKP	-48.64***	-48.65***	-47.76***	-47.81***
TASI	-39.54***	-39.55***	-39.48***	-39.50***
BAX	-33.18***	-33.18***	-51.82***	-51.86***
QSI	-41.43***	-41.42***	-41.58***	-41.57***

Notes: *** Significance at the 1% level. ** Significance at the 5% level. * Significance at the 10% level. H_0 : Null Hypothesis: Series has a unit root. Number of lags based on AIC criteria are two as daily data is taken for the study. ADF: Augmented Dickey Fuller Test, PP: Phillips-Perron Test. Figures show the test statistics and figures in parenthesis indicate MacKinnon (1996) one-sided p-values. Unit root test is conducted with Constant and Constant & Trend test equation. Bartlett kernel estimation method with Newey-West Bandwidth.

Before testing the existence of linkages among the six GCC stock markets, there is a need to examine the stationarity property in the time series. Table 3 presents the results of unit root test through application of Augmented Dickey-Fuller (ADF) and the Phillips-Perron (PP) tests. ADF tests is applied to examine the null hypothesis that a unit root is present in a time series sample (Fuller, 1976) and PP test is applied to observe problem of

structural breaks in time series, by adopting a non-parametric adjustment (Phillips and Perron, 1988). Both the test analysis reveal that all six markets index data are non-stationary at level and has unit root in the series. Hence, at level, null hypothesis cannot be rejected as the test statistics are not statistically significant. However, at first difference, the series reject the null hypothesis and hence, conclude that series are stationary. Consequently, from the analysis of unit root test, it can be inferred that all the stock market indices series are integrated in order 1 alternatively, $I(1)$.

3.1 Co-integration Analysis

After assessing the stationary property of the data series, co-integration testing using the Johansen Co-integration Test is conducted. However, prior to conduct of the co-integration test, there is a need to select appropriate lags. Hence, appropriate lag order selection criteria test is applied and the results are displayed in Table 4 which indicate four lag criteria. Among the four criteria used, the two Schwarz information criterion (SC) and Hannan-Quinn information criterion (HQ) give consistent lags of two. Therefore, for current Model 2 lags orders have been selected.

Table 4: Lag order selection

Lag	LogL	LR	AIC	SC	HQ
0	-75414.97	NA	87.34334	87.36229	87.35035
1	-50344.77	49937.18	58.35179	58.48443	58.40085
2	-50167.83	351.1992	58.18858	58.43491*	58.27970*
3	-50122.62	89.42773	58.17791	58.53794	58.31109
4	-50057.94	127.5024	58.14469	58.61841	58.31992
5	-50013.19	87.89126	58.13455	58.72197	58.35185
6	-49956.38	111.1871	58.11045	58.81156	58.36980
7	-49913.19	84.22019	58.10213*	58.91694	58.40354
8	-49885.43	53.94577*	58.11167	59.04017	58.45513

Notes: * indicates lag order selected by the criterion. LR: sequential modified LR test statistic (each test at 5% level). AIC: Akaike information criterion. SC: Schwarz information criterion. HQ: Hannan-Quinn information criterion.

Johansen Co-integration Test will help in finding the speed and direction of moving causality among the six GCC markets in long run and short run. The test considers null and alternative hypothesis and the results of Johansen Co-integration Test using maximum likelihood estimation is represented in Table 5.

Table 5: Johansen co-integration test MLE

Null Hypothesis	Trace Statistics	5% value	Critical	Max-Eigen Statistics	5% Critical Value
None*	130.228	95.75		60.306	40.07
At most 1*	69.92	69.81		41.79	33.87
At most 2	28.12	47.85		15.54	27.58
At most 3	12.58	29.79		8.27	21.13
At most 4	4.30	15.49		3.85	14.26
At most 5	0.449	3.841		0.449	3.841

Notes: * denotes rejection of the hypothesis at the 0.05 level.

The results derived from the test of co-integration rejects the first two null hypotheses and shows existence of at least two co-integrating equations among the six GCC stock markets. The results from the trace statistics and Max-Eigen value gives similar results for the test. This validates the finding that there exist some linkages between these stock markets in long run. As more than one co-integrating equations from the analysis is

generated, VECM can be applied. VECM will analyze the dynamic impact of random shocks long run relationship between the stock markets and help in generating the co-integrating equations. These equations will provide the understanding in deriving the speed to co-integration among all the six markets. Moreover, this model will also establish long run and short run flow of causality existing in time series. The model of VECM will be applied to assess the impact of five GCC stock markets on MSX. Consequently, MSX is assumed as dependent variable and other variables derived from the VECM model are assumed as independent variables. The results obtained from this test will reveal the vulnerability of MSX with regard to random shocks in other GCC markets in long run and short run. The VECM equation is derived and represented as follows:

$$\begin{aligned} D(\text{MSX}) = & C(1) * (\text{MSX}(-1) - 6.233 * \text{BAX}(-1) + 1.4396 * \text{DFMGI}(-1) \\ & + 0.8652 * \text{TASI}(-1) - 1.4098 * \text{QSI}(-1) + 5184.5692) + C(2) * (\text{BKP}(-1) \\ & - 2.5063 * \text{BAX}(-1) + 0.4839 * \text{DFMGI}(-1) + 0.5019 * \text{TASI}(-1) \\ & - 0.5343 * \text{QSI}(-1) + 2072.4149) + C(3) * D(\text{MSX}(-1)) \\ & + C(4) * D(\text{MSX}(-2)) + C(5) * D(\text{BKP}(-1)) + C(6) * D(\text{BKP}(-2)) \\ & + C(7) * D(\text{BAX}(-1)) + C(8) * D(\text{BAX}(-2)) + C(9) * D(\text{DFMGI}(-1)) \\ & + C(10) * D(\text{DFMGI}(-2)) + C(11) * D(\text{TASI}(-1)) + C(12) * D(\text{TASI}(-2)) \\ & + C(13) * D(\text{QSI}(-1)) + C(14) * D(\text{QSI}(-2)) + C(15) \end{aligned} \quad (3)$$

The above equation is run using OLS process and derive the values of coefficients are shown in the following Table 6.

Table 6: Vector error correction causality test

	Coefficient	Std. Error	t-Statistic	Prob.
C(1) MSX(-1) - 6.233*BAX(-1) + 1.4396*DFMGI(-1) + 0.8652*TASI(-1) - 1.4098*QSI(-1) + 5184.5692	-0.01595	0.003724	-4.28404	0.0000***
C(2) BKP(-1) - 2.5063*BAX(-1) + 0.4839*DFMGI(-1) + 0.5019*TASI(-1) - 0.5343*QSI(-1) + 2072.4149	0.034993	0.009128	3.833587	0.0001***
C(3) (MSX(-1))	0.25664	0.024323	10.55148	0.0000***
C(4) (MSX(-2))	0.052498	0.024593	2.134665	0.0329
C(5) (BKP(-1))	0.013838	0.09695	0.14273	0.8865
C(6) (BKP(-2))	-0.01192	0.095363	-0.125	0.9005
C(7) (BAX(-1))	0.153512	0.158486	0.968617	0.3329
C(8) (BAX(-2))	-0.27683	0.161103	-1.71832	0.0859
C(9) (DFMGI(-1))	0.005166	0.018906	0.273242	0.7847
C(10) (DFMGI(-2))	-0.02043	0.019244	-1.06142	0.2886
C(11) (TASI(-1))	0.011872	0.011609	1.02267	0.3066
C(12) (TASI(-2))	0.008483	0.011364	0.746446	0.4555
C(13) (QSI(-1))	0.007372	0.009187	0.802424	0.4224
C(14) (QSI(-2))	-0.00442	0.009208	-0.47995	0.6313
C(15) Constant	0.8239	0.926222	0.889528	0.3738

Notes: *** indicates statically significance at 1% level.

The coefficient $C(1)$ is the coefficient of co-integrating model which is also referred as error correction term (ECT). It represents the speed with which the variables will adjust to equilibrium in long run. From the linear regression, lagged residuals represent the deviation from the long-run relationship in the previous period. The results derived from the analysis exhibit that the value of coefficient $C(1)$ is -0.01595 and the p value is less than 5% (0.0000) which indicate that speed coefficient is statistically significant at 1 per cent. The coefficient $C(1)$ is inferred as the proportion of disequilibrium that disperses by the next period. In the

above analysis, $C(1)$ is negative which indicates that if MSX is below its long run equilibrium with the other GCC markets, the negative value of ECT will cancel out and become positive readjusting itself back to equilibrium. On the contrary, if MSX is above its long run equilibrium, the negative coefficient of ECT will pull it back down to the equilibrium. Hence, it suggests in long run the markets will eventually move towards equilibrium and causality will flow from TASI, DFMGI, BAX, QSI and BKP indices to MSX. Nevertheless, it is equally important to assess the short run relationship. To test the short run causality, Wald test is applied. Wald test will assess the statistical significance of remaining coefficients by generating the p values. These p values will give the direction of short run causality movement from the independent variables to dependent variable with following null hypothesis for Wald test.

Table 7: Wald Test

	Null Hypothesis	Test Statistics
Long Run Causality ($C(1)$)	$C(1) = 0$	15.478 ***
Oman (MSX)	$C(3)=0$	11.846***
Dubai (DFMGI)	$C(9)=C(10)=0$	2.166
Kuwait (BKP)	$C(5)=C(6)=0$	3.974
Bahrain (BAX)	$C(7)=C(8)=0$	1.405
Qatar (QSI)	$C(13)=C(14)=0$	1.6945
Saudi Arabia (TASI)	$C(11)=C(12)=0$	4.039

Notes: Test Statistics indicate Chi-square value with 2 df. *** indicates statically significance at 1% level.

The results obtained from the Wald test indicate short run causality and long run causality among the six markets. Here as per the null hypothesis, on the basis of the obtained co-integrating equations, it is assumed that selected markets had trivial impact on MSX. However, the results obtained from Wald test suggest the value of Chi-Square test statistics of 15.478 is statistically significant for co-integrating equation coefficient [$C(1)$]. Hence, two major results can be drawn through Wald test. First, the long run causality runs from all other markets to MSX. In other words, in long run all the six GCC markets move towards equilibrium. However, the same cannot be said in the case of short run. The study has tested selected markets' influence on MSX and found none of the other markets have significant impact on the movement of MSX in short run. In short run, only the lagged coefficient of MSX had statistically significant impact on the MSX index, while it cannot be proved that other stock markets had any significant impact on short run movement of MSX. As such the null hypothesis with respect to short run causality cannot be rejected.

In order to further supplement the findings, impulse response function and variance decomposition is applied. Impulse response function works excellent when reaction of any dynamic system is to be assessed to some external change. The results obtained from impulse response function are displayed in the Figure 2.

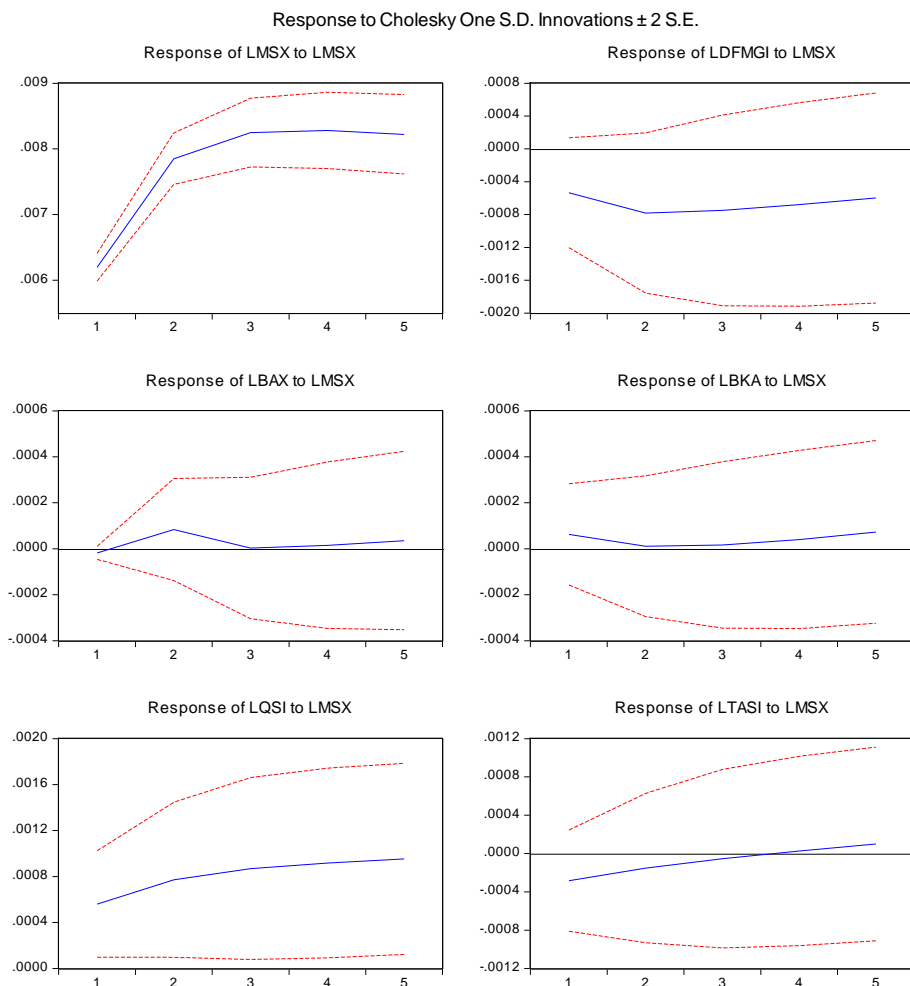


Figure 2: Impulse response function

The above figure results exhibit the impulse response function of MSX with itself and other GCC markets. Red line in the figure shows the accuracy with 95% confidence interval and blue line shows the impulse response function. A one standard deviation shock on LMSX initially increases LMSX in period one. This positive response sharply increases and continues in period two. Between period two and three, it keeps increasing till it hits period four where it gets steady and remains in the constant trajectory. With regard to other markets, one standard deviation shock of LDFMGI in period one reduces LMSX. Moreover, the shock creates negative impact on LMSX. After period two, it keeps increasing upwards towards the positive path. With regard to LBAX, one standard deviation shock of LBAX on LMSX results in increase in LMSX in period one. However, between period two and three, it results in decrease till it reaches period four, where the effect of one standard deviation shock results in slight increase in LMSX. With regard to LBKA, one standard deviation shock of LBKA results in decrease in LMSX in period one. However, from period two, it results in slight increase in LMSX for the subsequent periods. LQSI in period one with one standard deviation shock increases the LMSX. The increase is continued till period three and thereafter it is constant with slight increase in period four and five. LTASI has different

response than its peers. One standard deviation shock in LTASI results in increase in LMSX and thereafter it is observed that this increase is consistently observed in the subsequent periods. The overall observation from impulse response function, reveals that the impact of other GCC markets on MSX is asymmetric in short run. This finding is further strengthened by use of variance decomposition for movement of MSX as show in Table 8.

Table 8: Variance decomposition of LMSX

Period	S.E.	LMSX	LBAX	LBKA	LDFMGI	LQSI	LTASI
1	0.006197	100.0000	0.000000	0.000000	0.000000	0.000000	0.000000
2	0.010018	99.65610	0.000118	0.022603	0.088338	0.206203	0.026636
3	0.013001	99.42230	0.000253	0.021429	0.145019	0.370431	0.040566
4	0.015439	99.27194	0.000280	0.024887	0.180872	0.484319	0.037703
5	0.017515	99.17581	0.000261	0.027073	0.203168	0.563635	0.030054
6	0.019333	99.10733	0.000226	0.026131	0.217859	0.622756	0.025701
7	0.020961	99.04962	0.000192	0.023717	0.227996	0.669625	0.028854
8	0.022440	98.99321	0.000171	0.020972	0.235296	0.708731	0.041621
9	0.023800	98.93277	0.000166	0.018651	0.240719	0.742611	0.065081
10	0.025061	98.86521	0.000181	0.017203	0.244840	0.772765	0.099798

Analysis of variance decomposition reveals in short run 100% focus variance in LMSX is explained by itself in the first period. Others variables do not have strong influence in this period. From second period onwards, it is observed that apart from MSX itself, QSI has some impact on the MSX. Over time, this influence of QSI on MSX increases. It is also evident that DFMGI is the next market which has some impact on MSX from the second period onwards. The impact of other markets viz BAX, BKA and TASI is relatively less on the MSX both in short run.

4. Conclusion

This study investigates the time-varying, long and short run relationship among stock market returns of six GCC countries (Bahrain, Kuwait, Oman, Qatar, Saudi Arabia and United Arab Emirates). To investigate the movement of stock markets and measure their interdependency, Johansen Co-integration test was applied. Evidence from co-integration test traces the illustration of possible dynamic linkages among the GCC stock markets. The results show that six GCC stock markets had maximum two co-integrating vectors or analogously five independent common stochastic trends within this variables system. The calculated recursive coefficient of the error correction term is negative and statistically significant during the period, suggest in long run the stock markets move towards equilibrium. The causality movement among all the GCC stock markets in long run converge and flow in a unified direction. However, similar conclusion cannot be drawn in short run causality flow as shown by impulse response function and variance decomposition, MSX has considerable impact on itself especially in short-run. MSX has exhibited significant impact which resulted the market to change. However, other markets had limited response in short run and were asymmetric in nature. The analysis showed that short run causality flow is unidirectional from the lagged MSX value towards MSX. However, with respect to lagged value of other GCC markets, short run causality flow is not observed to be statistically significant towards MSX. In long run, overall empirical findings present that regional financial integration among the six GCC stock markets has increased however, it is still limited. In future, higher level of integration is expected between these regional stock markets which will provide greater diversification and broaden investor base.

This study contributes in providing useful information to financial managers to understand the dynamics of the stock market in GCC region and help in making better

investment choices for portfolio management. The results provide managers and the investors' significant clues to invest their funds in any GCC stock market to generate efficient returns. Additionally, the stock market linkages allow the finance managers to understand the movement which help to raise capital by offering financial securities in appropriate stock market. The long run convergence of these stock markets indicate the possibility of launching unified financial instruments which will not only attract foreign direct investments but also provide alternative investment options. These instruments, will be indeed a step further in the regional GCC integration. The major government initiatives towards capital formation and investments will be enhanced and contribute to overall sustainable development of the region. As the study reveals weak form of short run causality, the policy makers need to be less concerned with the economic or non-economic shocks in GCC countries in short run. Though these countries have uniformity in terms of culture, location, economic dependence and religion, short term shocks will not deter the stock markets returns as they will move towards equilibrium in long run.

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Currency Carry Trades and Stock Market Returns in Africa

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Abstract: Research Question: Is there a causal link between African currency targeted carry trades and the returns of their stock market indices? What is the nature of return volatility in carry trades and stock markets, and does volatility spillover exist between the two series in Africa? **Motivation:** The interactive and dynamic relationship between currency carry trade returns and stock market returns has not been communicated in exactitude, especially in emerging and frontier markets of Africa. This study explores the causal link between African currency carry trades and stock market returns. It also explores the dynamic relationship and volatility spillover between the currency carry trades and stock market returns. **Idea:** The primary idea is that there is conclusive evidence on the empirical failure of the uncovered interest rate parity (UIP) condition, and currency carry trades, which are investment/trading strategies, seek to exploit this failure. **Data:** Data on prices of stock market indices, interbank interest rates, and exchange rates between the target currencies and funding currencies of weekly periodicity sourced from DataStream, Quantic EasyData, and the central banks of the sampled countries are used. **Method/Tools:** The vector autoregressive (VAR) - Granger causality framework and the dynamic conditional correlation-generalised autoregressive conditional heteroskedasticity (DCC-GARCH) estimation technique were employed in this study. **Findings:** The study finds evidence of causality running from carry trades to stock markets in 22 out of the 28 currency pairs studied, but not causality from stock markets to carry trades. Traces of volatility spillover could only be observed from carry trades to stock markets in 10 out of the 28 currency pairs studied. We conclude that the African currency carry trades drive their stock markets, that the conditional correlations between currency carry trades and stock market returns are dynamic and time-varying, and that there is high degree of persistence in African return volatility. **Contributions:** This study has made significant contribution to our knowledge on currency carry trades in Africa's emerging and frontier markets. It has shown the interactive and dynamic relationships that exist between currency carry trade returns and the returns of stock market indices.

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JEL Classification: C32, F31, G11, G15

1. Introduction

Carry trades are currency investment strategies that are funded by borrowing in low-interest-rate currencies and investing in high-interest-rate currencies. A carry trading strategy is motivated by and exploits the failure of the theory of uncovered interest rate parity (UIP). The UIP condition predicts that a high-interest-rate currency will depreciate relative to a low-interest-rate currency. The assumption is that the interest rate differential between any two countries is offset fully by an expected depreciation of the high-interest-rate currency or, equivalently, by an expected appreciation of the low-interest-rate currency (Cho *et al.*, 2018). However, empirical evidence indicates an apparent violation of the UIP condition, where the interest rate differentials between the two countries are not completely offset by the exchange rate differentials in these countries. This evident violation of the UIP condition by the speculative activities of carry traders is a major issue in international finance and has accordingly received and continues to receive high research support.

Carry trade activities have relevance for international financial markets and their participants as well as the economies of various countries. There is conclusive evidence on the empirical failure of the UIP (Hansen and Hodrick, 1980; Fama, 1984; Froot and Thaler, 1990; Engel, 1996; Obstfeld and Rogoff, 2000; Sarno *et al.*, 2006; Burnside, 2015) and the profitability of currency carry trades (Brunnermeier *et al.*, 2008; Burnside *et al.*, 2007; Ackermann *et al.*, 2012; Ames *et al.*, 2013; Menkhoff *et al.*, 2012; Nkansah and Kaseeram, 2018a). Korhonen and Kunz (2009) for instance showed that currency carry trade could be categorised as a prudent investment, and that, on risk-adjusted basis, the currency carry trades outperform equity indices regardless of the risk measure. Similarly, Das *et al.* (2013) affirmed the viability of currency carry trade as an asset class. The inclusion of currency carry trade in an existing portfolio enhances the portfolio performance as well as the risk-return profile of that portfolio (Das *et al.*, 2013). Thus currency carry trades provide the alternative investment and portfolio diversification opportunities that investors, portfolio managers, hedge funds and other stock market partakers search for (see e.g. Galati and Melvin, 2004; Galati *et al.*, 2007; Popova *et al.*, 2007; Ferri, 2010; Marston, 2011). Nkansah and Kaseeram (2018b) confirmed the viability of African carry trade as an asset class and demonstrated its significance for asset allocation decisions. This is largely consistent with previous studies on currency carry trades of developed countries.

In fact, the last two decades have seen the introduction of a variety of new instruments designed exclusively for the purpose of currency carry trading (see e.g. Lynch, 2007; Galati *et al.*, 2007; Korhonen and Kunz, 2009). The Deutsche Bank's G10 Carry Spot index, the CSFB index, the Barclays Intelligent Currency Carry Trade Index, and other forms of structured currency carry trade instruments which take the form of collateralised foreign exchange obligations (CFXOs) now exist. Also, investment in the currency carry trades which ignites capital flows into the target currency countries and the unwinding of the carry trade which reverses the flow of capital tend to move the stock markets in these target countries. For instance, Hattori *et al.* (2007) contended that the decision of the central bank of Japan to reduce interest rate to near zero percent not only influenced the liquidity position of the Japanese economy, but rather the liquidity of the entire world economy. When this happens, investors will borrow cheaply from Japan and invest the proceeds in high-yielding financial assets, such as stocks abroad, thereby exerting pressure on both the foreign exchange rates and stock markets of the recipient countries, especially during periods of carry trade unwinding.

Elder (2012) suggested that the performance of currency carry trades and stock markets is linked. Undoubtedly, carry trade profits usually attract more investment funds from investors and could also find their way into the stock markets as well as strengthen the target currencies. Given this interconnectedness between carry trades and stock market returns, their associated volatilities can therefore be transmitted across countries. For instance, Minh (2016) reported, among other things, a significant positive association between carry trade and stock market performance in target currency countries. Similarly, Cheung *et al.* (2012) studied the implications of carry trade on returns of stock markets in Australia, Canada, Britain, Mexico and New Zealand, and found that currency carry trade has a significant influence on the stock market returns of the target currency countries. Tse and Zhao (2012) found significant proportions of volatility spillovers between the US stock market and carry trade; and Fung *et al.* (2013) documented significant causality and volatility spillover between the currency carry trade and the Asian stock market returns.

Whilst carry trades have been studied since the 1980s, very little is known about its interactive and dynamic relationship with the stock market, especially in Africa's emerging and frontier markets. For instance, Tse and Zhao (2012) examined the link between the daily carry trades and the U.S stock market returns, whereas, Fung *et al.* (2013) analysed the information transmission mechanism between currency carry trade and four equity markets, namely, the Japanese stock market, Australian stock market, Indian stock market, and Korean stock market. Also, Cheung *et al.* (2012) assessed the effect of the Yen carry trades on stock markets domiciled in the target currency countries including Australia, Britain, Canada, New Zealand and Mexico. The aforementioned studies mainly focused on the G10 currencies and other emerging markets outside the African region. Yet most African countries could be fertile grounds and a major target for currency carry trading activities due to the high interest rate regimes that most of these countries experience in the region. Studies on African carry trades have focused on the profitability of the trade and its asset class viability (Hassan and Smith, 2011; Nkansah and Kaseeram, 2018a, 2018b). The dynamic relationship between carry trade and stock markets remains a major research gap that necessitates this enquiry.

This study builds on prior carry trades studies and addresses two major research issues. First, it examines the causal relationship between the currency carry trades and stock market returns in the African emerging and frontier markets. Second, it explores the time-varying relationship and volatility spillover between carry trade returns and the stock market returns in these markets. We use four developed currencies (USD, EUR, JPY and GBP) as funding currencies and seven African currencies (BWP, EGP, ZAR, GHS, TND, MAD and NGN) as the target markets as well as the returns of stock indices of their respective countries (i.e. Botswana, Egypt, South Africa, Ghana, Tunisia, Morocco and Nigeria). For each of the seven countries, four carry trade strategies are conducted and all these four compared successively to the returns of the respective stock index. Thus the approach enables us to examine the intra-country causality and volatility spillover between stock markets and carry trades for the selected countries.

The study provides evidence of significant causal relationship running from currency carry trades to the stock markets of their respective African countries. Evidence is also provided that the stock market returns generally do not cause currency carry trades in Africa, except for very limited currency pairs. The study further reports evidence of volatility spillover emanating from the currency carry trades to the stock markets for a significant number of currency pairs. Ten out of twenty eight currency pairs have evidence of volatility spillover from carry trade to their respective stock markets.

The remainder of the paper is organised as follows. Section 2 presents the related literature, whilst Section 3 deals with the methodology and data of the study. The empirical results are presented in Section 4 with Section 5 presenting the conclusion of the study.

2. Related Literature Review

The currency carry trade strategy is anticipated to generate zero returns, and can generate positive returns only when the UIP fails to hold. Factors such as consumption risk, liquidity risk, peso effect, market frictions and untimely revisions of portfolio decisions are said to explain the excess return of carry trade (Bacchetta and Wincoop, 2010; Brunnermeier *et al.*, 2008; Burnside *et al.*, 2007; Lustig and Verdelhan, 2007; Melvin and Taylor, 2009). Investors all over the world take advantage of this strategy by borrowing from the countries with low interest rates (of which the Japanese currency has been the most popular). The yen was the most sought after funding currency until after the 2008 financial crisis, when the dollar carry trade and the recently emerging euro carry trade came into the picture (Fung *et al.*, 2013). The Australian dollar and the New Zealand dollar, on the other hand, have been the most sought after high-yielding target currencies for carry traders. It is therefore not surprising that most studies on currency carry trade focus on these currencies and the G10 currencies in general.

Carry trade activities involving intensive borrowing of Japanese yen during 2006–2007 and US dollars during 2008–2009 are evidenced in the literature (Curcuro *et al.*, 2010). Carry trade activities of investing markets intensified worldwide post global financial crisis in 2008 (Shah, 2010; Szalay, 2012). There appears to be a consensus that the currency carry trade is profitable (Brunnermeier *et al.*, 2008; Burnside *et al.*, 2008; Darvas, 2009; Olmo and Pilbeam, 2009; Xanthopoulos, 2011; Moosa and Halteh, 2012; Potì *et al.*, 2014; Al-Ali, 2015; Burnside, 2015). However, unwinding activities of carry traders can put selling pressure on the stock market of the target currency country (Cheung *et al.*, 2012). In consequence, the Yen carry trades moved the stock markets of target currency countries but subsequently aggravated the global financial market slide in 2007 (Hayashi, 2007). The unwinding of the Yen carry trades partially led to the sharp decline of the global financial markets (Fackler, 2008; Parkinson, 2008). Zhang *et al.* (2010) documented that during financial crisis or extreme market conditions, exchange risk intensifies and for that matter carry trade investors are forced to reverse their positions by buying back their funding currencies.

Empirically, Fung *et al.* (2013), Cheung *et al.* (2012), Tse and Zhao (2012), and Lee and Chang (2013) are relevant studies that investigated the relationship between the currency carry trade and the stock markets as well as their volatility spillovers. They predominantly focus on the cross-market predictive power of whether variations in currency carry trade (or stock market) are able to predict the performance of stock markets (or carry trades), and their associated volatility spillover effects. For instance, Tse and Zhao (2012) examined the link between the daily carry trade and U.S stock market returns using vector autoregression and the exponential generalised autoregressive conditional heteroskedasticity methods. Their study found that the returns of the currency carry trade (or stock markets) had no predictive power over the future returns of stock markets (or carry trade). The study further concluded that there was significant volatility spillover from the US stock market to carry trade market but the reverse was not the case.

Also, Fung *et al.* (2013) intimated that the flow of capital from low yielding currency countries to invest in high yielding assets like stocks in target currency countries will lead to the appreciation of the target currency, and that the performance of the stock markets and carry trade are closely related. They studied the information transmission mechanism between currency carry trade and four equity markets in Asia, namely, the Japanese stock

market, Australian stock market, Indian stock market, and Korean stock market, using similar approach to Tse and Zhao (2012). They found evidence of significant Granger causality from the carry trade returns to Indian, Japanese and Australian stock markets. Also, Fung *et al.* (2013) additionally documented that the causality of currency carry trade to Asian stocks could not be observed during the period prior to the 2008 financial crisis, which is an indication that the uncovered interest parity hypothesis may not hold in a systematic way. Their findings on volatility spillover indicated that volatility flow from carry trade to stock markets and vice versa (i.e. bi-directional) and that the spillover effects were more intense during the financial crisis and post-crisis periods.

Cheung *et al.* (2012) also assessed the effect of yen carry trade on stock markets domiciled in the target currency countries with an aim to empirically evaluate the implications of the yen carry trades on the target currency countries' stock market returns. Their study used three different proxies; currency specific profit measure, a currency-specific futures position variable and the Deutsche Harvest Index as proxies for carry trade activity and scope. Focusing on five target countries including Australia, Britain, Canada, New Zealand and Mexico they found evidence which supports the perception that the currency carry trade affects the activities of stock markets domiciled in the target currency countries. Thus, the investment in the currency carry trade which ignites flow of capital into these target currency countries and the unwinding of the carry trade which reverses the flow of capital tend to move the stock markets in these target countries. The prior study above however did not consider the dynamic relationship and the volatility spillover between carry trade and the stock markets.

Currency carry trade investors worldwide, after the 2007-2009 global financial crisis, found solace in the economies with growth prospects where monies are invested in high-yielding financial assets such as stocks, bonds, and other securities with growth potentials. The influx of capital into the recipient countries has the potential of strengthening their currencies, and for that matter, could influence the performance of the stock markets. These high-yielding financial assets were mostly in the emerging markets and, as such, most of these carry trade funds found their way into the emerging markets (Shah, 2010; Szalay, 2012). Indeed, Elder (2012) concluded that there appears to be close correlation between differing assets classes in the financial markets post financial crisis, and Tse and Zhao (2012) corroborated this, examining the relationship between the currency carry trade and the US stock markets.

The interest rates in Japan have been extremely and continue to be low relative to other developed countries. This makes it a potential funding currency alongside other currencies such as the USD, EUR and the GBP which have also maintained a relatively low interest rate for some years now. African currencies, which are largely characterised by high interest rates, also offer some arbitrage opportunities and present an avenue for them to be targets for the currency carry trades. Indeed, studies on African carry trades have confirmed the profitability of the trade and its viability as an asset class (Hassan and Smith, 2011; Nkansah and Kaseeram, 2018a, 2018b). Plantin and Shin (2011) suggested that the success of currency carry trade could rather result in the failure of the uncovered interest parity but not the UIP as a pre-condition of carry trade. Thus, the currency carry trade has the potential of disrupting the international financial markets and in particular the target currency countries through the building up and unwinding of carry trades which are a concern to policymakers. In their study, Hattori *et al.* (2007) contended that the domestic monetary policy of Japan to reduce policy rate or interest rate to near zero percent not only influences the liquidity position of the Japanese economy but indirectly influences the liquidity of the entire world economy. This near zero interest rate of Japan stimulates currency carry trades over the globe, as investors borrow cheaply from Japan and invest the proceeds in high-yielding

financial assets, such as stocks, abroad, thereby exerting pressure on not only the foreign exchange rates but also the stock markets of the recipient countries.

Indeed, the players in the financial markets have in the recent past attributed the movements in stock market returns to the activities of carry trade. Yen carry trade is believed to have spurred on stock markets of target currency countries and its unwinding was responsible for the global stock market crash during the 2007 financial crisis (Hayashi, 2007). Likewise, the sudden fall of the global stock market in the global market crash in October 2008 is believed to have been partially caused by the unwinding of the yen currency carry trade (Fackler, 2008; Parkinson, 2008). Thus, the unwinding of the yen currency carry trade usually destabilises the stock markets of the target currency country. Moreover, the perception or the knowledge of unwinding of the carry trade in itself, even if there is no unwinding, puts selling pressure on the stock markets and consequently destabilises the market (Cheung *et al.*, 2012).

The relationship between carry trade and stock markets has also been situated within the context of global liquidity and asset prices which is concerned with global money supply and asset price inflation at the same time (Kramer and Baks, 1999; Rüffer and Stracca, 2006; Giese and Tuxen, 2007; Belke *et al.*, 2010). Lee and Chang (2013) studied the link between spillovers of currency carry trade returns and U.S stock market returns using the generalised vector-autoregression method of Diebold and Yilmaz (2012). The study hypothesised “that the magnitude of spillovers of currency carry trade returns is positively correlated with market risk sentiments and, therefore, has an impact on market returns”. Using the G10 currencies and the S&P 500 index futures, they found a significant positive relationship between spillovers of currency carry trade returns and stock market returns. They further concluded that this relationship intensifies during bear markets rather than in bull markets.

Studies on carry trade and stock market nexus in the extant literature completely ignores the African markets. Additionally, the dynamic interaction and information linkages between carry trade and stock markets have not been adequately explored in the existing studies. Funding currencies to implement the trade have always been limited to one currency (mostly Japanese Yen). Thus, the scope of carry trade and stock market relationship will therefore be limited to one funding currency. The current study uses a broad-based funding currencies of four low-interest currencies to implement the trade on seven African markets. Each African market's dynamic relationship with carry trade is examined for all the four funding currencies.

3. Methodology and Data

3.1 Estimating Causal Relationship Between Carry Trade Returns and Stock Market Returns

We specify an unrestricted vector autoregressive (VAR)-Granger model, in the spirit of Fung *et al.* (2013), and adopt equation (1) to estimate the causality relationship between carry trade returns and stock market returns. We adopt Eqs. (1) and (2), respectively, to estimate the sum of cross-asset which describes the total causality from the stock market to the carry trade market ($\sum c_{1i}$) and from the carry trade transaction to the stock market ($\sum b_{2i}$). The choice of the VAR becomes appropriate as both carry trade and the stock market returns follow an I(0) process. The estimation is done for a pair of carry trade return and stock return, estimating in all twenty eight (28) currency pairs.

$$CT_t = a_1 + \sum_{i=1}^k b_{1i} CT_{t-i} + \sum_{i=1}^k c_{1i} STOCK_{t-i} + d_1 CRISIS_t + \varepsilon_{1,t} \quad (1)$$

$$STOCK_t = a_2 + \sum_{i=1}^k b_{2i} CT_{t-i} + \sum_{i=1}^k c_{2i} STOCK_{t-i} + d_2 CRISIS_t + \varepsilon_{2,t} \quad (2)$$

where CT_t = weekly returns of currency carry trades; $STOCK_t$ = weekly returns of the stock markets; $\sum c_{1i}$ = total causality from stock market to carry trade market with $\varepsilon_{1,t}$ as error term; $\sum b_{2i}$ = total causality from carry trade market to stock market with $\varepsilon_{2,t}$ as error term; and $CRISIS_t$ = a dummy variable equals 1 for the crisis period and 0 otherwise.

3.2 Estimating the Time-Varying Relationship Between Carry Trade Returns and Stock Returns

The dynamic conditional correlations-generalised autoregressive conditional heteroskedasticity (DCC-GARCH) model proposed by Engle (2002) is used to estimate the conditional correlations between any pair of carry trade returns and stock market returns. The approach enables us to examine the volatility spillover and information linkages between carry trade returns and returns of African stock market indices. We specify the conditional covariance matrix (H_t) as in Eq. (3) and the conditional correlation matrix (Q_t) as in Eq. (4). The variance terms ($H_{ii,t}$), the covariance terms ($H_{ij,t}$), and the standard residual terms (ε_t) are specified as in Eq. (5), Eq. (6) and Eq. (7), respectively. Admittedly, the strength of the DCC-GARCH model is sturdily upheld in the extant literature (see for instance Kearney and Lucey, 2004; Chelley-Steeley, 2005; Chiang *et al.*, 2007; Padhi and Lagesh, 2012; Fung *et al.*, 2013; Hwang *et al.*, 2013).

$$H_t = D_t R_t D_t \quad (3)$$

$$Q_t = (1 - \delta - \theta) Q_0 + \delta \varepsilon_{i,t-1} \varepsilon_{i,t-1} + \theta Q_{t-1} \quad (4)$$

$$H_{ii,t} = \alpha_{ii} + \sum_{j=1}^2 \beta_{ij} \varepsilon_{j,t-1}^2 + \gamma_i H_{ii,t-1} + \lambda_i \varepsilon_{i,t-1}^2 I_{\varepsilon_i < 0}(\varepsilon_{i,t-1}) \quad (5)$$

$$H_{ij,t} = Q_{ij,t} \frac{\sqrt{H_{ii,t} H_{jj,t}}}{\sqrt{Q_{ii,t} Q_{jj,t}}} \quad (6)$$

$$\varepsilon_t = \begin{pmatrix} \varepsilon_{1,t} \\ \varepsilon_{2,t} \end{pmatrix} | \psi_{t-1} \sim \text{Student} - t(0, H, \nu) \quad (7)$$

where H_t = conditional covariance matrix; Q_t = conditional correlation matrix; $H_{ii,t}$ = variance terms; $H_{ij,t}$ = covariance terms; R_t = a time-varying correlation matrix; D_t = a $k \times k$ diagonal matrix of time-varying standard deviations; Q_0 = the unconditional correlation matrix; β_{ij} = a measure of volatility spillover from asset j to asset i ; γ_i = a coefficient of GARCH effect; λ_i = a coefficient of asymmetric volatility; and δ and θ = are conditional correlation coefficients of time-varying volatility. The standardized residuals or errors, with a process that follows student-t distribution, are formulated as $\varepsilon_t = \begin{pmatrix} \varepsilon_{1,t} \\ \varepsilon_{2,t} \end{pmatrix} | \psi_{t-1} \sim \text{Student} - t(0, H, \nu)$.

3.3 Data and Data Sources

The weekly price indices of seven emerging and frontier markets in Africa, namely, South Africa, Egypt, Morocco, Nigeria, Ghana, Botswana and Tunisia were sourced from

DataStream. Also, the weekly interbank interest rate with one month investment horizon of the target countries (i.e. South Africa, Egypt, Morocco, Nigeria, Ghana, Botswana and Tunisia) and the funding countries (i.e. United States of America, United Kingdom, Japan, and the Euro Area) as well as the exchange rates between the target currencies and the funding currencies were obtained from the Central Banks of the respective countries and BFA INET. The data covers the period between January 2001 and December 2014. We used the formulation $Z_{t+1} = \ln(1 + (i_t^* - i_t)) - \Delta S_{t+1}$ with its log return of the interest rate differential $\ln(1 + (i_t^* - i_t))$, and $\Delta S_{t+1} = S_{t+1} - S_t$ to compute the weekly African carry trade returns for all the 28 currency pairs. In the formulation above, i_t^* is the interest rate of the target countries at time t , and i_t is the interest rate of the funding countries. Also, we used the formulation $R_t = [\ln(P_t) - \ln(P_{t-1})] \times 100$ to transform the weekly price indices into their continuously compounded weekly log returns. In the above formulation, R_t is the weekly stock returns, P_t is the current stock price, and P_{t-1} is the previous week's stock returns.

4. Empirical Results

4.1 Descriptive Statistics of The Stock Market Returns

Table 1 and Table 2 present the descriptive statistics of the weekly returns of the market indices in the sample and of the currency carry trades executed in this study, respectively.

Table 1: Descriptive statistics of returns to stock market indices

Market	Obs.	Mean	Std Dev.	Skew	Kurtosis	Min	Max	Jarque-Bera
Botswana	729	4.5177	17.31	0.590	9.646	-0.119	0.167	1384.006***
Egypt	729	4.9324	28.84	-1.008	8.024	-0.248	0.129	889.974***
Ghana	729	3.6014	27.40	-0.388	5.711	-0.166	0.135	241.504***
Morocco	677	4.2213	17.31	-0.667	6.279	-0.124	0.086	353.431***
Nigeria	729	4.3206	27.40	-0.388	5.711	-0.166	0.135	241.504***
South Africa	729	3.6534	28.12	-0.275	8.308	-0.201	0.242	865.185***
Tunisia	729	4.6058	12.98	-0.728	8.966	-0.119	0.072	1145.469***

Notes: The sample covers the period January 12, 2001 to December 26, 2014, except Morocco which covers the period January 11, 2002 to December 26, 2014. The obs. is the total number of weekly observations per market. Mean statistics and standard deviations are annualized by multiplying them by $\sqrt{52}$ and expressing same in percentages. *** is statistical significance at the 1% level.

In Table 1, positive mean annualised returns are observed for all the stock indices in the sample markets. The annualised returns range from 3.60% for the Ghanaian stock market index to 4.93% for the Egyptian stock market index. Also, the annualised standard deviations are relatively large and range from 12.98% (Tunisia) to 28.84% (Egypt). Moreover, all the market returns, excepting the Botswana stock market, are negatively skewed and characterised by large excess kurtosis. Thus the results corroborate the prior evidence that African markets are largely volatile (see for instance, Alagidede, 2009; Alagidede and Panagiotidis, 2009).

In Table 2, twenty-eight currency pairs are executed with four currency pairs from each of the seven countries in the sample. All the currency pairs produced positive excess returns, excepting the GBPTND and EURTND pairs. The annualized mean excess returns range from $\pm 0.0721\%$ (for the EURMAD, USDTND, and GBPTND pairs) to 1.947% (for the USDBWP pair). Also, volatility of the excess returns is quite high for most of the pairs as the annualized standard deviations range from 1.4422% (EURMAD pair) to 132.827% (JPYNGN pair). The annualized excess returns are predominantly negatively skewed with large excess Kurtosis, an indication that the African carry trade returns are largely leptokurtic. The results thus point to the fact that the African carry trade exhibits crash risk

or the peso effect. The results further reveal non-normality of currency carry trade returns on the basis of the Jarque-Bera statistics. These results are upheld by the extant literature on the stylized features of returns in African financial markets (see for example, Alagidede, 2009; Alagidede and Panagiotidis, 2009).

Table 2: Descriptive statistics of African currency carry trade weekly returns

Carry Trade	Obs.	Mean	Std. Dev.	Skew	Kurtosis	Min.	Max.	Jarque-Bera
EURBWP	729	0.6489	12.1866	-0.6934	7951	-0.1007	0.0603	543.2287***
EUREGP	729	0.2163	9.4464	-1.2442	12.6963	-0.1122	0.0508	3043.902***
EURGHS	729	0.6489	10.3838	0.0730	5.6936	-0.0647	0.0803	221.0241***
EURMAD	677	0.0721	1.4422	0.0115	3.9288	-0.0109	0.0085	24.34903***
EURNGN	729	0.8653	8.3648	-0.1444	24.1172	-0.0790	0.1120	13547.79***
EURZAR	729	0.2163	13.1240	-0.6363	5.6688	-0.0954	0.0735	265.5368***
EURTND	729	-0.1442	3.1007	0.0344	3.8690	-0.0178	0.0157	23.0807***
USDBWP	729	1.9470	12.4029	1.2432	9.9351	-0.0621	0.1324	1648.699***
USDEGP	729	0.3606	4.8314	-9.1473	130.1805	-0.1106	0.0231	501478.1***
USDGHS	729	0.8653	10.8165	-0.4357	146981	-0.2297	0.2244	628987.9***
USDMAD	677	0.3606	6.5620	-0.0233	5.3252	-0.0365	0.0548	152.567***
USDNGN	729	0.8653	8.3648	-0.1444	24.1172	-0.0790	0.1120	13547.79***
USDZAR	729	0.3606	14.0615	-0.8165	5.7654	-0.1062	0.0647	313.2929***
USD TND	729	0.0721	5.9130	-0.0170	4.8622	-0.0335	0.0479	105.3641***
JPYBWP	729	1.1538	127.346	-0.1375	353.8054	-3.3505	3.3374	3738085***
JPYEGP	729	0.6490	9.3022	-1.0945	10.3114	-0.1009	0.0495	1769.273***
JPYGHS	729	1.1538	10.7444	0.1398	5.5071	-0.0682	0.0790	193.2904***
JPYMAD	677	0.5048	9.0138	-0.5982	7823	-0.0739	0.0603	487.7322***
JPYNGN	682	1.0817	132.827	0.1630	321.2499	-3.3371	3.3609	2878128***
JPYZAR	729	0.6490	16.0805	-0.9468	7.1588	-0.1353	0.0758	634.2845***
JPYTND	729	0.3606	8.4369	-0.6653	4565	-0.0669	0.0523	459.8904***
GBPBWP	729	0.7211	12.2587	-0.8607	8.5166	-0.1234	0.0571	1014.427***
GBPEGP	729	0.2884	8.9416	-0.9969	14.4993	-0.1086	0.0591	4137.378***
GBPGHS	729	0.7932	10.0233	0.0762	5.4711	-0.0658	0.0676	18839***
GBPMAD	677	0.2163	5.6967	-0.0141	9.6737	-0.0597	0.0417	1256.387***
GBPNGN	729	0.7932	12.4750	-0.1262	9.2097	-0.0935	0.1123	1173.212***
GBPZAR	729	0.2163	13.1240	-0.5481	6.0115	-0.0971	0.0789	742.879***
GBPTND	729	-0.0721	5.7688	-0.0539	7.9442	-0.0566	0.0414	311.9719***

Notes: The sample covers the period January 12, 2001 to December 26, 2014, except Morocco which covers the period January 11, 2002 to December 26, 2014. The obs. is the total number of weekly observations per market. Mean statistics and standard deviations are annualized by multiplying them by $\sqrt{52}$ and expressing same in percentages. *** is statistical significance at the 1% level. The carry trade column shows the currency pairs such as EURBWP being the Euro-Botswana currency pair; USDGHS being the Dollar-Ghanaian Cedi currency pair, etc.

4.2 Causality Between African Carry Trades and Stock Market Returns

Table 3 presents the results of estimating Eqs. (1) and (2) which sought to investigate the causal relationship between currency carry trade returns and stock market returns. To this end, two hypotheses were tested: (1) that the returns of stock market indices in the sample do not Granger-cause the variations in the returns of carry trades; and (2) that the carry trade returns of the sample markets do not Granger-cause the movements or changes observed in the returns of stock market indices. From the results in Table 3, the hypothesis that stock markets do not drive currency carry trades was sustained for all sampled countries and for all funding currency pairs. The results show significant evidence that stock market returns do not drive currency carry trades in Africa. Thus there is broad lack of sufficient evidence to reject the hypothesis regardless of the funding currency (USD, EUR, GBP or JPY) used. Specifically, all four strategies for each of the funding currency in relation to the Botswana

Pula (BWP), the Nigerian Naira (NGN), and the South African Rand (ZAR) support the hypothesis no causal relationship running from the stock market to the currency carry trades in Africa. Three out of the four strategies for the remaining four African currencies (the Ghanaian Cedi, GHS; the Egyptian Pound, EGP; the Moroccan Dirham, MAD; and the Tunisian Dinar, TND) in relation to each of the funding currencies also sustain the hypothesis.

The results in Table 3 however reject the second proposition that currency carry trades do not cause/drive stock market movements in Africa. The results show largely significant evidence of causal relationship running from returns of currency carry trades to the stock market returns. Thus, for all investment strategies implemented (i.e. targeting each local currency for four carry trades in USD, EUR, GBP or JPY by longing the local currencies and shorting the funding currencies), currency carry trade is found to drive stock market movements in Africa. Specifically, carry trades that target the Moroccan Dirham, the South African Rand, and the Tunisian Dinar using USD, EUR, GBP and JPY as funding currencies cause movements in stock market of that particular country. Also, the results show that stock market movements in Botswana, Egypt and Nigeria can be caused by carry trades that target the currencies of these countries and are funded by EUR, GBP and USD (for Botswana and Nigeria) and GBP, USD and JPY (for Egypt). The results further indicate that the Ghanaian stock market responds to carry trades that target the Cedi and are funded by EUR and GBP.

The findings are consistent with prior studies on carry trades such as Fung *et al.* (2013). The evidence is indicative of a violation of the uncovered interest rate parity condition. In this case the target currencies appreciate rather, and the target currency appreciation strengthens the profits that accrue to carry trade strategy and that certainly will attract more investors. Moreover, as more investors are attracted by these carry trade profits, the demand for these target currencies and for that matter currency carry trade investment will rise. The rise in demand for currency carry trade means an increase in capital inflows into the targeted African countries which ultimately will strengthen the cash flows of the financial markets in the target countries. The rise in cash inflows will ultimately move stock market returns in the target countries. As suggested by Fung *et al.* (2013), this finding reinforces the argument that high carry trade returns ultimately lead to high stock returns and vice versa.

Table 3: Causality between African currency carry trade returns and their stock market returns

Market	EUR FUNDED			GBP FUNDED			USD FUNDED			JPY FUNDED		
	Lags	F-stat	Prob	Lags	F-stat	Prob	Lags	F-stat	Prob	Lags	F-stat	Prob
Botswana												
Stock-//→Carry trade	4	0.910	0.458	4	0.820	0.512	6	0.438	0.854	7	0.501	0.834
Carry trade-//→Stock		29.875	0.000		34.152	0.000		39.954	0.000		0.846	0.550
Egypt												
Stock-//→Carry trade	4	2.631	0.033	4	0.577	0.679	3	1.923	0.124	2	0.676	0.509
Carry trade-//→Stock		1.078	0.367		2.031	0.088		6.227	0.000		6.449	0.002
Ghana												
Stock-//→Carry trade	3	0.560	0.642	3	2.156	0.092	5	2.212	0.051	8	1.809	0.072
Carry trade-//→Stock		3.230	0.022		3.761	0.011		1.055	0.384		1.258	0.263
Nigeria												
Stock-//→Carry trade	3	1.821	0.142	2	1.650	0.193	3	1.821	0.142	8	0.526	0.837
Carry trade-//→Stock		19.475	0.000		10.880	0.000		19.475	0.000		0.289	0.970
Morocco												
Stock-//→Carry trade	3	0.677	0.566	2	5.358	0.005	2	2.325	0.099	2	1.698	0.184
Carry trade-//→Stock		39.042	0.000		413	0.001		79.786	0.000		17.295	0.000
South Africa												
Stock-//→Carry trade	3	0.247	0.863	1	0.124	0.725	4	1.050	0.381	3	1.086	0.354
Carry trade-//→Stock		24.828	0.000		170.590	0.000		47.739	0.000		103.210	0.000
Tunisia												
Stock-//→Carry trade	2	4.309	0.014	3	1.561	0.198	2	0.806	0.447	4	1.587	0.176
Carry trade-//→Stock		28.728	0.000		2.410	0.066		74.489	0.000		12.984	0.000

Notes: The Table shows the results of VAR Granger causality test between currency carry trade targeting African currencies and their respective stock market indices. Thus Stock-//→Carry trade test the hypothesis that the stock market index of the country under study does not Granger cause currency carry trade in that country and vice versa. Selection of lag length was based on the Akaike information criterion (AIC). A total of 729 weekly observations (12/01/2001-26/12/2014) for each market were used for the estimations.

4.3 Volatility Spillover Effects of African Carry Trades and Stock Market Returns

Table 4 (with EUR, GBP, USD and JPY as funding currencies as funding currencies) presents the results of estimating Eq. (2), a DCC-AR (1)-GARCH (1, 1)- t framework. Prior to the estimation, we tested and confirmed the stationarity of the series as well as the presence of ARCH effect and volatility clustering in the carry trade returns and stock market returns. Tables 4 show that the estimates of carry trade and stock market return volatilities for all the countries have all satisfied the non-negativity constraint ($\alpha + \beta < 1$). The hint is that the model is adequate in measuring the time-varying conditional correlations, as this suggests that mean reversion exists along a constant level, and controls for high degree of persistence in conditional volatility of carry trade and stock market returns.

The results in Tables 4 indicate largely very small coefficients of the ARCH parameter α , in most cases not significantly different from zero, but nevertheless with a few statistically significant coefficients such as the Nigerian and Moroccan currencies both paired against the Great British Pound. The coefficients of the GARCH parameter β are predominantly large and statistically significant for a number of markets and currency pairs. These results reveal that the conditional volatility of the stock market returns is influenced more by the previous volatility of carry trade than their lagged returns. Thus, there is more of a GARCH effect than there is for an ARCH effect. The large GARCH coefficients are also a demonstration of a significant amount of fluctuation in the return volatility over time. This further signifies that there is a high degree of persistence in the return volatility and evidence of mean reversion. An increase in volatility is established in the literature as a condition for increased volatility spillover between the two assets (King and Wadhwani, 1990; Padhi and Lagesh, 2012). There is evidence of modest volatility spillover from carry trade market to the stock market returns dotted across the sampled countries. Specifically, we report evidence of volatility spillover from EUREGP, GBPGHS, EURNGN, GBPNGN, GBPMAD, EURZAR, GBPTND, JPYEGP, JPYGHS and USDMAD carry trade to the stock markets of Egypt, Ghana, Nigeria, Morocco and South Africa.

An indication is that the conditional correlations between the African carry trades and stock market returns are dynamic and time-varying. Besides, the conditional correlation coefficient across the pairs of carry trades and the stock markets are largely low, with the lowest being the GBP-NGN pair (0.0012) and the highest being the EUR-MAD pair (0.1525). The evidence thus seems to suggest that carry trade can be an important asset class to consider for portfolio diversification across African markets. The evidence presented in Tables 4 is consistent with the position established in the literature (Cheung *et al.*, 2012; Tse and Zhao, 2012; Fung *et al.*, 2013; Minh, 2016). Nevertheless, this study documents only a few cases of volatility spillover considering the number of currency pairs executed. This seemingly low level of volatility spillover cases reported could be attributed to the fact that the currency carry trade as a trading strategy may not be popular and formalised amongst the players of African financial markets. Once it is not popular or practised, the volume and value of carry trades expected to take place to influence this volatility transmission may be very few or even non-existent.

Table 4: Volatility spillover effects of African carry trade returns and stock market returns

Market	Parameter	EUR FUNDED			GBP FUNDED			USD FUNDED			JPY FUNDED		
		Estimate	Std Errors	t-statistic	Estimate	Std Errors	t-statistic	Estimate	Std Errors	t-statistic	Estimate	Std Errors	t-statistic
Botswana	ρ	-0.0368	0.0379	-0.9711	0.0012	0.0345	0.0353	0.0126	0.0344	0.3670	-	-	-
	α	0.0333	0.0330	1.0100	0.0000	0.0000	0.0552	0.0000	0.0000	0.0000	-	-	-
	β	0.0781	0.5527	0.1413	0.5814	0.4370	1.3300	0.8274	0.6405	1.2920	-	-	-
	v	5.2441***	0.5106	10.2700	4.9494***	0.4272	11.5900	5.3695***	0.5289	0.0000	-	-	-
	L-L	352.3040			3761.6280			3760.1200			-	-	-
Egypt	ρ	-0.0575	0.0394	-1.4610	-0.0051	0.0389	-0.1319	0.0350	0.0311	1.1230	-0.0328	0.0435	-0.7545
	α	0.0000	0.0000	0.0000	0.0221	0.0305	0.7227	0.0488	0.0390	1.2520	0.0127	0.0212	0.6001
	β	0.8129**	0.4047	2.0090	0.0000	0.5477	0.0000	0.3783	0.3783	0.0000	0.9108***	0.1025	8.8850
	v	4429***	0.8994	7.3860	5.8304***	0.6384	9.1330	3.1644***	0.1205	26.2700	6.0197	0.6920	8.6990
	L-L	3404.1620			3680.5860			4629.4570			3605.6140		
Ghana	ρ	-0.0151	0.0368	-0.4103	-0.0261	0.0358	-0.7294	0.0118	0.0358	0.3291	-0.0185	0.0419	-0.4414
	α	0.0000	0.0000	0.0090	0.0000	0.0000	0.0000	0.0000	0.0000	0.0012	0.0040	0.0103	0.3849
	β	0.2962	23.2750	0.0127	0.7684***	0.3859	1.9910	0.3623	0.7232	0.5009	0.9698***	0.0407	23.8100
	v	8.7238***	1.6672	5.2330	8.5258***	1.5687	5.4350	3.8557***	0.2682	14.3700	8.4808***	1.4728	5.7580
	L-L	3335.4260			3612.9580			4014.9870			3564.7310		
Nigeria	ρ	0.0654*	0.0352	1.8580	0.0404	0.0855	0.4718	0.0118	0.0358	0.3291	-0.0014	0.0292	-0.0462
	α	0.0083	0.0202	0.4121	0.0152***	0.0079	1.9290	0.0000	0.0000	0.0012	0.0000	0.0000	0.0017
	β	0.8736***	0.0848	10.3100	0.9727***	0.0170	57.2500	0.3623	0.7232	0.5009	0.0385	6.0930	0.0063
	v	4.5670***	0.4027	11.3400	10.7135***	2.3859	4.4290	3.8557***	0.2682	14.3700	2.8936***	0.1026	28.2000
	L-L	3800.6810			3491.7340			4014.9870			2550.0290		
Morocco	ρ	0.1525***	0.0383	-3.9850	0.0251	0.0542	0.4640	0.1263***	0.0417	3.0300	0.0812**	0.0378	2.1490
	α	0.0000	0.0000	0.4590	0.0530***	0.0262	2.0220	0.0046	0.0165	0.2819	0.0000	0.0000	0.0164
	β	0.3124	1.7622	0.1773	0.8242***	0.0644	12.8100	0.9004***	0.0819	10.9900	0.7801	0.8652	0.9017
	v	9.1333***	1.6686	5.4740	8.4141***	1.5808	5.3230	9.2940***	1.7267	5.3830	8.4450	1.3601	6.2090
	L-L	4838.1000			4046.4230			3938.8760			3729.8280		
S. Africa	ρ	0.0030	0.0595	0.0510	0.1148***	0.0378	3.0400	0.0128	0.0394	0.3257	0.0782*	0.0417	-1.8780
	α	0.0073	0.0066	1.0950	0.0078	0.0250	0.3139	0.0000	0.0000	0.0047	0.0862	0.0543	1.5870
	β	0.9829***	0.0095	103.7000	0.0000	0.6030	0.0000	0.0030	1.6096	0.0018	0.0825	0.1941	0.4249
	v	10.1838***	1.9364	5.2590	10.0016***	1.9717	5.0730	10.2950***	2.0678	4.9790	8.7684***	1.5213	5.7640
	L-L	3180.6970			3185.9470			3118.9290			3031.0870		
Tunisia	ρ	-0.0513	0.0372	-1.3780	-0.0286	0.0499	-0.5731	0.1429***	0.0348	4.1040	0.05279	0.040299	1.31
	α	0.0000	0.0000	0.0161	0.0207	0.0228	0.9072	0.0000	0.0000	0.0103	0.0000	0.0000	0.3108
	β	0.2694	1.3861	0.1943	0.9026***	0.0756	11.9400	0.1262	1.1181	0.1129	0.6619	0.8257	0.8017
	v	9.3473***	1.8678	5.0050	7.5620***	1.1748	6.4370	9.1611***	1.8522	4.9460	7.4433	1.1817	6.2990
	L-L	4580.902			4210.0540			4195.2590			3954.0290		

Notes: This Table presents the volatility spillover effects between carry trade returns and stock market returns in Africa with EUR and GBP as funding currencies. The Table shows the results of the Engle (2002) DCC-AR (1, 1) with student t distribution. ρ measures correlation, while α and β are respectively the ARCH and GARCH parameters under the restrictive condition of non-negativity satisfying $\alpha + \beta < 1$ in all cases. L-L is log-likelihood, SE is standard error, t-stat is t-statistics and v is the degrees of freedom of the distribution of innovation. ***, **, and * are statistical significance at 1%, 5% and 10%, respectively. A total of 729 observations (12/01/2001-26/12/2014) for each country were used for the estimation.

Furthermore, Figures 1 and 2 present the conditional correlation plots between the carry trade returns of African currencies and their respective stock market returns. Figure 1 relates to carry trades funded by the Euro and British Pound, whilst Figure 2 relates to those funded by the United States Dollar and Japanese Yen. The plots confirm the presence of conditional correlations between African currency carry trades and stock market returns, excepting carry trades that target the Tunisian Dinar and funded by the Yen, that target the Botswana Pula and the South Africa Rand and funded by the US Dollar, and those that target the Moroccan Dirham and Tunisian Dinar and financed by the Euro. In addition, the plots largely show that the conditional correlations between the African currency targeted carry trades and their stock market returns are dynamic and time-varying.

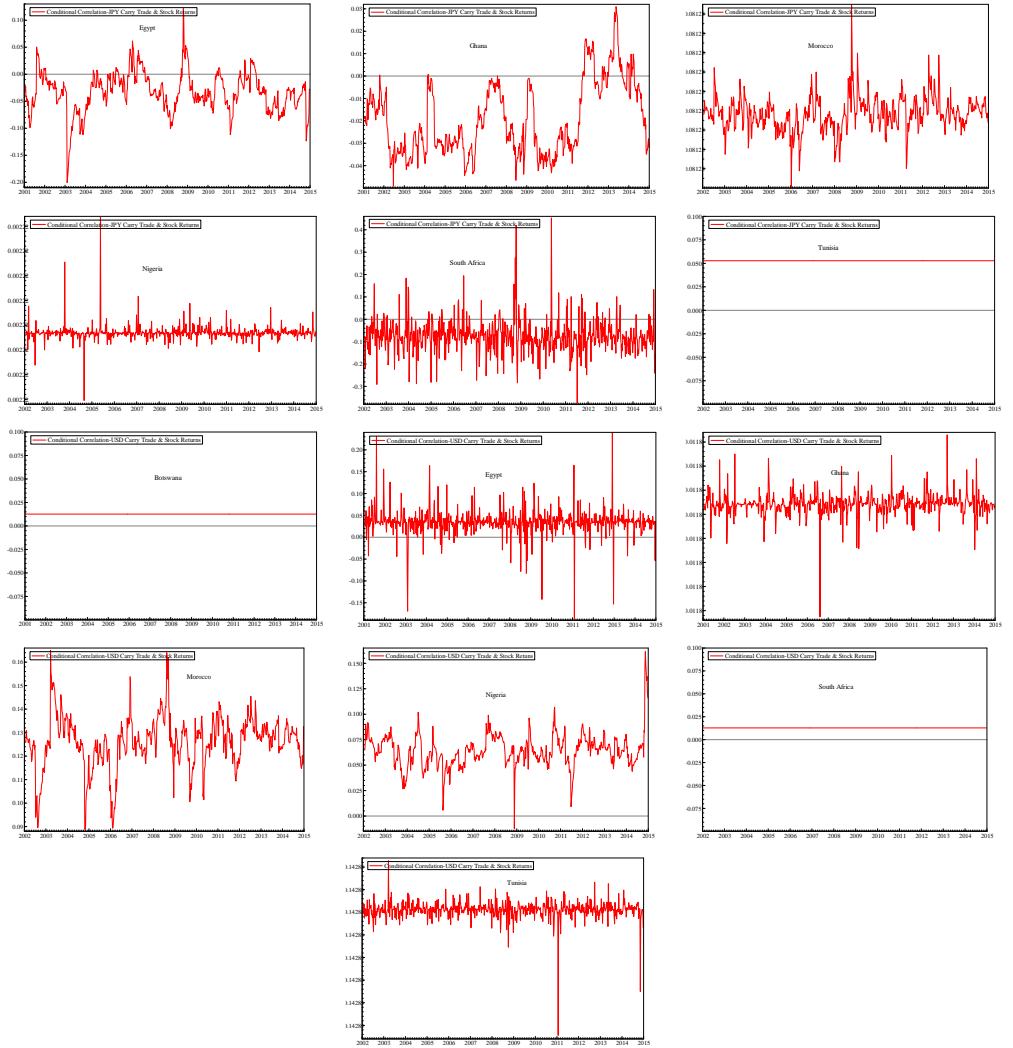


Figure 1: Conditional correlations of JPY and USD carry trades and stock markets

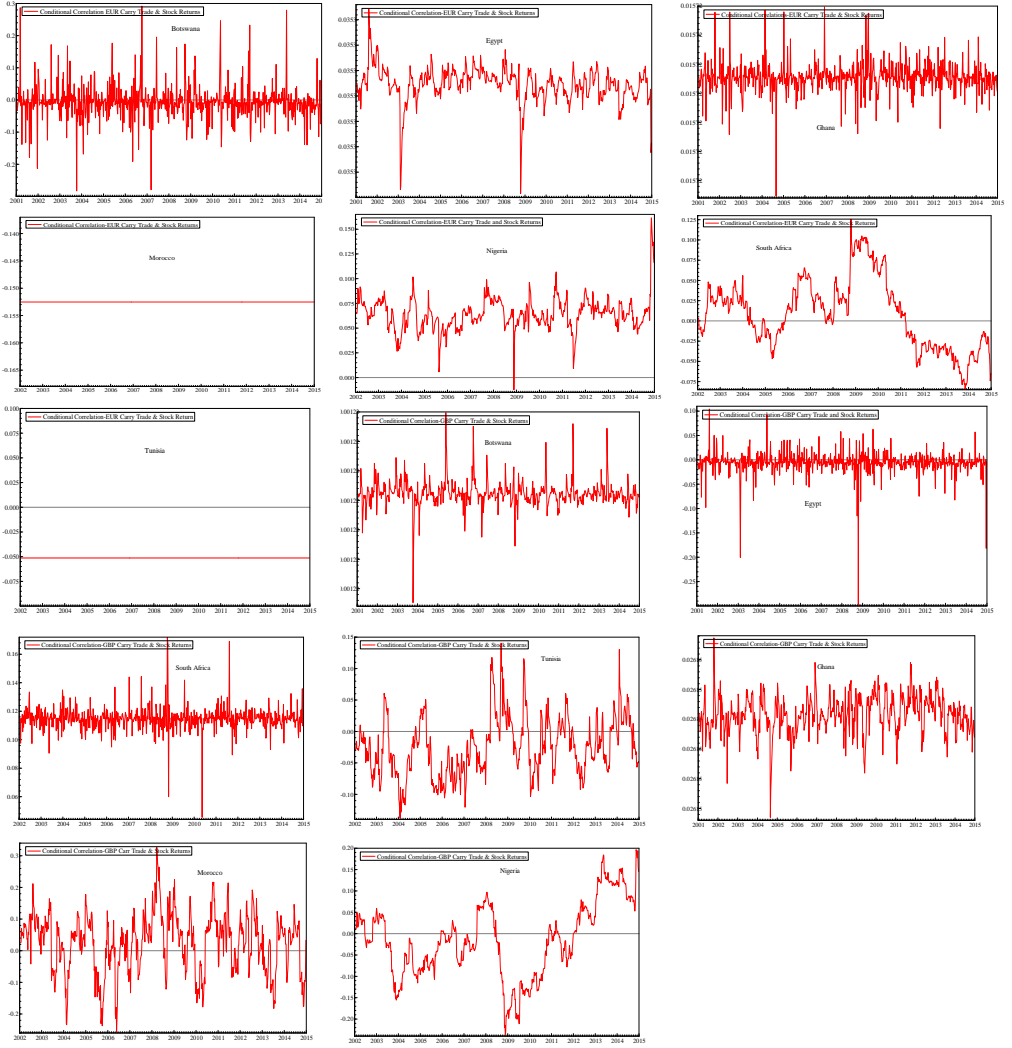


Figure 2: Conditional correlations of EUR and GBP carry trades and stock markets

5. Conclusions

We explore the implications of carry trades targeting African currencies for the returns of stock market indices in Africa. To this end, we examine the causal relationship between African currency targeted carry trades and stock market returns using vector autoregressive-Granger causality (VAR-Granger). We additionally investigate the dynamic relationship and volatility spillover between currency carry trade returns and stock market returns using the dynamic conditional correlation-generalised autoregressive conditional heteroskedasticity (DCC- GARCH). We use four developed currencies as funding currencies and seven African currencies as the target markets as well as the returns of stock indices of their respective countries.

The paper provides evidence of significant causal relationship running from African currency targeted carry trades to the stock markets of their respective countries, but not vice versa. The paper also finds that stock market returns generally do not drive currency carry trades in Africa. The paper further documents evidence of moderate volatility spillover

emanating from the currency carry trades to the stock markets for a significant number of currency pairs, but not from stock markets to carry trade markets. In addition, evidence is provided that the conditional correlations between the African currency targeted carry trades and stock market returns are dynamic and time-varying, and that there is evidence of high degree of persistence in return volatility and mean reversion. An overarching implication of the findings is that there is high information transmission mechanism from the currency carry trade market to the stock markets much more than it is from the stock markets to currency carry trades.

The findings of this study have far-reaching implications for the stability of foreign exchange markets, the efficiency and growth of international financial markets and, to some extent, the global economy as a whole. First, from a theoretical standpoint, the findings confirm the assertion that the UIP does not hold in most financial markets, which further suggests that most financial markets, especially in developing economies, are inefficient. Impliedly, while it is plausible for investors and fund managers to make systematic gains by shorting low-yielding currencies and taking long positions in high-yielding currencies, such activities or trading strategies have the potential to disrupt foreign exchange markets, deepen financial market inefficiency and financial system failure, and, given the degree of economic and financial integration, disrupt the global economy. Given that carry trade has the ability to cause systematic mispricing and asset bubbles in the foreign exchange markets, and the fact that it is a major source of shock and volatility spillover in financial markets, we recommend that policy makers and financial markets regulators in Africa, in particular, need to formulate policies and tighten regulations to control the practice. The range of policies and regulations could comprise stepping up efforts to improve informational efficiency and flows in African financial markets, improve market regulation, and promote greater market integration with the developed financial markets for market efficiency, among others.

Second, an empirical implication of the findings is that, given that the African targeted currency carry trades are closely linked with their stock markets, activities of carry traders could influence the stock markets in two main ways: (1) carry-trade-related capital flows could find their way into the stock markets, spurring improved performance, and (2) the transient nature of the currency carry trade strategy could cause unexpected unwinding of carry trade investments by investors. The abrupt unwinding of carry trade investments is often due to large anticipated future losses caused by adverse economic and market conditions. This sudden withdrawal from the market can have devastating consequences for the performance of stock markets and economies, especially when sound regulatory and institutional framework to deal with the situation is lacking. The findings thus show that it is important for policy makers in developing and emerging economies, in particular, to maintain sound macroeconomic environment to keep traders in the financial market. Additionally, it is imperative for regulators in these economies to take the necessary, innovative and bold steps to improve their regulatory and institutional frameworks to track carry trade funds in order to be able to deal with the risks associated with the downside risk of the strategy.

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**Registration payment is only via ConfBay system.*

Submission Guidelines

Basic Submission Rules

- Format: All content in one file, including title page, abstracts, JEL, keywords, text, tables, figures, references and appendix, if any.
- Language: English
- Paper length: No limit
- Paper size: A4 with single spacing
- Font type: Times New Roman
- Font size: 10 point
- Figures & Tables: Included in the paper (please do not send separately)
- Margin: One inch margin around each side of the page
- File format: MS Word-compatible file (PDF file is not acceptable)

**Articles which previously published, under consideration by another conference or journals, and with pre-existing copyright are advised not to be submitted for review and consideration.*

Important Dates

Submission Deadline	1 June 2022
Notification of Acceptance (latest)	1 July 2022
Registration & Payment Deadline	1 August 2022

Conference Fees

<u>Local Participant</u>	<u>Fees</u>
Presenter (MFA member)	RM 450
Presenter (Non-MFA member)	RM 650
Presenter (Student)	RM 350
Participant	RM 350

<u>International Participant</u>	<u>Fees</u>
Presenter & Non-Presenter	USD 250
Student	USD 150

Contact

For further information, please contact:

MFAIC2022 Secretariat,
Labuan Faculty of International Finance
Universiti Malaysia Sabah
Labuan International Campus
Email: mfa2022_fkal@ums.edu.my
Phone: 087-503000, Ext : 410000
Fax No : 087-503113

PAST MFA CONFERENCE

The MFA is proud to be the pioneer in organizing a national-level conference that specializes in finance. Since its inaugural workshop in 1999, the meeting of finance academicians and practitioners has developed to become an annual symposium and today, owing to the overwhelming response, the meeting is now known as an annual conference. The conference is hosted by local institutions of higher learning, both public and private, on rotational basis.

The conference is a great platform for academicians and practitioners to discuss and exchange ideas pertaining to issues related to finance. It also provides an avenue for researchers to share their findings on financial issues relevant to Malaysia. Selected papers from the conference are published in the Capital Market Review which is an official publication of Bursa Malaysia and Research Institute of Investment Analysts Malaysia (RIIAM).

Previous MFA Annual Conference:

1999: THE MALAYSIAN FINANCE ASSOCIATION 1ST ANNUAL WORKSHOP

Theme: The Inaugural MFA Workshop

Host: Universiti Kebangsaan Malaysia (UKM)

2000: THE MALAYSIAN FINANCE ASSOCIATION 2ND ANNUAL SYMPOSIUM

Theme: The Malaysian Financial Crisis and its Recovery

Host: Universiti Malaya (UM)

2001: THE MALAYSIAN FINANCE ASSOCIATION 3RD ANNUAL SYMPOSIUM

Theme: Malaysian Capital Markets: Challenges for the New Millennium

Host: Universiti Islam Antarabangsa Malaysia (UIAM)

2002: THE 4TH ANNUAL MALAYSIAN FINANCE ASSOCIATION SYMPOSIUM

Theme: Globalization and Malaysian Financial Market: Strategies for Sustainable Growth

Host: Universiti Sains Malaysia (USM)

2003: MALAYSIAN FINANCE ASSOCIATION'S (MFA'S) 5TH ANNUAL SYMPOSIUM

Theme: Competitiveness and Stability Financial Strategies in Malaysia

Host: Multimedia University (MMU)

2004: THE MALAYSIAN FINANCE ASSOCIATION 6TH ANNUAL SYMPOSIUM

Theme: Revitalising the Financial Market: The Tasks Ahead

Host: Universiti Utara Malaysia (UUM)

2005: THE MALAYSIAN FINANCE ASSOCIATION 7TH ANNUAL CONFERENCE

Theme: Consolidation and Prudent Financial Management: Roads to Malaysian Economic Prosperity

Host: Universiti Teknologi MARA (UiTM), Terengganu

2006: THE MALAYSIAN FINANCE ASSOCIATION 8TH ANNUAL CONFERENCE

Theme: Managing Finance for Global Business Growth

Host: Universiti Malaysia Sabah (UMS)

2007: THE MALAYSIAN FINANCE ASSOCIATION 9TH ANNUAL CONFERENCE

Theme: Positioning Malaysia as A Premier Financial Market

Host: Universiti Teknologi MARA (UiTM)

2008: THE MALAYSIAN FINANCE ASSOCIATION 10TH ANNUAL CONFERENCE

Theme: Strengthening Malaysia's Position as a Vibrant, Innovative and Competitive Financial Hub

Host: Faculty of Economics and Business, Universiti Malaysia Sarawak (UNIMAS)

2009: THE MALAYSIAN FINANCE ASSOCIATION 11TH ANNUAL CONFERENCE

Theme: Financial Markets, Governance and Growth: Issues & Challenges

Host: Faculty of Economics and Management and the Graduate School of Management, Universiti Putra Malaysia (UPM)

2010: THE MALAYSIAN FINANCE ASSOCIATION 12TH ANNUAL CONFERENCE

Theme: Re-Engineering the Financial System towards a Global Innovation Economy

Host: Taylor's University College

2011: THE MALAYSIAN FINANCE ASSOCIATION 13TH ANNUAL CONFERENCE

Theme: Financial Innovation & Transformation in the 21st Century World Conference

Host: UKM-Graduate School of Business, Universiti Kebangsaan Malaysia (UKM)

2012: THE 14TH MALAYSIAN FINANCE ASSOCIATION CONFERENCE

Theme: Emerging Markets and Financial Resilience: Decoupling Growth from Turbulence

Host: Graduate School of Business (GSB), Universiti Sains Malaysia (USM)

2013: THE 15TH MALAYSIAN FINANCE ASSOCIATION CONFERENCE

Theme: Financial Challenges and Economic Growth – The Way Forward

Host: Graduate Studies Department, INCEIF

2014: THE 16TH MALAYSIAN FINANCE ASSOCIATION CONFERENCE

Theme: Financial Systems Re-Generation: MAPS, GAPS and TRAPS

Host: Universiti Malaya (UM)

2015: THE 17TH MALAYSIAN FINANCE ASSOCIATION CONFERENCE

Theme: Financial Inclusion as A Means to Minimize Fragility

Host: Universiti Teknologi MARA (UiTM), Sabah

2016: THE 18TH MALAYSIAN FINANCE ASSOCIATION CONFERENCE

Theme: Towards a Vibrant Social Finance for A Sustainable Banking and Financial System

Host: Universiti Sains Islam Malaysia (USIM)

2017: THE 19TH MALAYSIAN FINANCE ASSOCIATION CONFERENCE

Theme: Challenges and New Directions amidst Global Financial Uncertainty

Host: Universiti Tunku Abdul Rahman (UTAR)

2018: THE 20TH MALAYSIAN FINANCE ASSOCIATION CONFERENCE

Theme: Innovative Ecosystem for Financial Revolution

Host: Universiti Utara Malaysia (UUM)

2019: THE 21ST MALAYSIAN FINANCE ASSOCIATION CONFERENCE

Theme: Charting A New Course in Financial Innovation and Education

Host: Sunway University

2020: THE 22ND MALAYSIAN FINANCE ASSOCIATION CONFERENCE [VIRTUAL CONFERENCE]

Theme: Financial Sustainability During the Era of Covid-19 Pandemic

Host: Malaysian Finance Association (MFA)

2021: THE 23RD MALAYSIAN FINANCE ASSOCIATION INTERNATIONAL CONFERENCE [VIRTUAL CONFERENCE]

Theme: Sustainability of Business and Finance: Embracing the New Norms Amidst Covid-19

Host: Universiti Sains Malaysia (USM)



OBJECTIVES

The objectives of MFA are to stimulate public interest in finance related studies, to encourage the research and discussion of finance related issues with special reference to Malaysia, to issue Malaysian finance Journals and other publications with the prior approval of the relevant authorities, to promote and organize conferences, forums, dialogues and activities between private and public sectors on current finance issues of national and international concerns; and to undertake such management, economic, and other activities as the Association deems appropriate for the furtherance, promotion and execution of its aforesaid objectives.

MEMBERSHIP

Membership is open to academicians, professionals and students in the area of Finance, Banking, Economics, Insurance, Real Estate, Accounting and other finance related area.

There are three types of membership: Ordinary Membership, Associate Membership and Life Membership.

Ordinary Membership

The Ordinary Membership is open to all academicians and working person in the field of Accounting, Banking, Business Administration, Economics, Finance, Financial Engineering, Actuarial Science, Data Science, Insurance and other finance related area. Ordinary member is eligible to attend and vote at all general meetings of the Association.

Associate Membership

The Associate Membership is open to foreign professionals / scholars / postgraduates in the field of Finance, Banking, Economics, Insurance, Real Estate, Accounting and other finance related area. The associate members are entitle to all general meetings, but are not eligible to hold an office and to vote.

Life Membership

The Life Membership is open to Malaysian academicians, an extension of ordinary membership and entitles to all the rights and privileges of ordinary members.

Membership Fee

Ordinary member RM 100 per year
Associate member RM 100 per year
Life member RM 600

Payment can be remitted via bank draft, cheque, money order made payable to "PERSA TUAN KEWANGAN MALAYSIA (BARU)" or direct payment to BANK MUAMALAT MALAYSIA BERHAD: 1205-0003606-71-1.

Please notify us your application by sending the application form and proof of payment to mgf@mfa.com.my.

Note: Ordinary and Associate Membership expires every 31 December each year.

Inquiries should be forwarded to :

SECRETARY,

Malaysian Finance Association (MFA)
c/o: Faculty of Business and Management (FBM)
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40450 Shah Alam Selangor MALAYSIA

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MFA MEMBERSHIP FORM

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Capital Markets Review

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INSTRUCTION FOR AUTHORS

1. The cover page should contain the title of the manuscript, the author(s) and their affiliation(s). Title should be typewritten in bold and in 14pt fonts. Author's name and affiliation should be typewritten in single spacing using 8pt fonts with affiliations typed in italics. All text on this page should be centre aligned. Contact of corresponding author and acknowledgement should be mentioned in the footnote in 8pt fonts with a symbol *. Author must provide complete correspondence information – Author's name, telephone number and email address.
2. Manuscripts may be written in either Bahasa Melayu or English. Only original and unpublished works will be considered. The first page of text shows the title of the manuscript with an abstract of about 300-350 words and a maximum of 6 keywords identifying the main topics of the manuscript. JEL classification numbers should be included after the keywords.
3. Structured Abstract (300-350 words)
Research Question: In one sentence, define the key features of the research question or problem statement. **Motivation:** In a few sentences, capture the core scholarly motivation for the study. If relevant, identify a 'puzzle' that this research aims to resolve. Identify up to 3 key papers upon which the research builds. What's new? Highlight where novelty exists in the study; how does it improve or build on existing literature? So what? Outline the primary reason why it is important to know the answer to your research question. **Idea:** Articulate the core idea behind the research – what specifically does the study do? If relevant: articulate the central hypothesis; highlight key independent variables and dependent variable(s). **Data:** Provide an overview of what data were collected/analysed/used in the study; including data source(s), time period, sample size and measurement tool(s). **Method/Tools:** Provide a brief summary of the empirical framework, research design and approach. **Findings:** Highlight the key takeaway points. Highlight any novel result – how do the findings agree/disagree with existing literature? What do the findings add? Highlight any important implications this research has for influence in real-world decisions/behaviour/activity. **Contributions:** Outline the primary contribution of this paper to the relevant research literature.
4. The paper starts after the JEL classification, with all pages numbered consecutively at the bottom right. Heading of main section (e.g. **1. Introduction**) and headings of subsections (e.g. **3.1 Data Sample**) should be typed in bold. Headings of subsequent subsections (e.g. *3.1.1 Data Source*) should be typed in italics.
5. Tables and figures should be embedded in the text. All tables and figures should be numbered consecutively with Arabic numerals, have a brief title, and be referred to in the text. The entire table should be presented in one page unless too long. Landscape table is acceptable. Vertical lines should not be used in the table. Explanatory notes should be placed at the bottom of the table. The word 'Notes' precedes the table notes. Tables and their respective titles should be aligned to the left. Figures and their respective titles should be aligned to the centre. All figures should be provided as high-quality printouts, suitable for reproduction.
6. The whole manuscript should be typewritten in single spacing using 10pt fonts, except for tables (maximum 9pt fonts), figures (maximum 9pt font), footnotes (8pt fonts), and explanatory notes for the tables (8pt fonts).
7. Responsibilities for the accuracy of bibliographic citations lie entirely with the authors. Submission to Capital Markets Review should follow the style guidelines described in the American Psychological Association (APA).
8. Capital Markets Review welcomes article submissions and does not charge a submission fee. Please email your manuscript to Professor Dr. Chee-Wooi Hooy, Chief Editor, Capital Markets Review: cmr@mfa.com.my (cc: cmr.mfa@gmail.com).

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Published twice a year in March and September, CMR contains papers in both English and Bahasa Melayu. CMR publishes double-blind refereed articles in various aspects of finance, including Asset Pricing, International Finance, Corporate Finance, Banking, Risk and Insurance, Market Microstructure and Islamic Banking and Finance. The journal welcomes empirical and theoretical contributions that have not been previously published.

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