Hālal Investment Sensitivity to Cash Flow and the Effects of Capital Market Imperfections

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Abstract.-This paper examines the relationship between hālal investment sensitivity and cash flow, as well as the impact of capital market imperfections on investment sensitivity in ṣukūk -dependent companies versus conventional enterprises in six countries: Saudi Arabia, the United Arab Emirates, Kuwait, Qatar, Bahrain, and Malaysia. The research is based on panel data from 240 non-financially listed conventional and Islamic enterprises from 2018 to 2022. The study incorporates both analytical and econometric approaches. Stationarity, co-integration, and multivariate Granger-Causality tests are carried out using the estimated equations. The study finds that there are considerable distinctions between ṣukūk -dependent firms and traditional enterprises. At the 5% significance level, both groups' investment expenditures responded significantly to cash flow. But hālal investment rises by $0.14 for ṣukūk -dependent companies, whereas conventional investment climbs by $0.17 for conventional businesses when current cash flow rises by $1. Market capital imperfections, as assessed by four factors, have a significant effect on hālal investment cash flow sensitivity. The sensitivity of hālal investments to cash flows diminishes when fund flows, analyst following, institutional ownership, and the corporate governance index increase. Finally, the Grnagel causality tests confirm the study's alternative hypotheses. There is a bidirectional causal relationship between hālal investment and cash flow, while there is a unidirectional relationship from capital market imperfections to hālal investment-cash flow sensitivity.

1. Introduction

The relationship between capital expenditure and cash flow is a crucial aspect of financial management. Financial limitations affect cash flow and capital costs. Enterprises may raise funds for their operations in a variety of ways, allowing them to develop and expand. They may raise funding by issuing bonds, acquiring loans, reinvesting profits in their activities, or issuing additional shares to investors. Firms with financial restrictions, such as restricted access to external funding, may need to rely more on internal cash flow for investments. The maturity and effectiveness of financial markets and institutions might impact the decisions they make. (Cetenak et al., 2022).

Investment sensitivity to cash flow indicates how much cash flow influences an enterprise's investment decisions. It is calculated by dividing the percentage change in capital expenditures by the percentage change in cash flow from operations. A high sensitivity indicates that an enterprise's investment decisions are significantly influenced by cash flow, whereas a low sensitivity implies that an enterprise's investment decisions have less impact on cash flow (Hovakimian, 2009). Investment cash flow sensitivity might be affected by many factors such financial constraints, cash flows, and firm's growth prospects (Chiu, Fang Ho, & Tasi, 2022).

In transparent capital markets, there is no distinction between external and internal financing costs. Companies that operate in the world of perfectly efficient markets pay no taxes, have no transaction costs, and bankruptcy is possible, but there are no bankruptcy costs, agency difficulties, and information that is perfectly symmetric (Modigliani & Miller, 1958). An inefficient

capital market can lead to underinvestment, overinvestment, or resource misallocation in the context of investment since it hinders the market's ability to function effectively (Senay & Abon, 2008). According to the pecking order hypothesis, under asymmetric information, firms should prioritize internal funding before debt and equity financing because external financing will result in adverse selection and lower business valuation (Myers & Majluf, 1984).

Ḥālal is an Islamic term that means "lawful" or "allowed." ḥālal investment represents the obligations that follow Sharīʿah, or Islamic law. Ḥālal investing avoids activities that include prohibited goods such as gambling, alcohol, or tobacco, as well as charging or receiving interest, which steers ḥālal investors away from traditional bonds or other interest-bearing assets. Ḥālal investment also requires taking social responsibility and donating any illegal profits to charitable organizations (Paltrinieri et al., 2023).

There are several factors contributing to the rise in popularity of ḥālal investing, such as the growing Muslim population and the growing need for financial services and goods that abide by Islamic law. Investors become more conscious of their financial decisions according to their own principles, steering clear of businesses or sectors that negatively affect the environment or society. Innovations in technology, especially in fintech, have opened the world of ḥālal investing to more people. The introduction of Islamic finance and ḥālal investing to both Muslim and non-Muslim investors have increased its attractiveness and adoption due to the globalization of financial markets. Finally, a growing number of nations are realizing the benefits of Islamic finance and modifying their legal and regulatory

structures to support and promote hālal investment (Khan, Al-Jabri & Seif N., 2019).

ṣukūk are the most used instruments for internal hālal finance. They've grown in popularity during the past decade. ṣukūk are like bonds; however, they are not debt-based. Bonds are basically loans. The investors profit from the interest, which is not hālal. Investors profit from ṣukūk comes from investment income. Furthermore, ṣukūk signifies ownership of underlying assets, projects, or company operations (Azmat et al., 2014). The issuing of ṣukūk indicates the security of such assets or cash flows, with investors getting a portion of the profits earned by actual activity. Ṣukūk has become a global phenomenon, attracting Islamic investors while diversifying financial sources. Ṣukūk comes in seven different varieties: ijārah, muḍārabah, Murābaha, Mushāraka, Istisnā, sālam, and Hybird (Cheistopher et al., 2014).

The current study aims to test the significant relationship between investment and cash flow in both Islamic and conventional enterprises. Determine the effect of capital market imperfections on the sensitivity of hālal investment to cash flow. Examine the causality direction between hālal investment and cash flow as well as hālal investment sensitivity to cash flow and capital market imperfections.

The study is significant because it bridges a gap in the literature on whether Islamic enterprises have a significantly higher sensitivity to cash flow than conventional enterprises. Moreover, it employs the Granger causality test to determine the direction of causality between hālal investment and both cash flow and capital market imperfections.

The structure of the paper is a review of the prior studies in Section two. showing the data and methodology in Section three. Findings and discussion are shown in Section four. Section five contains the study conclusion, policy implications, and limitations.

2. Literature Review

The primary challenge to the theory of financial restrictions is that no matter how small or large, an entity could depend on both internal and external funding to support its investment plans. Positive net present value (NPV) and the total amount of funds required are the two factors that go into the investing decision. In the finance literature, financing restrictions are a long-standing issue. Although previous studies have attempted to identify the origins and consequences of financial limitations, the assessment of these constraints remains an ongoing topic.

Investment to cash flow sensitivity has received the most attention in traditional economics. Fazzari et al. (1988) is a prior study that argues the pecking order theory to assess corporations' decisions about investments when dealing with external financial restrictions. External financing expenses are higher because of asymmetries in information and agency fees. When a firm's cash flow is inadequate to fulfill its investment requirements, it will start looking for external finance. Therefore, the higher the sensitivity degree of investment to cash flow, the higher the hidden costs of external borrowing, and the tighter the financial restrictions.

In contrast to Fazzari et al. (1998), Kaplan and Zingales (1997) and Cleary (1999) state distinct outcomes. The studies adopt alternative criteria to categorize organizations as restricted or unrestricted.

They find that enterprises that face financial restrictions will have lower investment cash flow sensitivity. On the other hand, the studies of both Gilchrist & Himmelberg (1995) and Erickson & Whited (2000) contend that the estimated sensitivity of investment to the internal fund flow will be affected by Tobin's Q measurement challenges.

Almeida et al. (2004) study how costly external resources affect business financial decisions. Instead of analyzing the sensitivity of investment to cash flow, they focus on the sensitivity of cash-to-cash flow by categorizing enterprises as having financial restrictions or not. The study finds that companies with financial restrictions are more likely to keep cash on hand due to limited access to external resources. These findings are supported by the Denis and Sibilkov (2010) study. They reveal that enterprises with financial restrictions preserve more cash and invest more heavily. Thus, enterprises with financial limitations will have cash on hand and can assess their investment options in a shorter period.

Rashid and Jabeen (2018) utilize a large sample of Pakistani non-financial firms from 2000 to 2013 to explore the influence of financial limitations on creating a relationship between cash flow and external financing. The data show an inverse and statistically significant relationship between eternal funding and cash flow. In addition, the paper explores how credit multipliers affect both financially constrained and unconstrained firms' external funding decisions. The findings demonstrate that the negative sensitivity of external funding increases with tangible assets for enterprises that have no financial constraints. However, when asset tangibility improves, the adverse sensitivity of external borrowing to cash flow either decreases or reverses for financially constrained enterprises. This finding implies that financially limited enterprises gain substantially when investing in tangible assets. These assets help to minimize their financial limitations and it could be an immediate provider of money during times of negative cash flow disruptions.

Guizani (2019) examines the impact of Sharia conformity on the sensitivity of investment to internal funding for oil-rich nations. The study employs a fixed effect panel approach for 207 non-financial enterprises registered on the Gulf Cooperation stock exchange market between 2009 and 2014. The results show that the sensitivity of investment to cash flow is positive and substantially larger for enterprises that are more restricted. The data shows that GCCs are more sensitive to investment-cash flow than developed markets. The study also demonstrates that Sharia compliance lessens businesses' reliance on locally produced cash when embarking on new investment initiatives. Moreover, when liquidity becomes available, investment-cash flow sensitivity rises, and corporate investment expenses become more sensitive to cash flow during the crisis phase.

Wang and Zhang (2021) aim to test the hypothesis that investment in firms is sensitive to cash flow and that this sensitivity diminishes over time. The study finds that the economy is transitioning away from tangible assets and moving toward intangible ones. Firms in the new economy, on the other hand, face more competition and have less predictable future cash flow than their existing counterparts have. As a result, the current cash flow provides less information about future cash flow, making investments less sensitive.

Yilmaz (2022) studies the investment cash flow sensitivity (ICFS) and the

influence of leverage on businesses' ICFS, utilizing data from 66 non-financial enterprises in the Muscat Securities Market in Oman from 2013 to 2019. The study employs a dynamic panel investment model based on the Euler equation methodology as well as dynamic panel regressions performed with the dynamic panel system generalized method of moments. The findings reveal a considerable sensitivity of investment to cash flows in the sample enterprises. A positive coefficient for the cash flow variable shows the presence of financial limitations. Also, leverage has a significant impact on the ICFS of firms, implying that those with higher leverage have ICFS.

Regaringy Senay and Abon (2008) evaluate the impact of imperfect capital markets on investment sensitivity to cash flow. They employ five variables—fund flow, institutional ownership, bond ratings, analyst follower count, and an indicator of anti-takeover laws—as indicators of imperfection in the capital market. According to the study, investors' sensitivity to cash flow in US manufacturing firms decreases over time as capital market inefficiencies diminish.

Kashif et al. (2022) use the regression technique on 137 non-financial industrial firms that are listed on the stock exchange of Karachi. The paper demonstrates that the cash flow generated by enterprises has a significant and positive effect on investment sensitivity in both transparent and imperfect capital markets, but the sensitivity is greater in the case of imperfect capital markets, where a significant number of enterprises rely primarily on cash flow generated internally.

Accordingly, the above studies attempt to examine the sensitivity of investment to cash flow for a specific sample of non-

financial firms without specifying whether these enterprises issue debt or ṣukūk. They find that capital market imperfection enhances investment sensitivity to cash flow and that investment sensitivity to cash flow is positive. Thus, the current study fills a gap in the literature by examining the sensitivity of hālal investment and conventional investment to cash flow, as well as measuring the impact of market imperfections on the sensitivity of investment to cash flow in both types of enterprises.

3. Methodology, Data and Variables

3.1 Methodology

The current study uses panel data approaches to examine data collected over time from the study sample. The technique requires continuously monitoring the same entities across time. Furthermore, the versatility of this data analysis enables the investigation of a wide range of research questions. It allows us to investigate the long-term effects of policies and actions. It also helps to comprehend how socioeconomic concerns influence individual behaviors and market trends, as well as measure the impact of external variables on business outcomes (Baltagi, 2008).

The panel data analysis uses two models: fixed effects models (FEM) and random effects models (REM). FEM accounts for individual-specific effects by introducing dummy variables for each entity in the dataset. This technique accounts for time-invariant individual features and enables the investigation of changes within the same entity at multiple time points. REM presupposes that individual-specific effects are independent and uncorrelated with the regressors. These models calculate the average effect of variables on the whole sample (Hsaio, 2005).

The panel model can be specified as follows:

$$Y_{it} = \alpha + X'_{it}\beta + u_{it} \quad i=1,....N; t=1,....,T \quad (1)$$

Where:

(i) denotes the cross-section dimension whereas

(t) denotes the time-series dimension.

(α) is a scalar, *(β)* is $K \times 1$, and *(Xit)* is *it* of observation on *(K)* explanatory (Independent) variables.

To employ the panel data method, the author is conducting descriptive statistics to understand the data's primary characteristics. These statistics include mean, standard deviation, and distributions to gain insights into the variables involved in the analysis.

The panel data is being tested for stationarity. A unit root test is utilized to determine the stationarity of each series. The null hypothesis (H0) assumes a stationary series, whereas the alternative hypothesis (H1) calls for a nonstationary series (Ioan et al., 2020). The study uses the Levin, Lin, and Chu (LLC) unit roots test, as well as the Lm-Pesarn-Shin (IPS) and Philips-Perron (PP) stationary tests, at the level and initial difference, with intercept, and with intercept and trend. To reject the null hypothesis, at least one test must have a p-value less than 0.05/3M, where M is the total number of series and 3 is the number of conducted tests.

To identify the appropriate model for analyzing the data, The Hausman test (1978) will be used to determine whether the random effects model (REM) or the fixed effects model (FEM) should be applied as a regression model. The test null hypothesis (H0) is that REM is correct, while the alternative hypothesis (H1) is that FEM is valid. After using the Hausman test, the computed Hausman statistics are compared to the critical values for the k-degrees-of-freedom. The null hypothesis is rejected if the Hausman p-value < 0.05. Although random effects are preferred for greater efficiency, the fixed effect is more reliable and appropriate when Error terms are not connected with regressors (Abou Elseoud, Yassin, & Ali, 2020).

After estimating the chosen model, the study does robustness tests for serial correlation and multicollinearity problems to ensure that the findings are reliable. Finally, the study employs the cointegration test to determine the existence of a long-term relationship between the study variables and the Granger causality test to identify the nature and direction of the relationship between hālal investment and both cash flow and capital market imperfection. The Granger causality test hypotheses are:

Hypothesis 1:
H10: There is no causal relationship between hālal investment and cash flow.
H1a: There is a causal relationship between hālal investment and cash flow.

Hypothesis 2:
H20: There is no causal relationship between hālal investment sensitivity to cash flow and market imperfection.
H2a: There is a causal relationship between hālal investment sensitivity to cash flow and market imperfection.

3.2 Data and Variables

Ṣukūk is a relevant Islamic financing product; however, most Islamic finance markets haven't fully explored its potential. Out of the 57 members of the Organization of Islamic Cooperation (OIC), only 14 have given authorization to many stocks market-listed companies to raise funds for their projects by issuing ṣukūk. The present study selects the major six countries, accounting for around 60% of all the enterprises that rely on

șukūk issuance. Saudi Arabia, the United Arab Emirates, Kuwait, Qatar, Bahrain, and Malaysia are these countries (Bashar, 2023).

Table 1: A brief description of the selected stock markets.

**Table 1 Brief discerption of the selected stock markets**

The stock market	Discerption
The Saudi financial market (Tadawul)[1]	The Saudi financial market (Tadawul) is the main market in the GCC countries. There are 224 listed business entities, of which 180 are non-financial companies, that include energy, petrochemicals, capital goods, commercial services, transportation, consumer services, media and entertainment, healthcare, telecommunications, public utilities, technology, and real estate management and development sectors. 120 of them are șukūk-dependent companies.
The UAE stock markets[2]	The UAE has two stock markets: the Abu Dhabi Securities Market (ADX) and the Dubai Financial Market (DFM). The two markets consist of 160 listed enterprises. 110 of them are non-financial sectors such as industry, public utilities, commercial services, real estate, telecommunications, and consumption products; 40 of them are șukūk-dependent enterprises.
The Kuwait Stock Exchange[3]	The Kuwait Stock Exchange has 147 listed firms, 88 of which are non-financial enterprises specializing in health care, consumer services, real estate, public utilities, energy, telecommunications, and industrial. 70% are șukūk-dependent business enterprises.
The Qatar Stock Exchange (QSE)[4]	The Qatar Stock Exchange (QSE) lists 54 businesses, 33 of which are non-financial operations in transportation, power, water, industrial, telecommunications, real estate, medical care, and Ooredoo. 45 percent of them are șukūk-dependent firms.
The Bahrain Bourse (BHB)[5]	The Bahrain Bourse (BHB) has 61 listed businesses, 50 of which are non-financial and operate in the services, hospitality, and tourist industries. 14 of them constitute șukūk-dependent businesses.
Bursa Malaysia (FTSE)[6]	Bursa Malaysia (FTSE) is one of ASEAN's largest stock exchanges, with 972 listed firms. 668 of them are non-financial șukūk-dependent enterprises in the chemicals, health care, metal, postal, aviation, and gas sectors (Bursa Malaysia, 2023).

Sources: [1] (Suadi exchange, 2023), [2] (Securities & Commodities Authority, 2023), [3] (Bourse Kuwait, 2023), [4] (Qatar Stock Exchange, 2023), [5] (Bahrain Bourse, 2023), [6] ((Bursa Malaysia, 2023).

The study's sample covers the non-financial listed enterprises in the stock markets of the six nations that rely on financing through șukūk or bonds. The selected non-financial enterprises consist of health care, telecommunications, real estate, transportation, chemicals, industrial, metal, media & entertainment, and public utilities.

The study depends on secondary data from Thomson Reuters governance indices as well as annual reports from non-financial firms in the six nations for the period 2018–2022. Figure 1 shows the distribution of listed firms in each stock market

Figure 1: Distribution of listed enterprises in slected countries's stock markets
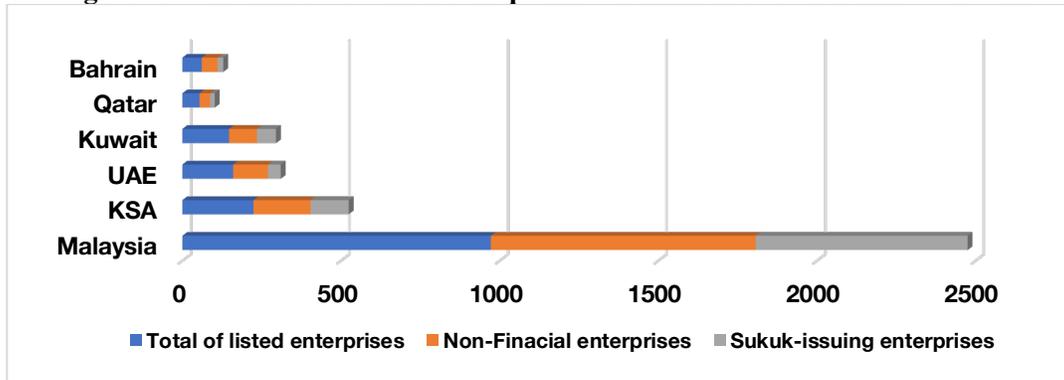
Source: Stock markets' website of the slected countries

Mohamed Sayed Abou Elseoud

The research sample consists of 240 firms, of which 120 rely on sukūk and 120 rely on bonds. Table 2 shows the distribution of the sample by nation.

Table 2 . The distribution of study sample by nation

Countries	No. of Islamic enterprises	No. of conventional enterprises	Total
Bahrain	5	3	8
KSA	34	34	68
UAE	25	19	44
Kuwait	5	6	11
Qatar	6	9	15
Malaysia	45	49	94
Total	120	120	240

Source(s): Author's Own.

According to the prior studies, the current study variables are capital expenditure, total assets, cash flow, Tobin's Q, ṣukūk Issuance value and the amount of conventional debt (bond), as well as capital market imperfections factors which are: flows of funds, the following of analysts, institutional ownership, and the index of corporate governance. Table 3 shows the definition of each variable.

Table 3. study variables definitions and abbreviations

Variable	Abb.	Definition
Total asset [1]	TA	It represents the entire quantity of properties possessed by a company. It has an economic value that is spent over time to provide a benefit to the holder. It is normally documented in the accounting records and appears on the firm's balance sheet.
Cash flow[1]	CF	It refers to the flow of funds within and outside of an organization. It may be divided into cash flows from operation, investment, and finance.
Tobin's Q[1]	TQ	It is a financial metric that compares the market value of a company (or its assets) to the replacement cost of its assets. The Q ratio is calculated as a ratio of the market value a firm's assets. If Q ratio>1, this means that the market value a firm's exceeds the replacement cost of its assets, while Q ratio <1 indicates that the firm is poorly valued by the market
Capital expenditure[1]	CE	It is the amount of money a company spends on purchasing, maintaining, or improving its fixed assets, such as buildings, vehicles, machinery, or property.
Ṣukūk[2]	SUK	Financial products that adhere to Islamic principles and serve to raise cash in the Islamic finance industry.
Conventional debt[1]	DET	It is a type of debt finance. It consists of stock, loans from banks, and facilities of credit. It is frequently given to provide quick funds for a certain project that the firm is interested in pursuing.
Flow of funds[3]	FF	The amount of money that moves within and out of different investment vehicles over certain periods. Analysts may use the path of cash flows to gain knowledge concerning the health of certain stocks and sectors, as well as the entire market.
Following of Analysts[4]	FA	It means how equity analysts believe a company's financial state and stock price will fare in the short to medium term. These projections depend on basic research, financial statement examination, and comparisons to peers and rivals.
Institutional ownership[5]	InO	ownership of a company's shares via large institutions of finance, retirement funds, and foundations. Their presence has a clear influence on organizations because they hold significant shareholdings, and thus anticipated to be able to oversee management
Index of Corporate governance[6]	CG	an index of whether the board of directors and top executives are operating in the most beneficial interest of the firm, if there is a vision for sustainability, a positive atmosphere, truthful and precise disclosures, as well as efficient procedures and regulations.

Source: [1](Brealey R., et al., 2022), [2](Azmat et al., 2014). [3](Kent &Bu., 2020), [4](Kim et al., 2021), [5](Moradi et al., 2022), [6](Aliabadi et al., 2018)

Thus, the study tests the following two equations:

$$\frac{CE_{i,t}}{TA_{i,t-1}} = a_i + B_1 \frac{CF_{i,t}}{TA_{i,t-1}} + B_2\ TQ_{i,t-1} + B_3\ SUK_{i,t-1} + e_i \qquad (2)$$

$$\frac{CE_{i,t}}{TA_{i,t-1}} = a_i + B_1 \frac{CF_{i,t}}{TA_{i,t-1}} + B_2\ TQ_{i,t-1} + B_3 \frac{SUK_{i,t}}{TA_{i,t-1}} + B_4 \frac{DET_t}{TA_{i,t-1}} + B_5\ (CF_{i,t}\ x\ factors) + €_i \qquad (3)$$

Where:
- $CE_{i,t}$: A capital expenditure of firms i,
- $TA_{i,t-1}$: Total assets at the beginning of the period.
- $CF_{i,t}$: The cash flow of an enterprise is calculated as (Net revenue minus amortization and depreciation adjusted by $TA_{i,t-1}$)
- B_1 : determines the sensitivity of investment to cash flow for the time period t

- $TQ_{i,t-1}$: Tobin's Q that calculated as (Total of assets minus Equity book value plus the market value of equity) divided by $TA_{i,t-1}$.
- $SUK_{i,t-1}$: A value of ṣukūk.
- DET_t : A value of conventional debt.
- $CF_{i,t}$ x factors : refers to the interplay of the variables and the cash flow related to investment market imperfection. These variables are flows of funds, the following of analysts, institutional ownership, and the index of corporate governance.
- e_i & $€_i$: unexplained portion of the model

Equation 2 assesses the sensitivity of hālal investment to cash flow in ṣukūk-dependent, while Equation 3 examines the impact of capital market imperfections on hālal investment sensitivity to cash flow.

4. Results and Discussion

4.1 Descriptive statistics

Table 4 shows descriptive statistics for the collected data. The table clearly differentiates between companies that issue ṣukūk and those that issue debt. Conventional firms are larger (in terms of total assets) than Islamic enterprises. While typical firms have lower capital expenditures and cash flow ratios than ṣukūk issuers, conventional firms leveraged up to 76.4%, whereas Islamic firms leveraged up to 42.1% through ṣukūk

Table 4. Descriptive statistics

Variables	All enterprises		Islamic enterprises		conventional enterprises	
	Mean	SD	Mean	SD	Mean	SD
CE_t / TA_{t-1}	0.2121	0.4358	0.2621	0.6935	0.1791	0.4012
CF_t / TA_{t-1}	0.2024	0.2377	0.2925	0.3135	0.1504	0.2661
$TQ_{i,t-1}$	1.7351	1.4296	1.5368	1.4189	1.7918	1.1483
TA_t	94219	61437	8531	4153	9864	5385
SUK_t / TA_{t-1}			0.4218	0.7154		
DET_t / TA_{t-1}					0.7641	0.8917

Source(s): Author's Own.

Table 5 shows the Pearson correlation matrix. At the 5% level, the correlation between capital expenditure and both CF and TQ is significant and positive, while the correlation between capital expenditure and TA is significant and strongly negative.

Unlike conventional enterprise investments, which have negative and significant associations with debt, ṣukūk has a negative

but insignificant correlation with capital expenditures.

Table 5. Correlation matrix

Panel one: Islamic enterprises					
	CE_t/TA_{t-1}	CF_t/TA_{t-1}	$TQ_{i,t-1}$	TA_t	SUK_t/TA_{t-1}
CE_t/TA_{t-1}	1	0.238**	0.465**	-0.548**	-0.454
CF_t/TA_{t-1}		1	0.636**	-0.394**	0.273
$TQ_{i,t-1}$			1	-0.301**	0.116
TA_t				1	0.337
SUK_t/TA_{t-1}					1
Panel two: Conventional enterprises					
	CE_t/TA_{t-1}	CF_t/TA_{t-1}	$TQ_{i,t-1}$	TA_t	DET_t/TA_{t-1}
CE_t/TA_{t-1}	1	0.276**	0.434**	-0.541**	-0.365**
CF_t/TA_{t-1}		1	0.239**	-0.434**	0.251**
$TQ_{i,t-1}$			1	-0.236**	-0.143**
TA_t				1	0.325
DET_t/TA_{t-1}					1

Source(s): Author's Own. Note: *, **, *** Significant at 10%, 5%, and 1% respectively.

4.2 Results for stationarity

The study used the Levin, Lin, and Chu (LLC) unit roots test, as well as the Lm-Pesarn-Shin (IPS) and Philips-Perron (PP) stationary tests, at the level and first difference, with and without intercept, and trend. Table 6 demonstrates that the series has an integration order of I(0), indicating that it might be applied straight to panel regression.

Table 6: Unit root and Stationary tests

	LLC		IPS		PP	
	Statistic	Prob.	Statistic	Prob.	Statistic	Prob.
TA	-4.18516**	0.0000	-1.13459	0.1283	26.5804**	0.0089
CF	-5.41689**	0.0000	-8.88233**	0.0000	89.302**	0.0000
TQ	-4.98138**	0.0000	-2.78711**	0.0027	41.2614**	0.0000
CE	-5.2772**	0.0000	-3.6484**	0.0001	33.8451**	0.0007
SUK	-5.03771**	0.0000	-2.63212**	0.0042	39.4868**	0.0001
DET	-5.54707**	0.0000	-3.72622**	0.0001	34.4992**	0.0006

Source(s): Author's Own. Note: ** Level of significant is 5%

4.3 Husman test reslts
In order to determine whether the random effects model (REM) or the fixed effects model (FEM) should be adopted as a regression model, table 7 illustrates the Husman test findings, where P < 0.05

indicates that the null hypothesis is accepted, and FEM is valid for the study estimations.

Table 7. Hausman test

Type of Model	Fixed Vs Random
Chi-square test value	238.99
P-value	0.000
Conclusion	Accept H0
Decision	Fixed Effect Model

Source(s): Author's Own.

4.4 Robustness tests results

Table 8 shows the robustness test results. The Jeffrey M. Wooldridge test, which looks for autocorrelation in a panel, and the modified Wald test, which looks for heteroskedasticity, both illustrate the significance of parameter estimation. Table 8 shows that the F statistic for equations 2 and 3 is 15.56 and 16.43, respectively, with p values of 0.0109 and 0.0106. This means that, at the 1% level of significance, we accept the null hypothesis, which means there is no autocorrelation in both models.

The variance inflation factor (VIF) is adopted to assess the multicollinearity problem. The VIF measures how much the variance of an estimated regression coefficient increases due to multicollinearity. Table 8 illustrates the VIF values for each variable and their reciprocals. The VIF values are all marginally above 1. TA has the highest VIF at 1.23, and CE has the lowest at 1.16. The reciprocals of these VIF values, which indicate tolerance, range from approximately 0.810 to 0.892, suggesting no evidence of serious multicollinearity among the variables.

Table 8: Robustness tests results

Serial Correlation Test			
H0: no first-order autocorrelation			
Model 1		Model 2	
F=15.563		F=16.43	
Prob > F = 0.0109		Prob > F = 0.0106	
Variance Inflation Factor			
Variables	Variable	VIF	1/VIF
TA		1.23	0.8104
CF		1.21	0.8289
TQ		1.2	0.8308
CE		1.16	0.8642
SUK		1.12	0.8928
DET		1.19	0.8403
Mean VIF		1.18	

Source: Author's Own.

4.5 Testing hālal Investment–cash flow sensitivity

Table 9 shows the effect of cash flows on hālal investment sensitivity. The study divides model one into two panels. The first panel defines the dependent variable as a firm's spending on capital relative to its beginning-of-period total assets. The second panel computes the dependent variable as the proportion of the firm's capital expenditure and research and development (R&D) expenses to its beginning-of-period total assets.

Model A is the initial framework that comprises a complete sample of conventional and Islamic enterprises. Ṣukūk and Debt are dummy variables that take 1 if the enterprise depends on ṣukūk or debt and 0 otherwise. Both ṣukūk and debt are included in nominal terms in models B and C, respectively. The equations' explanatory power (R^2) ranges from 32% to 38%.

The study finds that there are considerable distinctions between ṣukūk-dependent firms and traditional enterprises. According to models A, B and C, the cash flow is significant and positively affected on capital expenditures for both Islamic and conventional enterprises. At the 5% significance level, both groups' investment expenditures responded significantly to cash flow. But hālal investment rises by $0.14 for ṣukūk-dependent companies, whereas conventional investment raises by $0.17 for conventional businesses when current cash flow rises by $1. The findings are in line with earlier studies [e.g., Miller &Modigliani (1963); Fazzari et al., (1988); Erickson & White, (2002); Baker et al., (2003); Rauh (2006); Meysam et al., (2013)].

Tobin's Q has a positive and significant effect, implying that high-growth companies are going to invest more. The findings suggest that Islamic enterprises have a higher Q ratio than conventional firms. Due to the source of funding. When Islamic enterprises issue ṣukūk, the Q ratio and investment tend to rise. More cash reduces the firm's financial constraints. However, while traditional enterprises rely on debt, the connection between Q ratio and investment might be more complicated. In other situations, they may migrate in the opposite direction, as depicted in the second panel.

The ṣukūk to total assets (SUKt/TAt-1) has an indirect and significant impact on capital spending in both panels of model A. This indicates that when Islamic enterprises issue additional ṣukūk while overall assets stay relatively stable, the ratio falls, boosting the available cash for hālal investment. Despite having no influence on hālal investment in model B (first panel), SUKt/TAt-1 has a significant negative effect in the second panel. This indicates that cash raised by releasing further ṣukūk could be allocated to R&D.

The regression results in model A show that, at 1%, debt to total assets (DETt/TAt-t) has a negative and significant effect on capital spending, with greater significance than SUKt/TAt-1. In model C, the DETt/TAt-1 has no effect on investment spending; this might be because the increased debt is not spent on investment expenditure but rather allocated to other costs.

Table 9. Fixed effect regression of sensitivity of hālal investment to cash flow

First Panel: Capital expenditure is a dependent variable			
	Model A	Model B	Model C
CF_t / TA_{t-1}	0.164**(3.45)	0.143**(1.95)	0.176**(4.29)
$TQ_{i,t-1}$	0.242**(2.81)	0.341**(3.56)	0.133* (1.92)
SUK_t / TA_{t-1}	- 0.143*** (0.24)	- 0.458 (1.96)	
DET_t / TA_{t-1}	-0.368***(3.82)		-0.123 (1.25)
R^2	0.351	0.383	0.324
Second panel: (Capital expenditure and R&D)			
CF_t / TA_{t-1}	0.189* (1.63)	0.112 (1.34)	0.187*** (3.03)
$TQ_{i,t-1}$	0.203***(2.63)	0.145** (2.36)	-.451*** (3.04)
SUK_t / TA_{t-1}	- 0.153 (0.32)	-0.135*** (2.17)	
DET_t /TA_{t-1}	-0.396***(4.13)		-0.468 (1.96)
R^2	0.351	0.383	0.324

Source: Author's Own. Note: *,**, *** Significant at 10%, 5%, and 1% respectively.

4.6 Testing the effect of capital market imperfection on hālal investment sensitivity to cash flow

To examine the impact of imperfection of capital market on hālal investment sensitivity to cash flow, the study estimates equation 3 as shown in Table 10. There are four factors used as proxies of imperfection of capital market, which are: flow of funds (FF), following of analyst (FA), institutional ownership (InO), and index of corporate governance (CG).

- The factor (FF) has a significant negative impact on capital expenditure for both Islamic and conventional businesses. These findings suggest that as capital market imperfections decrease, so does investment sensitivity to internal fund availability. In this approach, raising FF must increase liquidity across assets.
- Analysts do research to improve publicly available data about firms and reduce the information asymmetry between executives and outsiders. As a result, the factor FA should reduce the difference between external and internal finance expenditures. As shown in Table 10, the cash flow ratio to the number of FAs is large and negatively associated with hālal investment for businesses that use sukūk but has no effect on traditional operations. This might be owing to the sukūk's benefits over traditional bonds, particularly in terms of less information asymmetry.
- Institutional ownership (InO) has a negative and substantial influence on both firms, with nearly comparable coefficient magnitudes. Finally, for both types of entities, the association between investment sensitivity to cash flow and corporate governance index (CG) is negative and significant at the 1% level. This shows that the board of directors and top executives in the selected sample are acting in the best interests of their companies.

Accordingly, the overall results show that the hālal investment-cash flow sensitivity decreases with factors that diminish capital market imperfection.

Table 10: Testing the effect of capital market imperfection on ḥalal investment sensitivity to cash flow

Variables	Model (A)	Model (B)	Model (C)
CF_t / TA_{t-1}	0.144 (1.21)	0.124** (3.12)	0.163** (4.24)
$TQ_{i,t-1}$	0.165*** (3.15)	0.102 (1.34)	0.316*** (3.005)
SUK_t / TA_{t-1}	-0.165 (0.15)	-0.14(1.37)	
DET_t / TA_{t-1}	-0.281**(3.17)		-0.163**(2.96)
$FF \times CF_t$	-0.037**(2.45)	-0.031**(2.01)	-0.038***(5.78)
$FA \times CF_t$	-0.042 (2.96)	-0.166* (2.003)	-0.054 (0.019)
$InO \times CF_t$	-0.311** (2.02)	-0.025*** (3.009)	-0.021**(2.29)
$CG \times CF_t$	-0.0341*** (4.42)	-0.036***(3.06)	-0.026***(4.15)
R^2	0.326	0.361	0.354

Source: Author's Own. Note: *,**, *** Significant at 10%, 5%, and 1% respectively

4.7 Results for Co-integration

The study employs the Kao co-integration test to assess whether a set of time series variables is co-integrated. Cointegration suggests that the variables move together in the long run, even if they have short-term variations. Table 11 shows the t-statistic and the corresponding probability value (p-value) of the two models. The ADF statistics reported for the two models are -2.636 and -2.451, and the associated probability values are 0.0042 and 0.0136, respectively. The fact that the observed p-value is <0.05 leads to rejecting the null hypothesis. This implies that there is statistically significant evidence of cointegration, indicating that the variables in question are likely to share a common stochastic trend or long-run equilibrium relationship.

Table 11: Kao residual cointegration test

Model one			Model two		
	t-Statistic	Prob.		t-Statistic	Prob.
ADF	-2.63645	0.0042	ADF	-2.451	0.0136
Null Hypothesis: p-value > 0.05, No co-integration					

Source: Author's Own

4.8 Results for causality

After verifying and estimating the existence of a long-term relationship between the study variables, the paper uses Granger causality test to identify the nature and the direction of the relationship among the variables as shown in table 12.

The causal relationship between ḥalal investment and cash flow is bidirectional causality in the whole sample and among ṣukūk-dependent enterprises, with probability values less than 0.05. This means that the study accepts alternative hypothesis H1a.

- **Ḥalal investments generate cash flow**. This might be attributable to the fact that Islamic enterprises are investing in capital projects (for example, building a new facility), which incur upfront costs. Over time, these expenditures may result in greater production capacity,

efficiency, and income. As the firm benefits from these expenditures, its cash flow may rise because of more revenue, lower expenses, or improved operational efficiency.

- On the other hand, **cash flow causes hālal investment**. Since positive cash flow allows companies to fund hālal investments, When Islamic companies generate extra cash, they may use a portion for investment projects. This reinvestment has the potential to improve future operations and increase cash flow in the long term.

The causal relationship between hālal investment and Tobin's Q ratio is bidirectional causality.

- **Hālal investments enhance the Q ratio**. When a company invests in productive assets, it improves its future cash flows and profitability. This beneficial influence on predicted future profits may result in an increase in the firm's market valuation, and hence its Q ratio.
- **The Q ratio promotes hālal investment**. A high Q ratio (market value surpassing replacement cost) may indicate that the firm's investment initiatives will be lucrative. In this scenario, the company may be more inclined to incur capital costs. On the other hand, a low Q ratio may hinder investment since the market considers the firm's assets to be expensive in comparison to their replacement costs.

The causal relationship between hālal investment and ṣukūk issuance is unidirectional causality.

- The causal relationship between hālal investment and ṣukūk issuance is dynamic and context dependent.

- Examining the causality between hālal investment and ṣukūk for the entire sample suggests that there is no causation between the two variables. However, examining the causality between hālal investment and ṣukūk for Islamic enterprises reveals that there is a one-way causation between hālal investment and ṣukūk issuance, **where ṣukūk issuance causes capital expenses**. When ṣukūk is issued, the proceeds are often put aside for certain projects or assets. These funds are utilized to cover major costs like infrastructure development or facility renovations. Thus, issuing ṣukūk might result in hālal investment.

The causal relationship between Investment and bonds issuance is unidirectional causality.

- Bonds can be an effective funding source for capital expenditure, particularly during favorable market circumstances.
- The Granger causality test shows that there is unidirectional causality between CE and DET issuance among selected conventional enterprises. **The causality moves from DET to CE.**
- Bond issuance will fund investments for firms with growth-oriented plans aimed at increasing CE and expanding operations. Non-financial firms with substantial capital requirements (e.g., infrastructure, utilities) frequently use bond issuance for CE.
- Bondholders assess a company's CE plans. If they believe CE will enhance future CF, they may be more willing to invest. Finally, companies with strong financials (healthy CF, low debt) are better positioned to issue bonds for CE.

The causal relationship between hālal investment-cash flow sensitivity (ICF) and capital market imperfection is unidirectional causality. This means that the study accepts alternative hypothesis H2a.

- **Capital market imperfections impact hālal investment-CF sensitivity**. Because the capital market in the selected countries is underdeveloped and

almost imperfect. Thus, the firm's sample faces significant flaws (for example, confounding information asymmetry), and they may rely more heavily on internal funds due to difficulty acquiring external capital. As a result, their hālal investment -CF sensitivity will be greater. These results confirm the significance of the four factors of capital market imperfection that are shown in table 10.

Table 12: Causality direction among the study variables

	Causality	F-stat	Prob.	Causality Direction	Results
Whole sample (A)	CE → CF	3.39	0.001*		
	CF → CE	7.14	0.037*		
ṣukūk-dependent companies (B)	CE → CF	3.14	0.011*	Bidirectional causality	CE ⟺ CF
	CF → CE	6.78	0.039*		
conventional enterprises (C)	CE → CF	6.87	0.008*		
	CF → CE	4.24	0.028*		
Whole sample (A)	TQ → CE	2.84	0.001*		
	CE → TQ	1.98	0.122		
ṣukūk-dependent companies (B)	TQ → CE	2.35	0.006*	Bidirectional causality	TQ ⟺ CE
	CE → TQ	2.02	0.139		
conventional enterprises (C)	TQ → CE	2.54	0.004*		
	CE → TQ	1.89	0.164		
Whole sample (A)	Suk → CE	1.91	0.432	No Causation	
	CE → Suk	1.74	0.063		
ṣukūk-dependent companies (B)	Suk → CE	5.03	0.001*	Unidirectional causality	Suk → CE
	CE → Suk	1.89	0.149		
Whole sample (A)	DET → CE	2.03	0.613	No Causation	
	CE → DET	1.96	0.451		
conventional enterprises (C)	DET → CE	4.65	0.012*	Unidirectional causality	DET → CE
	CE → DET	2.01	0.447		
Whole sample (A)	MIP → ICF	6.23	0.005*	Unidirectional causality	MIP → ICF
	ICF → MIP	1.74	0.451		
ṣukūk-dependent companies (B)	MIP → ICF	5.87	0.011*	Unidirectional causality	MIP → ICF
	ICF → MIP	1.89	0.391		
conventional enterprises (C)	MIP → ICF	5.31	0.009*	Unidirectional causality	MIP → ICF
	ICF → MIP	1.61	0.513		

Source: Author's Own. Ha: There is causality between the two variables, while H0: there is no causality

Based on the preceding results, the study's key findings are:

- The regression results in Table 9 show that the relationship between hālal

investment and cash flow is positive and significant. Positive cash flow implies that the liquid assets of Islamic enterprises are growing, allowing them to meet their commitments, reinvest in

their operations, distribute earnings to stockholders, fund expenses, and build a cushion against potential financial difficulties. Islamic enterprises' hālal investment-cash flow sensitivity corresponds to the higher cost of external financing as compared to conventional firms that leverage borrowing.

- Despite the expansion of Islamic financing in the selected countries, the costs of issuing ṣukūk remain much higher than the price of issuing conventional debt. Enterprises that issue conventional debt tend to have significant ethical hazards and adverse selection problems that lead to substantially greater investment-cash flow sensitivity than those that issue ṣukūk (as shown in table 9). The moral hazard indicates an inherent financial limit on investment, making the firm's investment vulnerable to cash flows.

- Capital markets are not perfect, and various imperfections can affect a firm's investment decisions. As shown in Table 10, the four factors of capital market imperfection have a significant and negative effect on capital expenditure for both Islamic and conventional firms. These findings imply that the increase in these variables will decrease the sensitivity of investment to cash flows, where firms with stronger abilities to process information could lower the asymmetry of information. A higher FF should decrease the cost of external financing for every firm.

- The Granger causality tests show that the alternative hypotheses are accurate, where there is a causal relationship between hālal investment and cash flow on the one hand and hālal investment-

cash flow sensitivity and capital market imperfection on the other hand.

5. Conclusion

The paper analyzes the theoretical and empirical aspects of hālal investment-cash flow sensitivity as an indicator of financial limitations. Investment-cash flow sensitivity has been a vital measure of financial constraints since Fazzari et al. (1988), and it is one of the primary frameworks adopted to assess Myers' and Majluf's (1984) pecking order theory.

The study incorporates both analytical and econometric approaches. Stationarity, co-integration, and multivariate Granger-causality tests are carried out using the estimated equations. Unit root and stationary tests demonstrate that the series has an integration order of I(0), indicating that it might be applied straight to panel regression. The Kao co-integration test shows that there is a co-integration among study variables, which means the variables move together in the long run.

The sensitivity of hālal investments to the availability of internal finances for Islamic enterprises employing sukūk is examined in this study. Two equations are being estimated using data from 240 non-financially listed conventional and Islamic enterprises in six countries from 2018 to 2022.

The first equation determines if the sample has significant investment cash flow sensitivity. The second equation evaluates if capital market imperfections have a major impact on hālal investment cash flow sensitivity. The study first shows that there has been a persistent difference in the sensitivity of investment-cash flow between Islamic and conventional businesses. Ṣukūk

issuance minimizes investor cash flow vulnerability.

Following that, the sensitivity of hālal investment-cash flow to four capital market-related variables is investigated: fund flows, institutional ownership, and the analyst's corporate governance index. The study shows that hālal investment sensitivity to cash flow decreases when capital market imperfections diminish due to increased fund flows, institutional ownership, and analyst following. Increases in these factors minimize the cost differential between internal and external finances, reducing the sensitivity of investment to cash flow, especially among sukūk-issuing companies.

The significant effect of cash flow on hālal investment and the significant impact of capital market imperfection on hālal investment-cash flow sensitivity were confirmed by using the Granger causality test. It finds that there is a bidirectional causal relationship between hālal investment and cash flow, while there is a unidirectional causal relationship between hālal investment-cash flow sensitivity and capital market imperfection.

The study has main policy implications. Most of the chosen countries have somewhat primitive financial markets. This suggests that firms may have problems acquiring external capital. These barriers may result in high and insufficient investment costs. This may have policy implications for governments, especially in economies with a large concentration of SMEs in the non-financial sector. Government authorities may consider all these issues when creating tax

policies and offering incentives and assistance to businesses. The significant investment-cash flow sensitivity shows that firms may curtail investments if they are unable to get external finance. This will affect the nation's economic growth. As a result, policymakers should develop and implement micro-level measures to boost firm efficiency and capital, as well as macro-level policies to improve financial markets.

The current study has some limitations. The study period (2018–2022) has several economic and health events, impacting both the types and sources of investment funds and the study's conclusions. The most noteworthy phenomena were COVID-19, which had a negative impact on the world economy as a whole and the economies of the nation's chosen nations. The price of oil decreased, while the price of other items and the cost of financing increased. The nations in question suffered from the closure of most economic operations, reducing financing alternatives and making the investment rate more vulnerable to cash flow. Moreover, the study selected six nations over a five-year period. Further research could utilize data from both developed and developing countries over a longer time span. Furthermore, the study relies on annual financial statements; adopting quarterly statistics could expand the number of observations and generate more reliable findings. Also, the study includes data from non-financial enterprises across multiple sectors and does not concentrate on sectorial features; future studies could take sectorial features into account and conduct analysis accordingly.

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حساسية الاستثمار الحلال للتدفق النقدي ومدى تأثير سوق رأس المال غير التام

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المستخلص. يهدف هذا البحث إلى اختبار العلاقة بين حساسية الاستثمار الحلال والتدفق النقدي، بالإضافة الى قياس مدى تأثير سوق رأس المال غير التام لحساسية الاستثمار في الشركات المعتمدة في تمويلها على الصكوك مقابل الشركات التقليدية التي تعتمد في تمويلها على إصدار الأسهم والسندات في ست دول هي: المملكة العربية السعودية، والإمارات العربية المتحدة، والكويت، وقطر، والبحرين، وماليزيا. ويعتمد البحث على بيانات 240 شركة تقليدية وإسلامية مدرجة في سوق الأوراق المالية في تلك الدول خلال الفترة 2018- 2022، باستخدام المنهجين التحليلي والقياسي. وسعيًا لتحقيق أهداف الدراسة تم إجراء اختبارات الاستقرار وجذر الوحدة، بالإضافة إلى التكامل المشترك والسببية لجرانجر متعددة المتغيرات باستخدام المعادلات المقدرة. وتوصلت الدراسة إلى استجابة النفقات الاستثمارية لكلا المجموعتين من الشركات بشكل معنوي للتدفق النقدي، عند مستوى معنوية 5%، حيث بلغت مرونة الاستثمار في الشركات المعتمدة على الصكوك 0.14 في حين بلغت مرونة الاستثمار التقليدي 0.17. أما فيما يتعلق بتأثير وجود رأس المال غير التام، فقد تم التوصل إلى وجود تأثير معنوي كبير له على حساسية التدفق النقدي للاستثمار الحلال، حيث تتضاءل حساسية الاستثمارات الحلال للتدفقات النقدية عندما تزداد تدفقات الأموال، ومتابعة المحللين، والملكية المؤسسية، ومؤشر حوكمة الشركات. وأخيرا، أكدت اختبارات السببية لجرنجر على قبول الفرضيات البديلة للدراسة. حيث كانت هناك علاقة سببية ثنائية الاتجاه بين الاستثمار الحلال والتدفق النقدي، في حين كانت هناك علاقة أحادية الاتجاه من ناحية عوامل سوق رأس المال غير التام إلى حساسية التدفق النقدي للاستثمار الحلال.