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ACADEMIC PAPER

Impact of Ownership Structure on Investment Efficiency of Sharia Compliant Firms

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ABSTRACT

Sharia compliance is very common preference among Muslim nations of world, requiring to meet certain criteria as a sharia compliant firm. Muslims prefer to either invest in stocks or buy products from firms that are working as per the sharia rules and does not contribute in non-sharia activities in the society. This research is conducted, focusing on sharia compliant firms' ownership structure and impact on firm's investment efficiency. The workable data comprises of 65 non-financial sharia compliant firms listed in Islamic index of Bursa Malaysia and the span of study was 10 years from 2011 to 2020. Panel data analysis using two-step System Generalized Method of Moments technique was used in the study. The results showed that ownership concentration has a direct positive relationship with investment inefficiency while dispersed shareholdings displayed a negative relationship. Managerial shareholdings proved to have a positive relation with investment inefficiency as in line with agency theory. Institutional ownership was found to be negatively related to investment inefficiency while Mutual Fund ownership and Retail ownership were found to increase investment inefficiencies. Impact of Independent Non-Executive Ownership in firm was found to be statistically insignificant in impacting the investment efficiencies. The findings are in line with previous studies conducted on conventional non-financial institutions. Furthermore, the study could be further enhanced through inclusion of owner's activism and cash flow rights.

KEYWORDS

Islamic Finance, Corporate Finance, Sharia Complaint Firms, Investment Efficiency, Ownership Structure, GMM

INTRODUCTION

Islamic finance has been key player in recent years as main source of halal financing alternatives to overgrown world of interest-based financing transactions. Islamic banking and finance roots back to 14th century where all base laws and rules were provided from Prophet Muhammad (PBUH) and Quranic verses that defined Islamic financial transaction and business ethics. Islamic products are



divided into two categories, sharia-based and sharia-compliant products. Sharia based products are ones that were introduced during the life of Holy Prophet (PBUH) and followers started practicing these during the same era. Whereas, sharia-compliant products are based on principles of sharia, introduced only recently as alternative of conventional products to fulfill needs of ever-changing market demands (Naim, 2010)

Investment efficiency is a fundamental key performance indicator in corporate investment policy particularly in the perspective of Islamic Nations, where majority of firms are owned by families and enjoy powerful ownership concentration. A prior study defined investment efficiency as either missing chance to invest in opportunities with positive net present value projects (underinvestment) or to overinvest in projects resulting in negative present values of opportunities in the market. According to him, only efficient investment is to invest according to the expected returns from the projects. Both overinvestment and underinvestment fall in inefficient investment category. Controlling stockholders in strong proprietorship have the authority to benefit from private gains by recruiting management posts of their preference or even keep executive ranks for themselves. In simpler terms, they have the authority to give up of beneficial projects diverting funds to other companies owned by them and embark on non-beneficial projects. This will keep floating private benefits to the management resulting in diminished investment efficiency (Chen et al., 2017; Jiang et al., 2018). When there are lower growth and investment opportunities, there are higher chances to exploit rights of minority shareholders by the majority owners as ownership structure of firm decides how funds will be utilized. As per Ducassy and Guyot (2017), there are conflicting concerns among small and controlling shareholders in countries that fail to safeguard stockholder's rights.

Sharia compliant firms have specified debt and liquidity thresholds, where both debt and liquidity cannot exceed a certain threshold. Thus, the sharia compliant firms are usually low on debt as well as liquidity. The debt cannot be effectively used here as the monitoring/controlling tool for agency problems and only good governance can be the savior for firm. The debt of sharia compliant firms is already low so the firms should have improved corporate governance to mitigate agency costs (Anwer et al., 2021). Sharia compliant firms are characterized as low debt firms and only disciplinary mechanism available to these firms is good corporate governance (Jiraporn et al., 2012). Previous researches show that debt issuance and good governance are substitutes for mitigating agency problems (Arping & Sautner, 2010) making sharia compliant firms with low debt a good sample to check other governance mechanisms.

Investment efficiency would bring enhanced usage of company's capital operations and profits (Chen et al., 2017). Managers who have enhanced knowledge and skills can determine the accurate information on financing prospects enhancing firm's efficient investments (Habib & Hasan, 2017). A sharia compliant firm needs to fulfil many criteria in order to stay in the index. The study is focused on sharia compliant firms of Malaysia. There is availability of index's constituent data since 2000 onwards and index regulations from 1960s for Malaysia. Following is latest criteria approved by Sharia advisory committee (SAC) in Securities commission of Malaysia:

Benchmark	Activity
5%	<ul style="list-style-type: none"> Conventional banking, conventional insurance, gambling; liquor and liquor-related activities, pork and pork-related activities, non-halal food and beverages, Sharia non-compliant entertainment, interest income from conventional accounts and instruments, tobacco and tobacco-related activities.
20%	<ul style="list-style-type: none"> Share trading, stockbroking business, rental received from Sharia non-compliant activities and other activities deemed non-compliant according to Sharia.
33%	Cash over Total Assets – Placed in conventional instruments and accounts only Debt over Total Assets – Interest bearing debt only

Sharia Advisory Committee (SAC) in Securities Commission (SC) of Malaysia screens for sharia compliance in firms. Process is two-tier where firms are screened both qualitatively and quantitatively. In qualitative screening, firm's operations and products are monitored to see if they are halal or sharia



permissible, otherwise firm is sharia non-compliant. For firms having both permissible and non-permissible lines of business, there is percentage of turnover from non-permissible business lines that if exceeded results in sharia non-compliance of that firm. Revenue from non-permissible activities will be measured against total revenue of firms. Last part of screening process is screening of financial ratios where cash and debt of firm is measured. These percentage limits and their related businesses are given above.

Problem Statement & Research Gap

There is already a limit on debt issuance capacity of sharia compliant firms and these firms cannot take interest income more than 5% on lending. Control and monitoring layer provided by creditors (Debt-Monitoring Hypothesis) is lower in case of sharia compliant firms due to restriction on leveraging for sharia-compliance. Low debt characteristic of sharia compliant firms already provides pressure on owners and managers to perform for better in market. Sharia compliant firms have to maintain liquidity but they can not exceed certain thresholds. This causes limitation on these firms and their investment avenues. The impact of ownership on efficient investments made by firms in sharia compliant firms is still unexplored majorly and needs to be studied under the light of sharia corporate governance theory. These firms are different from other firms in market and should behave differently given their sustainability under stressed economic conditions as seen during the 2008 recession. There is limited literature available on sharia compliant firms while there is a growing trend of sharia compliance in market. An extensive study must be carried out on sharia compliant firms as these firms survived and even thrived after global recession of 2008, showing uniqueness from other firms in market. Agency problems in sharia compliant firms need to be mitigated differently due to unavailability of high leverage (low debt ratios) and already multiple screening layers in these firms. Sharia compliant firms are monitored more vigorously and pass through many filters biannually in order to stay sharia compliant making them best target for governance studies.

Significance & Rationale of Study

This thesis is concentrated on influence of ownership structure on investment efficiency in sharia compliant firms. This study examines effect of ownership structure (ownership concentration, managerial ownership, institutional ownership, mutual funds ownership, retail ownership, and independent non-executive director's ownership) on investment efficiency that explicates effective investment of sharia compliant firm's resources. Sharia compliant firms are already under extensive surveillance and studying these firms can provide insights into how well such firms function while meeting the compliance requirements. Alongside, we can witness through these firms, how controlled environments can be used to study specific aspects of firms where such ratios need to be strictly maintained. Under sharia compliance we get to see how investment inefficiencies still impacting these firms and what can be the sources of such inefficiencies.

Research Objective and Question

The study devises following objective and related question:

Research Objective: To find out effect of ownership structure (ownership concentration, managerial ownership, retail ownership, mutual funds ownership, institutional ownership and independent non-executive director's ownership) on investment efficiency in sharia compliant firms.

Research Question: What is effect of ownership structure (ownership concentration, managerial ownership, retail ownership, foreign ownership, mutual funds ownership, institutional ownership and independent non-executive director's ownership) on investment efficiency in sharia compliant firms?

LITERATURE REVIEW

In literature, there are different views of management motives, owner's motives, and their impact on a firm's performance. Nevertheless, all these studies are based on agency theory provided by Ross (1973) and Jensen and Meckling (1976). Theory also suggests providing incentives to agents for aligning agent-principal motives. One of these incentives are ownership in the firm. Gürsoy and Aydoğan (2002) divides ownership structure into two parts: 1) ownership concentration and 2) ownership mix.



Ownership concentration is percentage shares owned by majority shareholders of firm. Ownership concentration is how much shares are non-dispersed is ownership of a sharia compliant firm. The top three or top five shareholders might constitute majority of shareholding in a firm. Ownership-mix is identity of these shareholders. This identity as per Gürsoy and Aydoğan (2002) is whether shares are government owned, foreign investors or institutional or comprises of all shares owned by a certain type of investor.

Due to weak laws on creditor's protection in Asian countries, exploitation of rights of small stockholders by governing stockholders can be a major issue (Gao & Kling, 2008; Wang & Ye, 2014). Gomes and Novaes (2001) indicated that larger stockholders make a governing team that endorses an investment only under circumstance where each associate has beneficial returns from investment. Chen et al. (2017) concluded that there is an indirect association between investment efficiency and ownership concentration as ownership with elevated magnitude of control is damaging for efficient investments because governing stockholders have more power to seize entitlements over small stockholders.

Managerial ownership is measured by percentage of shares held by executive directors in sharia compliant firms. Once management is made part of ownership structure and given ownership rights, there is an enhancement of performance of these firms and there is a decrease in malpractices by majority owners as well (Chen, 2001; Gao & Kling, 2008). Hu and Zhou (2008) established that corporations having managerial ownership has improved functioning in contrast to corporations having management who are not involved in stockholdings. Additional findings revealed a non-linear relationship among the variables showing that after 50% ownership in the stocks by management, relationship becomes negative and thus gets non-linear. Additional claim unveils that, ownership by management is linked with risk taking attitude. In other words, managerial ownership worsens the gap between bondholders and stockholders (Chen & Steiner, 1999; Dixon et al., 2017).

Other variable employed in the study is institutional ownership. Institutional investors are supplementing corporations having poor management systems by counselling and assessments (Admati et al., 1994; Chen et al., 2007; Jensen & Meckling, 1976). These institutional investors carry out an extensive monitoring and scrutinizing at time of takeovers (Brickley et al., 1988; Chen et al., 2007). A prior study illustrated that a firm's performance is elevated with increase in institutional investors having few or no business terms with that firm. Yuan et al. (2008) established that China has seen an increase in institutional investors from year 2000 onwards and it helped economy perform better and reach performances that are more efficient. Elyasiani et al. (2010) backed up this claim.

Yuan, Xiao & Zou performed studies during period of 2001 to 2005 and concluded that managerial projects that resulted in investments from mutual funds had proven to enhance corporate efficiency in those projects. Chen et al. (2007) performed research on numerous United States of America firms claiming that mutual funds perform a particular regulating function to carry out useful operations that enhances corporate management and performance. Yuan et al. (2008), and Aggarwal et al. (2011) argued that these mutual fund institutions have more market data availability and exposure along with an enhanced investing experience that equips them for carrying out more efficient and effective management and control. Researchers worked on activism of shareholders and stated that institutional investors like mutual funds are highly active in governance and monitoring of management decisions. Chen et al. (2017) carried out research on SOEs (state-owned enterprises) in China and unveiled that investment efficiency in enhanced with increase in mutual funds ownership.

Retail owners are individual investors owning shares in firms. These investors are usually daily traders and do not bother to invest time in improving firm's operations. On the other hand, institutional investors are more efficient in monitoring managers and can bear time, expertise and cost of monitoring of firms (Shleifer & Vishny, 1997; Stiglitz, 1985). Another major factor is lack of interest from non-institutional owners towards management and performance of firms as they have easy option of selling stock and leaving when a firm is not performing well. These retail owners usually do not stay with single firms for long and earn more through frequent trading in liquid markets (Maug, 1998). Mura



(2007) investigated ownership structure of firms in UK and found that retail owners have a negative relationship with performance of firms.

The Non-Executive Directors of board include all directors that are not part of inner management of firm. These include independent directors and directors hired on contract and thus do not contribute towards executive responsibilities. As per Hart (1995), non-executive directors are highly dedicated in monitoring performance of management and their efficiency. Whereas, studies by Morck et al. (1988) and Jensen (1993) reveal that just like executive directors, non-executive directors require motivation in form of ownership to align with firm's interests. Mura (2007) studied panel data of non-executive and executive directors affecting a firm's performance. His findings reveal that there is no relationship of percentage ownership of non-executive directors with performance of firms. However, he concluded that proportion of non-executive directors in board is significant with performance of firms in UK. Morck et al. (1988) and Bhagat and Black (2002) in United States specifically worked on executive and non-executive director's ownership and its related impact on firms. Morck found out that there is nonlinear relation of ownership of non-executive directors with firm's performance. The study by Bhagat & Black reveal a non-significant relationship of non-executive directors with performance of firms. Bova et al. (2015) revealed a negative relationship of non-executive holdings with firm's risk. Thus, as ownership of non-executive directors increase, risk averse behavior dominates corporate environment.

Conceptual Framework

The conceptual framework of the study is as follows:

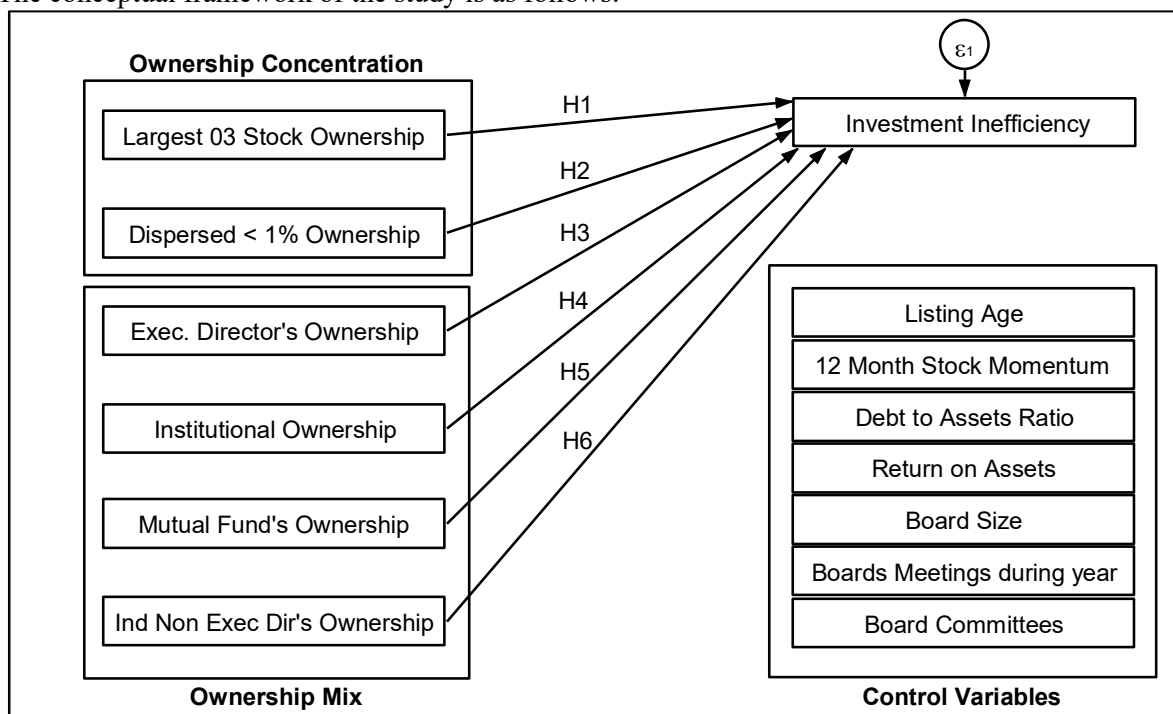


Figure 1: Conceptual Framework.

Hypotheses of the Study

Gürsoy and Aydoğın (2002) used ownership concentration proxies of Top 1 shareholder, Top 3 shareholders, other ownership as diffused shareholding and cash flow rights ownership in their study. Top1 ownership and top3 ownership should be negatively linked with investment efficiency as more shareholding control is provided to owner; there will be more agency related issues in firm. Following two hypothesis is devised.

H1: Total percentage ownership of largest three shareholders have a significant negative relationship with investment efficiency in sharia compliant firms.



The diffused ownership variable (OTHER) is total percentage of diffused ownership in firm where owners are less than 1%. As percentage of diffuse ownership increases, there is less control over firm by large shareholders. Thus, efficiency of firm should increase with rise in diffused ownership. Following hypothesis is devised:

H2: Total percentage ownership of diffused shareholders has a significant positive relationship with investment efficiency in sharia compliant firms.

Following study by Dixon et al. (2017) there exists a positive but non-linear relationship of managerial ownership and investment efficiency, following hypothesis is formulated:

H3: Managerial ownership has a significant positive relationship with investment efficiency in sharia compliant firms.

Following studies by Yuan et al. (2008) and Elyasiani et al. (2010), there is a positive and linear relationship of institutional ownership and investment efficiency. Previous researches predict that institutional investors enhance investment efficiency of firms. Retail owners lack expertise and patience to improve a firm's ownership and prefer to sell and move to better stocks (Maug, 1998; Mura, 2007). Mura says that firms perform better with institutional owners and negatively with non-institutional owners. From above literature, the study devises below hypotheses:

H4a: Institutional ownership has a significant positive impact on investment efficiency in sharia compliant firms.

H4b: Retail ownership has a significant negative impact on investment efficiency in sharia compliant firms.

Mutual funds are considered most efficient and skilled institutes with no attachments with firms they invest in. For that reason, Mutual funds provide better governance and monitoring over firms (Chen et al., 2017). This brings us to following hypothesis:

H5: Mutual Fund Ownership has a significant positive impact on investment efficiency in sharia compliant firms.

Morck et al. (1988) found out that there is nonlinear relation of ownership of non-executive directors with firm performance. Bova et al. (2015) worked on relationship of non-executive board members and a firm's risk-taking behavior. With increase in non-executive directors, risk averse behavior of firms dominates. Thus, investments are made with more scrutiny increasing efficiency. Following hypothesis is devised:

H6: Independent Non-Executive Directors Ownership has a significant and positive impact on investment efficiency in sharia compliant firms

METHODOLOGY

Research philosophy is positivism, research approach is deductive and research methodology is quantitative. Ontology is deductive as hypothesis either stands true or false. Epistemology is positivism as observable data obtained is only form of knowledge for this study, research is taken in value-free way and author is independent from data. Multiple regression analysis utilizing System Generalized Method of Moments technique is presented in this research on panel data. Target population was listed non-financial sharia compliant firms on available in Bursa Malaysia Stock Exchange. Sample was included in sharia compliance index throughout sample period of study. Convenience sampling was applied, where data availability of mentioned variables was the deciding criteria. Span of study was 10 years starting from May 2011 to May 2021 to make sample as uniform and generalizable as possible. Only balanced secondary data was used for study. Annual reports of firms and stock exchange filings were used to collect data. Malaysia is considered for this study because of separate sharia stock index



and available data for at least 10 years per firm. Besides having a separate index, another criterion for choosing this country is availability of regulations of sharia compliance in last 10 years so that firms follow sharia compliance regulations during entire study period. Bursa Malaysia sharia compliant index existed since 1960s.

The data spanning from 2009 to 2020 (12 years) was used for current analysis due to lagged variables in residual model. The initial number of groups/companies in the study comprised of 99 in total. However, the data was refined by removing missing data years and outliers. The resultant balanced data sample size stood at a total of 85 companies spanning over 10 years period from 2011 to 2020. The next refining of data involved removal of those firms where revenue/sales were not reported (e.g. holding companies) and the total workable companies resulting from this refinement was 65 with 10 years of data per variable. Initially, the research used 9 regressors in the study. However, 02 were dropped from study due to lack of information availability in annual reports of companies i.e. Foreign Ownership in the Company and the Cash Rights for the highest owner. Normality assumption holds valid as the sample size increases under central limit theorem, (Hsiao, 2022; Rice & Rice, 2007). With $N > 30$ approximately hold normality assumption for residual distribution and in terms of panel data, the dimensions for both T and N are: If $N > 30$ or $T > 30$ then the central limit theorem suggests the residuals are approximately normally distributed. In current study, $N=65$ and $T = 10$ and panel is strongly balanced which provides strength to the data's validity. In current study, residual model was followed provided by Biddle et al. (2009), later modified by Chen et al. (2011) and adopted by Lin et al. (2021). where authors measured investment efficiency of a firm by growth of sales and total investment made by firm in that year. This model predicts whether firm makes over or underinvestment in a particular year and its investment efficiency.

$$Investments_{i,t} = \beta_0 + \beta_2 SalesGrowth_{i,t-1} + \varepsilon_{i,t} \dots (1)$$

Where,

Investments = Change in company's long-term assets / lagged total assets

SalesGrowth = Percentage Sales Growth from t-2 to t-1

ε = Residual of equation and represents absolute value of investment efficiency

$$IIEFF_{i,t} = Investment_{i,t} - E(Investment_{i,t}) = \varepsilon_{i,t} \dots (2)$$

The investment efficiency measure, $IIEFF_{i,t}$ is the residual ($\varepsilon_{i,t}$) of Equation (1), which is the difference between the actual investment and the expected optimal investment from Equation (2). The smaller (larger) the $IIEFF$, the higher (lower) the investment efficiency. We take the absolute values of investment efficiency following the studies of Goodman et al. (2014) . A positive ε represents overinvestment in that year and a negative ε represents an under investment in that year. ε value at zero represents optimal investment efficiency. Closer the value of ε to zero, the more efficient firm was in that year (Chen et al., 2011; Richardson, 2006). All variables of the study are given in Appendix Table (3.1).

RESULTS AND DISCUSSION

First part of the analysis is to measure the investment efficiency variable which shall be used as the dependent variable in regression model. At $Sales_{i,t-1}$, the model was not providing significant results and there is no visible serial correlation issues in the data. For these reasons we have dropped the lagged sales growth term and ran the regression on year t only. The regressor Sales Growth was found significant at $p < 0.01$ with coefficient 0.0517 and std. error of 0.0149. Residuals of the study were calculated as the absolute value of difference of expected values of investments and the actual investments made during the period. The Wooldridge test for autocorrelation in panel data returned $Prob > F = 0.0588$, which fails to reject the null hypothesis of no first order serial correlation. Breusch-Pagan test for heteroscedasticity is also carried out where $Prob > Chi^2 = 1.00$ and results fail to prove for non-constant variance of residuals across all levels of the independent variables.

The variables used in study as the proxy for ownership structure and control variables along with the



time variables and panel variables are given in descriptive statistics. The variables are not widely dispersed and represent the normality assumption and there is no need to transform any variable keeping in mind the central limit theorem for medium to large data size. Few control variables were dropped as well which were not having any significance in model results. Descriptive statistics of variables are given under Table 4.1.

Table 4.1: Descriptive Statistics.

Variables	Observations	Mean	Std. Dev.	Min	Max
Year	650	2,016	3	2011	2020
Company	650	33	19	1	65
Industry	650	5	2	1	8
Long term assets growth	650	0.07214	0.52055	-2.39074	7.90252
lagged Sales Growth t_2 to t_1	650	0.41358	1.89556	-0.99938	27.90460
Sales Growth at t	650	0.34558	1.36055	-0.99938	10.98610
Investment Inefficiency	650	0.15481	0.49195	0.00050	7.62574
Largest 03 Stock Ownership	650	42.88	17.27	4.34	88.54
Dispersed < 14 Ownership	650	37.05	14.39	6.06	95.66
Executive Director's Ownership	650	11.09	16.04	0.00	65.77
Institutional Ownership	650	70.84	29.36	2.24	100.00
Retail Ownership	650	28.60	28.69	0.00	96.49
Mutual Fund's Ownership	650	5.66	10.55	0.00	63.72
Independent Non-Executive Director's Ownership	650	0.42	1.98	0.00	41.73
Leverage Debt to Assets Ratio	650	0.19890	0.22132	0.00020	1.79422
Listing Age of Company	650	17	11	2	53
Return on Assets	650	0.21078	0.27326	0.00000	1.32637
12 Month Stock Momentum	650	0.20618	0.65617	-0.71150	4.84160
Board Sise	650	7	2	2	14
Board Committees	650	3	1	1	7
Boards Meetings during the year	650	6	2	2	19

Correlation among the variables along with significance levels are provided under Table 4.2 below.

Table 4.2: Correlation Diagnostics with Significance levels.

Correlation	absIIEFF	L.absIIEFF	L2.absIIEFF	LSH3	OTHER	MANOWN	INOWN	MFOWN	INEXOWN
absIIEFF	1								
L.absIIEFF	0.0524	1							
L2. absIIEFF	-0.0066	0.0517	1						
LSH3	0.0771**	0.0373	0.0181	1					
OTHER	-0.1094*	-0.1234**	-0.125**	-0.6759***	1				
MANOWN	0.063	0.0239	0.0133	-0.0300	-0.1119**	1			
INOWN	-0.003	0.0409	0.0451	0.0646*	-0.1154**	-0.5442***	1		
MFOWN	0.0409	0.0341	0.0269	0.2021***	-0.2055***	-0.2393***	0.2807***	1	
INEXOWN	-0.0262	-0.0261	0.0458	-0.0630	0.0512	0.0308	-0.0372	-0.0604	1

Notes: *, **, *** Significant at 10, 5 and 1 percent levels, respectively

In terms of multicollinearity, the theory suggests VIF factors of below 05 and conditional index of below 30 as acceptable ranges. The tests in GMM were carried out with multivariate analysis and multicollinearity were within acceptable range as given in table (RETOWN was eliminated as RETOWN is reciprocal of INOWN and few control variables were dropped as well). Results of collinearity diagnostics are attached herewith under Table 4.3.



Table 4.3: Test Results for Multicollinearity.

Variable	VIF	SQRT VIF	Tolerance	R-Squared	Eigenvalue	Conditional Index
LSH3	2.21	1.49	0.4531	0.5469	1	7.3484
OTHER	2.07	1.41	0.4836	0.5164	2	1.1862
MANOWN	1.72	1.31	0.5807	0.4193	3	0.9364
INOWN	1.78	1.33	0.5621	0.4379	4	0.7598
MFOWN	1.48	1.21	0.6775	0.3225	5	0.6159
INEXOWN	1.01	1.00	0.9902	0.0098	6	0.5067
MOM12M	1.05	1.02	0.9555	0.0445	7	0.2240
Age	1.44	1.20	0.6966	0.3034	8	0.1851
ROA	1.08	1.04	0.9301	0.0699	9	0.0950
BMEET	1.26	1.12	0.7952	0.2048	10	0.0802
BCOMM	1.27	1.13	0.7860	0.2140	11	0.0520
Mean VIF	1.49				12	0.0102
					Condition Number	26.8070

Eigenvalues & Cond Index computed from scaled raw sscp (w/ intercept). Det (correlation matrix) 0.1241

A two-step System Generalized Method of Moments Linear Dynamic Panel Data Model, developed by Arellano and Bover (1995) and Blundell and Bond (1998), is used with 02 lags of dependent variable, controlled by listed age of the Company, stock returns momentum for previous 12 months, boards committees during financial year, board meetings held during the year and returns on Assets for company i at year t . For postestimation diagnostics, the Arellano-Bond test for autocorrelation and the Hansen J test for overidentifying instruments were used. The null hypothesis of the Hansen J test is that the instruments are valid, meaning that they are not correlated with the error term and are correctly excluded from the estimated equation. Arellano-Bond test for autocorrelation (Arellano & Bond, 1991) is used in dynamic panel data analysis to detect autocorrelation in the residuals of first-differenced equations. This test is essential when using GMM estimators as it helps validate the assumption that the instruments. GMM estimation model is as given below:

$$DV_{i,t} = \beta_0 + \alpha DV_{i,t-k} + \beta_i IV_{i,t} + \gamma_0 C_{i,t} + \delta_i + \mu_t + \varepsilon_{i,t}$$

Where $DV_{i,t}$ is the absolute value of Investment Efficiency of Company i at year t , $DV_{i,t-k}$ is the lagged dependent variables, $IV_{i,t}$ is the Ownership Structure regressor, $C_{i,t}$ is a vector of control variables, δ_i and μ_t denote sets of industry dummies and time effects and $\varepsilon_{i,t}$ is the error term. Following results were obtained using the System GMM in STATA for dynamic data analysis. (Table 4.4)

Table 4.4: Two-Step Generalized Method of Moments Linear Dynamic Panel Data Model.

Dependent Variable Investment Inefficiency	SYS-GMM estimation	
Constant	+0.428***	(0.075)
absIIEFF _{i,t-1}	-0.005	(0.012)
absIIEFF _{i,t-2}	-0.029***	(0.002)
LSH3	+0.002***	(0.001)
OTHER	-0.003*	(0.001)
MANOWN	+0.003***	(0.001)
INOWN	-0.001*	(0.001)
MFOWN	+0.006***	(0.002)
INEXOWN	+0.000	(0.001)
Age	-0.002	(0.001)
ROA	-0.757***	(0.076)
MOM12M	-0.049***	(0.005)
BMEET	+0.014***	(0.005)
BCOMM	-0.069***	(0.009)
No. of Instruments	46	
No. of Observations	65	
Arellano-Bond test for AR (1) (Pr > z)	0.132	
Arellano-Bond test for AR (2) (Pr > z)	0.582	
Hansen test of overidentifying restrictions	0.266	

Note: Standard error in the parenthesis. *, **, *** Significant at 10, 5 and 1 per cent levels, respectively



The higher the absolute value of IIEFF the more inefficient the investment was as per previous literatures. Thus, we will evaluate our results in terms of inefficiency of investments as dependent variable. At 2nd lag of Investment Inefficiency, there was no autocorrelation problem as given by Arellano-Bond test. LSH3, MANOWN and MFOWN are strongly significant at $p < 0.01$, OTHER and INOWN were found to be significant at $p < 0.10$. However, we have one regressor (Independent Non-Executive Director's ownership) which is found insignificant at all acceptable p-levels.

In terms of hypothesis of the study, ownership concentration has a negative impact on investment efficiency (and a positive relationship with investment inefficiency) and diffused ownership has a positive significant relationship with investment inefficiency, affirming the H_1 & H_2 of the study. Managerial ownership has a significant positive relationship with investment inefficiency in line with the previous studies which showed that managerial ownership at a lower threshold has a positive impact on efficiencies but higher managerial ownerships cause higher agency costs proving true for H_3 of the study. Institutional ownership has a negative impact on investment efficiencies and the H_{4a} holds true as per results from the study. Retail ownership has a deductively positive impact on investment inefficiency (reciprocal nature from institutional ownership) thus proving the H_{4b} of the study true. Mutual funds have a positive impact on investment inefficiencies of the firm and is not in line with previous studies as given in literature, thus disproving the H_5 which stated that mutual funds positively impact the investment efficiency of the firm. The last hypothesis for impact of independent non-executive director's ownership on investment efficiency was not statistically significant where we failed to reject null hypothesis for H_{10} of study stating that there is no relationship of independent non-executive ownership on investment efficiency. Following is the final regression model as per coefficient results. The inferences are listed down following the model under Table 4.5:

$$\begin{aligned}
 abs(IIEFF)_{i,t} = & 0.428 - 0.029abs(IIEFF)_{i,t-2} + 0.002LSH3_{i,t} - 0.001OTHER_{i,t} \\
 & + 0.003MANOWN_{i,t} - 0.001INOWN_{i,t} + 0.006MFOWN_{i,t} - 0.002ROA_{i,t} \\
 & - 0.049MOM12M_{i,t} - 0.069BCOMM_{i,t} + 0.014BMEET_{i,t} + \sum_{i=1}^7 IND_{i,t} + \sum_{i=1}^8 Year \\
 & + \varepsilon_{i,t}
 \end{aligned}$$

Table 4.5: Inference Results for Regression Model.

Regressor	Results Inference
LSH3	If percentage ownership in LSH3 increases by 1 then Investments inefficiency increases by 0.24%
MANOWN	If percentage ownership in MANOWN increases by 1 then Investments inefficiency increases by 0.29%
OTHER	If percentage ownership in OTHER increases by 1 then Investments Inefficiency decreases by -0.11%
INOWN	If percentage ownership in INOWN increases by 1 then Investments Inefficiency decreases by -0.09%
MFOWN	If percentage ownership in MFOWN increases by 1 then Investments inefficiency increases by 0.57%
ROA	If Return on Assets increases by 1 then Investments inefficiency is decreased by 0.75 points.
MOM12M	If stock momentum is increased by 1 then Investments inefficiency is decreased by 0.049 points.
BMEET	If number of board meetings are increased by 1 then Investments inefficiency also increases by 0.014 points.
BCOMM	If number of board committees are increased by 1 then Investments inefficiency decreases by 0.069 points.

CONCLUSION

The results depict that there exists a strong positive relationship between investment inefficiency in sharia compliant firms and the ownership concentration proxy used in the study. The results also show



that higher ownership of executive directors in the Company results in higher inefficiencies predicting higher agency costs and exploitation of resources of company. On the contrary, higher dispersed shareholding in the sharia compliant firms show lesser inefficient investments and provide evidence in accordance to previous studies that dispersed shareholdings allow companies to have better decision making and less exploitation of resources. The involvement of institutional owners in the company also provides an extra layer of surveillance and control over efficient decision-making processes. They contribute in terms of added experience and control as is visible in results of the study providing evidence of inverse relationship between inefficient investments and the percentage of institutional ownership in sharia compliant firms. Conversely, higher proportion of retail ownership in companies deductively increases chances of inefficient investments in line with previous studies. The study also shows that mutual funds ownership in sharia compliant firms increases in efficient decision making which is in contrast with the previous studies which shows that mutual funds like institutional owners provide extra control and discourage inefficient decisions. As per previous studies, Independent non-executive director's ownership has an inverse relationship with investment inefficiency. Whereas current study shows a positive and insignificant correlation.

DECLARATION

Limitations of the study

The first limitation of the study was the sharia compliance of companies under review where holding the compliance title throughout the study span was required in order to have controlled financial ratios. The variables under study must be available throughout the study span making the panel data highly balanced. Time constraint was also present as the data was extracted manually from annual reports of companies which in itself is a very laborious task.

Future Implications

The study could be further enhanced by inclusion of owner/investor activism as a proxy and its impact on investment efficiencies. Alongside, further ownership variables like foreign ownership, government ownership can also be used in the study. Rights of management/owners over cash flow of companies can also be utilized as a proxy for agency costs and investment inefficiencies.

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APPENDIX

Table 3.1: Definition and Measurement of Variables.

Name	Symbol	Proxy	Reference
Investment Efficiency	IEFF	$Investments_{i,t} = \beta_0 + \beta_2 SalesGrowth_{i,t-1} + \varepsilon_{i,t}$	Biddle, Hilary & Verdi (2009); Chen et al., (2011); Lin ety al., (2021)
Ownership Concentration	LSH3	LSH3: Sum of shares held by Largest 3 shareholders	Gürsoy & Aydoğan (2002)
	OTHER	OTHER: Shares held by Diffuse Shareholders	
Managerial Ownership	MANOWN	$\frac{shares\ owned\ by\ Executive\ directors}{Total\ outstanding\ shares} \times 100$	B. M. Fatma & J. Chichti (2011)
Institutional Ownership	INOWN	$\frac{Institutions\ Owned\ Shares}{Total\ outstanding\ shares} \times 100$	Bussa & Chichti (2012)
Mutual Funds Ownership	MFOWN	$\frac{Mutual\ Funds\ Owned\ Shares}{Total\ outstanding\ shares} \times 100$	Aggarwal et al. (2011)
Retail Ownership	RETOWN	$\frac{Retail\ (Individuals)\ Owned\ Shares}{Total\ outstanding\ shares} \times 100$	Mura (2007) (Modified)
Independent Non-executive Ownership	INEXOWN	$\frac{shares\ owned\ by\ Ind.\ Non - Exec\ Directors}{Total\ outstanding\ shares} \times 100$	Mura (2007)
Leverage	TDTA	$Leverage = \frac{Total\ Debt}{Total\ Assets}$	Anwer et al. (2023)
Age	Age	The number of years between fiscal year and listing year	Lin et al. (2021)
Return on Assets	ROA	$Return\ on\ Assets = \frac{Total\ Sales}{Total\ Assets}$	Lin et al. (2021)
Stock Momentum	MOM12M	The 12 Month stock returns before the investment year	Chen et al., (2006)
Size of the Board	BSIZE	No. of members on the board	Chen et al., (2006)
Committees on board	BCOMM	No. of committees on the board	Hayes, Mehran & Schaefer (2004)
No. of board meetings	BMEET	No. of meetings held by the board in a fiscal year	Chen et al., (2006)

