



Investment styles of islamic equity funds

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ARTICLE INFO

JEL classification:

A13
C25
G11
Z12

Keywords:

Shari'ah-compliant investment
Islamic equity fund
Investment style

ABSTRACT

We investigate the dynamics of investment styles of Islamic equity funds (IEFs), mainly through portfolio holdings. We rely on an unbiased survivorship sample of 224 active portfolios domiciled in 22 countries from 2004 to 2018 to shed new light on style concentration. IEFs are overwhelmingly skewed initially to value stocks in Islamic countries and growth stocks in non-Islamic countries. We find a subsequent shift from these styles to a more blended approach. Investments in Islamic countries shift from mid-cap to large-cap stocks, while those in non-Islamic countries remain in extremely large-cap stocks. The propensity of style shift is larger in asset type than in asset size. The style drift analyses show that most IEFs drift in style, with a more aggressive drift in Islamic countries than in their non-Islamic counterparts. They are more likely to alter their portfolio exposure in the sight of adverse outcomes. Implications of our results for faith-based investors and regulators are identified in the study.

1. Introduction

Over the years, mutual fund investment styles have intrigued and attracted the interest of numerous researchers (see, e.g. (Brown & Harlow, 2002; Chan, Chen, & Lakonishok, 2002; Barberis & Shleifer, 2003; Kaplan, 2003)). Put simply, style investing is the underlying course of investment across broad asset classes rather than in individual securities. Generally, style investing refers to the stock investing objective of value or growth alongside market capitalisation, i.e., the size of a fund's portfolio holdings. On the one hand, fund managers undertake a wide variety of approaches and adopt various criteria for the stock selection (Chan et al., 2002). On the other hand, investors invest in a fund based on their risk-return (extrapolative) expectations (Barberis & Shleifer, 2003).

Assets in a style or class usually share common characteristics (Barberis & Shleifer, 2003). The fund market identifies two broad classes - growth and value stocks. Value stocks are those currently trading below their book or intrinsic value (i.e., high book-to-market, BM), while growth stocks are those companies expected to expand faster (i.e., high market-to-book, MB). In most cases, value stocks are from more established firms, while growth stocks are from relatively younger firms. Importantly, value stocks provide dividends, unlike growth stocks, which typically refrain from dividend payouts and reinvest to expand. In this regard, to argue on the risk-return sensation, Chan and Lakonishok (2004) verify a variety of indicators, together with beta and return volatility, and suggest that both value and growth stocks bear similar risk-return status. Additionally, Morningstar¹ categorises funds into either value, growth, or blend categories. The blend holds funds that mix stocks in the portfolio holdings as a hybrid category. This category

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¹ The Morningstar database is the most encyclopaedic database for fund characteristics (Chan et al., 2002; Idzorek & Bertsch, 2004; Nainggolan et al., 2016).

<https://doi.org/10.1016/j.iref.2023.10.012>

Received 3 July 2022; Received in revised form 1 June 2023; Accepted 5 October 2023

Available online 9 October 2023

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aims to diversify within the key investment styles in a single fund and take advantage of the stability and dividend income of the value segment and the potential capital yield income of the growth portion. Besides, there are also size categories based on the typical market capitalisation of portfolio holdings, i.e., small, medium, and large-cap.²

The last two decades have seen the remarkable growth of socially responsible and ethically established investment funds as a significant investment stream (Abdelsalam, Fethi, Matallín, & Tortosa-Ausina, 2014; Nainggolan, How, & Verhoeven, 2016). Islamic equity fund(s)³ (IEF/IEFs) fit this category. Individual investors typically choose these funds based on their religious faith, ethical preferences, personal situations, and expectations (Chowdhury et al., 2021, 2022). As such, juxtaposed with the spectacular development of IEFs both in Islamic and non-Islamic jurisdictions, changes in IEF style investing are of vital interest.

Total assets under the Islamic financial system are expected to surge to US\$3.8 trillion by 2024.⁴ Sector-wise, Islamic funds are the third-largest contributor after Islamic banking and *Shukūk* (Islamic bonds). We witnessed a significant increase in Islamic mutual funds from 1161 in 2017 to 1292 in 2018, domiciled in 34 jurisdictions, including non-Organisation of Islamic Cooperation (OIC)⁵ countries (IFSB, 2019). Western countries have also developed a keen interest in asset-backed financial products/services and the risk-sharing principle of Islamic finance, upholding their Islamic financial services to attract Muslim and non-Muslim investors (Čihák & Hesse, 2010).

Unlike typical funds, Islamic funds undertake a rigorous screening course to select assets that meet qualitative and quantitative criteria set by the Shari'ah criterion (Abdelsalam, Fethi, et al., 2014). It specifically screens investments to eject interest charges, speculation, uncertainty, exploitation, or injustice activities, which Shari'ah strictly prohibits. Moreover, there is also the devotion to specific metrics for leverage and liquidity level (El-Gamal, 2006). Notably, the relativity and relevance of Islamic funds vary across nations or regions though their impact is spreading worldwide. Their role in Western economies is relatively modest compared to other types of investment, such as socially responsible investment (SRI), whereas it is much more firmly established, specifically in Muslim-majority countries in Asia and Africa regions (El-Masry, de Mingo-López, Matallín-Sáez, & Tortosa-Ausina, 2016). Like the typical fund, the Islamic fund refers to the standard practice of managing investment via methods that mix investors' financial objectives with religious considerations. Therefore, Islamic funds in Islamic and non-Islamic countries are actively held so that fund managers rebalance portfolios to attain investment objectives (Peillex, Erragragui, Bitar, & Benlemlih, 2018). Albeit, the objective might vary mainly with the core investment style.

Ferruz, Munoz, and Vargas (2012) recently assert that religious mutual fund investors invest based on their social and personal values. They also report that religious mutual fund managers typically invest in small-cap and value stocks. This reflects the behavioural aspect of risk avoidance, a common feature of investment by religious faith-based investors, investing in more well-established companies and securing income avenues via dividends. This is due to the leverage restraint in IEF that leans toward value stocks relative to the growth stocks (Campbell & Vuolteenaho, 2004). By contrast, Hoepner, Rammal, and Rezec (2011) find evidence from 20 countries that IEF is somewhat tilted to growth stocks. They also find that funds from predominantly Muslim economies exhibit a strong small-cap tilt. In this regard, Hayat and Kraeussl (2011) hypothesise that IEFs are susceptible to investing in sub-optimally leveraged companies, which means high exposure to companies that have difficulty in debt financing, such as startups, typically small companies. However, this size orientation rationale is arguable. In a recent study, Pastor, Stambaugh, and Taylor (2020) find that funds typically tilt more toward large-cap stocks because small-cap stocks are more expensive to trade. They conjecture that, in equilibrium, funds optimally choose the trade-off of trading cost versus potentially higher return of the small-cap stock. In consonance, Lettau, Ludvigson, and Manoel (2018) report that most US-based funds overwhelmingly hold large-cap stocks. Noteworthy is the significant contrast to the substance of the capital markets in Islamic and Western economic systems (Hearn, Piesse, & Strange, 2012).

The subtle contrasts and vagueness in the prior studies and the specificity of IEFs in Islamic and non-Islamic countries inspired us in this study that aims to add to cumulative knowledge on IEF style investing across these two broad country groupings. The impact of Shari'ah on consumers in Islamic countries is more potent than in non-Islamic countries, which may result in variations in investment styles. One can also expect variances in Islamic countries' investment styles (mostly emerging to developing markets) and non-Islamic countries (mainly developed markets) due to variances in the degree of competition and the learning curve aspect. So, the degree of style shift may be unlike. Moreover, prior studies have explicitly relied on return-based style analysis (RBSA) to explain the investment style despite the problems related to the misclassification (Van Campenhout, 2002). This points to a potential research gap about the implicit notion of portfolio holdings over time. We aim to mitigate this gap with our study. Therefore, we investigate IEF investment styles based on portfolio holding-based style analysis.

A consistent investment style is an important aspect of portfolio management (Brown & Harlow, 2002). However, studies report that typical funds do not always operate as their names suggest (Chan et al., 2002; Kaplan, 2003). Then again, over time, a security's value deviates noticeably from the underlying value as styles turn out to be favourable or unfavourable (Barberis & Shleifer, 2003). For that reason, empirical studies, for instance, Brown and Harlow (2002) and Kaplan (2003), report the role of style shift in investigating

² Large-cap stocks together account for the top 70% of the cumulative capitalisation of each style zone; mid-cap the next 20%; and small-cap the rest 10% (Morningstar, 2008).

³ Structure-wise, equity is the main asset class of Islamic funds (nearly 40%), thus Islamic fund managers invest mainly in Islamic equity, i.e., stock (Peillex et al., 2018).

⁴ An Inclusive Ethical Economy: State of the Global Islamic Economy Report 2018–2019, available at: <https://haladinar.io/hdn/doc/report2018.pdf>.

⁵ Organization of Islamic Cooperation (OIC) is the collective voice of the Muslim world (founded in 1969) to safeguard and protect Muslim interests in the spirit of promoting international solidarity. Read more: www.oic-oci.org.

investment styles. However, to our knowledge, the aspect of style shift is almost entirely non-existent in IEF-related studies. A recent exception, albeit with only oblique reference to style shift, is [Peillex et al. \(2018\)](#), who surmise that IEF managers are expected to be more sensitive to portfolios' idiosyncratic risks by adopting a more reactive stock-picking approach. Therefore, we conjecture that style shift in Islamic portfolios is important to explain the investment styles and is more significant in light of the Shari'ah-compliant ideologies.

Our analyses of an unbiased survivorship sample of 224 active IEFs domiciled in 22 countries from 2004 to 2018 yield several in-depth findings. First, our historical portfolio holding-based style analysis reveals that IEFs initially overwhelmingly tilt to value stocks in Islamic countries and growth stocks in non-Islamic domiciles. However, IEF managers have recently been moving to portfolios that are more tilted to blend style. Similarly, IEFs initially overwhelmingly pick mid-cap stocks in Islamic countries, but lately, most of them have been heavily skewed to large-cap stocks. We instead find a consistent large-cap tilt in non-Islamic domiciles. Further, our multinomial regressions quadrature these schemas, indicating a linkage between investment styles and historical returns. Second, from the typical style drift analysis, we find the majority of IEFs drift in style, but the drift rate (as well as mean score) is higher in Islamic countries than non-Islamic domiciles. Next, our portfolio-based style analysis finds that the propensity of style shift is higher in asset types than in asset sizes. IEF managers are more likely to alter their portfolio exposure to the market when they undergo negative returns and in the sight of a drop in total asset value. Collectively, IEFs shift in asset types more often once they secure an increase in fund flow. The more mature fund is more likely to style shift in Islamic countries. Funds from non-Islamic domiciles are more likely to shift in asset types when the market is relatively stable. We also note that the nature of the IEF style shift is similar to that of its conventional counterparts. Hence we argue that investment styles are induced by the shift of holding stock characteristics, both in asset type and size dimensions.

Our investigation is exploratory; therefore, scholarly contributions are broad. To our knowledge, historical portfolio-based style analysis is almost non-existent in extant Islamic fund-related studies. This is the first study to contribute more directly to exploring the investment styles instrumental in Islamic and non-Islamic jurisdictions through a portfolio holdings lens. It connects with preceding studies on the long-standing and complex issue of investment style and advances our understanding of Islamic equity portfolio holdings. Consequently, it can help restricted faith-based fund managers, as well as investors, to comprehend the subsequent compartment of Islamic investments.

The remainder of this article is organised as follows. Section 2 briefly reviews pertinent literature, highlights the study's objectives and states the research questions. In section 3, we explain our sample, describe the data, and develop the research approach. The empirical findings/insights are in section 4. Lastly, we offer concluding remarks in section 5, exploring the study's implications.

2. Prior research

Over the last decade, several studies have analysed IEFs. The critical research strands are the risk-return characteristics ([Hayat & Kraeusl, 2011](#); [Hoepner et al., 2011](#)) that take the effect of the Shari'ah compliance ([Ashraf, 2016](#); [Nainggolan et al., 2016](#)) as well as comparative performance in relation to conventional counterparts ([Abdelsalam, Fethi, et al., 2014](#); [Ashraf, 2013](#); [Boo, Ee, Li, & Rashid, 2017](#); [El-Masry et al., 2016](#)), and more lately, managerial skills in-stock selection ([Ashraf, 2013](#); [Ferruz et al., 2012](#); [Kamil, Alhabshi, Bacha, & Masih, 2014](#)) and performance persistence ([Abdelsalam, Duygun, Matallín-Sáez, & Tortosa-Ausina, 2014](#); [Abdelsalam, Duygun, Matallín-Sáez, & Tortosa-Ausina, 2015](#); [Makni, Benouda, & Delhoumi, 2016](#)). However, the literature is limited in explicitly analysing the investment styles in IEFs. Despite intense interest in IEFs by investors and portfolio managers, underlying investment styles have remained mainly vague in the scholarly literature. Next, we highlight the limited number of studies that provide some insights.

[Crane, McWilliams, Matten, Moon, and Siegel \(2008\)](#) claim that religious belief is the first rationale for socially responsible investment, and it remains a vital dynamic over time. According to [Peifer \(2011\)](#), religious mutual funds in the US consciously inject social and ethical concerns into economic decision-making. Similarly, [Ferruz et al. \(2012\)](#) assert that religious mutual funds commonly invest in value stocks. This probably arises from risk avoidance, an investment commonality across religious faith-based investors, investing in well-established companies and secure income avenues. This is arguable, with the leverage restraint in IEF as the higher leverage of value stocks relative to that of the growth stocks ([Campbell & Vuolteenaho, 2004](#)). In this regard, [Girard and Hassan \(2008\)](#) indicate a growth sector tilt in Islamic equity indices (FTSE Islamic indices). Consistent with the underlying expectancy, [Hoepner et al. \(2011\)](#) also find that the international investment style of IEFs appears somewhat tilted to growth stocks, conjecturing the relatively lower leverage of growth stocks. In contrast, [BinMahfouz and Hassan \(2012\)](#) find no significant growth stock tilt in IEF, particularly in the Arabian and other Asian, including Japanese funds. [Omri, Soussou, and Ben Sedrine Goucha \(2019\)](#) recently report that Islamic funds in Saudi Arabia are more value-oriented than their conventional counterparts.

[Girard and Hassan \(2008\)](#) signpost higher small-cap tilt in Islamic equity indices than conventional counterparts. [Hassan, Khan, and Ngow \(2010\)](#) raise the same issue in the Malaysian Islamic unit trust fund. [Hoepner et al. \(2011\)](#) provide the most substantial evidence that Islamic funds from predominantly Muslim economies display a strong small-cap preference. Similarly, [Wan-Ni \(2012\)](#) show that Christian indexes in the US and EU display some tilt to the small-size factor. [Ferruz et al. \(2012\)](#) also assert that religious mutual funds commonly invest in small-cap stocks. In this regard, [Hayat and Kraeusl \(2011\)](#) hypothesise that IEF is susceptible to investing in sub-optimally leveraged companies, which means high exposure to companies with difficulty in debt financing, such as -startups, typically small-cap stocks. In contrast, [BinMahfouz and Hassan \(2012\)](#) find that Islamic mutual funds, particularly in Saudi Arabia, do not seem influenced to target small-cap stocks. [Walkshäusl and Lobe \(2012\)](#) indicate that Islamic indices in emerging markets exhibit a substantial large-cap bias in their investment. In a recent study, [Omri et al. \(2019\)](#) report that Islamic funds in Saudi Arabia display a large-cap preference. In this regard, [Pastor et al. \(2020\)](#) show that mutual fund picks large-cap stocks since small-cap

stocks are more expensive to trade. They argue that a fund manager optimally considers the trade-off of trading cost versus a potentially higher return of small-cap stocks in equilibrium. Lettau et al. (2018) find that most mutual funds in the US overwhelmingly hold large-cap stocks.

Despite the rise in studies on IEF, their contributions have yet to reach a consensus on investment styles. One possible explanation for this broad and mixed empirical evidence might be that most studies implicitly reckon IEF as invariable to their domicile exposure. Another reason could be the lack of emphasis on the dynamic aspects of style investment. That said, related studies explicitly rely on RBSA. This highlights a potential research gap directly related to portfolio holdings-based style analysis. Furthermore, investment styles shift over time (Brown & Goetzmann, 1997). This may ameliorate when security prices deviate considerably from their underlying values as specific styles are favourable or unfavourable in the investment (Barberis & Shleifer, 2003). Thus a fund manager can motivate by economic reasons to alter portfolio holdings in anticipation of changing market conditions (Annaert & Van Campenhout, 2007). In this vein, Holmes and Faff (2008) also argue that prevailing market conditions can influence fund manager portfolio decisions. Put simply, any deviation from the stated investment objectives refers to a style shift/drift⁶ (Cumming, Fleming, & Schwienbacher, 2009). However, in-depth analysis of the IEF style shift is almost non-existent in extant studies. Recently, Shahimi and Hanafi (2019) examine the style drift of Şukük funds by RBSA and show that only a few of them indicate significant drift in style from the original objectives. Of relevance, Sha (2020) utilises the rarely employed portfolio holdings-based style analysis to study mutual funds in China and finds that the change in holding stock characteristics induces a style shift.

Accordingly, given the scant attention in prior literature to IEF style considerations, our study has dual objectives. First, we inspect the investment style of IEFs based on their historical portfolio holdings. Second, we empirically test for the nature of the IEF style shift. Hence, we pose the following research questions for our exploratory study.

1. Is there a style concentration in IEFs? If so, does this concentration vary in Islamic and non-Islamic countries?
2. Do IEF's style shift like its conventional counterparts? If so, why?

3. Data and method

3.1. Sample and summary statistics

We identify the IEFs via Morningstar⁷ over the 15 years. Our sample period is January 2004 to December 2018 and employs standard screens (i.e., Ethical Issue Strategy Focus: Shari'ah > Global Broad Category Group: Equity > Share Class: Oldest; see Appendix A Table A1 for specifics). The insertion of a fund with limited data raises some modelling issues; for instance, the low number of observations upsets the robustness of the analysis. Accordingly, the sample start date is confined to January 2004. In the sample period, some funds were born, but some did not survive. We consider both; otherwise, it could yield the so-called survivorship problem (Abdelsalam, Fethi, et al., 2014). However, we only consider funds for which information for at least two years was available. We collect data on fund name, country of domicile, investment area, region of sale, inception date, holdings type, Morningstar style box,⁸ total net assets, net flow, return, and management fee as of December 2018. We compute quarterly data to avoid calendar anomalies as well as missing values. We also convert monetary values into US\$ if reported otherwise. Table A2 in Appendix A exhibits the complete list of variables with the definition.

Our initial screening found 414 IEFs domiciled in 24 countries worldwide. Of these, 289 funds were domiciled in Islamic countries, and the rest 125 funds domiciled in non-Islamic domiciles. Asia Pacific countries dominate both in the cases of investment area and region of sale (see Appendix A Figure A1 for more details). The descriptive statistics in Table 1 shows notable disparities in the fund's characteristics across the countries. For instance, nearly one-third of our sample funds have died. The attrition rate varies considerably in the sample countries; collectively, 26% are in Islamic countries, while 46% are in non-Islamic countries. It suggests, as reported by Hoepner et al. (2011) that Islamic investment services might develop more smoother in Muslim-majority countries. However, since this study aims to examine the underlying investment styles of the IEF based on historical portfolio holdings, we require portfolio holdings linked with investment styles. Morningstar records holdings that have been either voluntarily disclosed by the fund or the fund provides while Morningstar makes holdings requests on an ad-hoc basis (Gregory-Allen, Balli, & Thompson, 2019). However, we find nearly half of our initial sample did not release such information,⁹ and the rate is significantly higher for Islamic-domiciled (54%) compared to non-Islamic domiciled (28%) funds. This is inconsistent with the risk-sharing ideology of financial contracts that requires high transparency in the Islamic financial system (Nainggolan et al., 2016). This is a significant issue for the Shari'ah regulator and fund managers, as portfolio holdings information is important for investors' confidence.

We ultimately include 224 IEFs with full disclosure of portfolio holdings and investment styles. Of these, 134 funds domiciled in 5 Islamic countries, and the rest 90 funds domiciled in 17 non-Islamic countries. On average, IEFs are relatively young at 133 months and small at 62.40 million assets. Funds from Islamic countries are older (155 months) and larger (70.26 million) than those from non-

⁶ The terms style 'shift' and 'drift' are used interchangeably in the literature and are generally synonymous.

⁷ To the best of our knowledge, Morningstar has the most comprehensive data coverage for IEFs from all over the world, and is also known for the granularity in clarifying Shari'ah Compliance.

⁸ Morningstar categorises funds as small-growth, small-value, small-blend, mid-growth, mid-value, mid-blend, large-growth, large-value, and large-blend (Morningstar, 2008).

⁹ In exploring the disclosure practices of IEFs, Nainggolan and Trinugroho (2018) report that only about 25% of the IEFs disclose holdings data.

Table 1
Summary statistics.

	Domicile	No. of funds	Dead	%	Disclosure	%	Age (Mon.)	TNA (\$, Mil.)	Fees (%)	Return (%)
Islamic Countries										
	Bahrain	10	7	70	–	–	–	–	–	–
	Indonesia	32	3	9	10	31	107	34.76	3.03	7.89
	Kuwait	18	15	83	1	6	182	57.70	1.50	6.02
	Malaysia	114	19	17	107	94	158	76.56	1.59	3.79
	Oman	2	–	–	–	–	–	–	–	–
	Qatar	3	–	–	–	–	–	–	–	–
	Saudi Arabia	105	30	29	14	13	169	59.21	1.57	6.62
	United Arab Emirates	5	2	40	2	40	80	6.96	1.88	3.49
	Subtotal/average	289	76	26	134	46	155	70.26	1.69	4.42
Typical Countries										
	Australia	2	–	–	1	50	89	17.72	1.50	–3.73
	British Virgin Islands	3	3	100	–	–	–	–	–	–
	Canada	1	–	–	1	100	117	15.32	2.50	5.47
	Cayman Islands	10	7	70	4	40	58	–	1.75	8.15
	France	1	–	–	1	100	111	0.95	1.00	2.55
	Guernsey	3	–	–	2	67	100	7.59	2.00	2.24
	Hong Kong	1	–	–	1	100	133	16.97	1.00	4.17
	India	2	–	–	2	100	194	20.25	1.25	15.46
	Ireland	21	14	67	16	76	67	29.02	1.39	–1.09
	Japan	2	1	50	2	100	70	22.89	1.00	1.46
	Jersey	2	–	–	2	100	143	42.16	1.38	–0.50
	Luxembourg	49	26	53	34	69	74	18.90	0.79	9.38
	Mauritius	3	1	33	1	33	98	–	0.50	5.63
	Singapore	2	2	100	2	100	143	3.36	1.00	8.42
	South Africa	11	2	18	11	100	139	58.66	0.93	4.00
	South Korea	1	1	100	1	100	38	0.09	0.80	31.96
	Thailand	3	–	–	3	100	142	2.89	1.61	10.95
	United Kingdom	2	–	–	–	–	–	–	–	–
	United States	6	1	17	6	100	224	372.41	0.88	5.99
	Subtotal/average	125	58	46	90	72	100	50.24	1.08	5.84
Entire Sample	–	414	134	32	224	54	133	62.40	1.45	4.96

Notes: The sample period is Jan. 2004–Dec. 2018. TNA (total net asset) and return are the mean, while fees are for the most recent year, i.e., 2018. The UK, together with 3 overseas territories, including the British Virgin Islands, Cayman Islands, and Guernsey, is considered a single country.

Islamic countries (100 months and 50.24 million, respectively). The oldest (224 months) and largest (372.41 million) funds are domiciled in the United States. The average management fee is 1.45% of the total net asset. Islamic country-domiciled funds charge significantly higher management fees, 1.69%, compared to those from non-Islamic countries, 1.08%. Not surprisingly, there is a significant variation across mean returns. The yearly return is nearly 5%, and non-Islamic domiciled funds (5.84%) performed better than Islamic-domiciled funds (4.42%).

3.2. Research methods

Our empirical approach comprises 2-steps. First, we decompose the investment styles by asset types and asset sizes based on the portfolio holdings over time that underlie the well-known Morningstar style box and then attempt to explore the investment styles over the core covariates.

There is no common consensus on the style measures (Trzcinka, 1995). An investment return manoeuvres the set of investment styles, which is only a multinomial statistic (Brown & Goetzmann, 1997). Though the issue of comparative performance is not our main concern, we employ standard multinomial regressions to relate the investment styles with the underlying covariates to identify relative concentration. In doing so, we use Morningstar style codes that reserve a multinomial distribution. We then take return alongside size, i.e., the log of the total net asset and net flow, in addition to age. Finally, we deploy the following equation:

$$style_{i,t} = \alpha_{i,t} + \delta_1 return_{i,t} + \delta_2 TNA_{i,t} + \delta_3 TNF_{i,t} + \delta_4 age_{i,t} + \varepsilon_{i,t} \quad (1)$$

where $style_{i,t}$ is a categorical variable acquired from the Morningstar's 'Equity Style Box', which categorises style on a 9-point scale from small growth to mid blend to a large value, $\alpha_{i,t}$ is intercept, $return_{i,t}$ is the quarterly return, $TNA_{i,t}$ is the natural logarithm of the

total net assets, $TNF_{i,t}$ is the total net flow at each quarter, $age_{i,t}$ is the age of the fund in the month, and $\varepsilon_{i,t}$ is the error term.

We employ multinomial regressions¹⁰, an extension of the binomial response, where the dependent variable takes more than two discrete values. In this regard, Multinomial Logit and Probit models have been much attention as a result of their suitability to the discrete response analysis (McFaden & Train, 2000). Thus, it expedites our comparison of investment styles (see, for example, Brown and Goetzmann (1997); Wilcox (1999)). In addition, multinomial regressions have been widely utilised in typical fund studies; see Levinthal and Myatt (1994) and Arshanapalli, Switzer, and Panju (2006).

Second, we first check the style shift based on common return-based style analysis, i.e., RBSA (we explain in section 5.3). We then extract style shifts based on portfolio holdings in asset types and asset sizes to expose the underlying aspects. It has been disputed that a mutual fund's investment styles shift over time (Brown & Goetzmann, 1997). This is mainly for the reason that security values deviate considerably from intrinsic values as specific styles turn out to be favourable or unfavourable over time (Barberis & Shleifer, 2003). Therefore, style shifts are motivated by economic reasons like market volatility or portfolio alteration in anticipation of changing economic conditions (Annaert & Van Campenhout, 2007). We explore the aspects of underlying variables as a source of shift in the IEF's investment style. We motivate with Cumming et al. (2009) and consider any deviation from the objective as a style shift. This style shift is our dependent variable, a discrete variable equal to 1 if a fund shifts and '0' otherwise. Consequently, a fund can be a blend type in one quarter and value or growth in a different quarter or vice versa, similarly in size orientation.

In the course, we evaluate the effect of a standard set of variables on the shift in investment style, including fund-specific variables, return, TNA (as fund size), and TNF (as fund flow), variables closely related to management, the fee (i.e., management cost), age, as a proxy for fund experience, (Abdelsalam, Fethi, et al. (2014)), and status, a binary format, 1 if live or 0 if dead as survivorship (El-Masry et al. (2016)), alongside the variable that is broadly related to the market condition (as Islamic market volatility). All of the independent variables are lagged in one quarter. Table A3 in Appendix A depicts correlation coefficients for the independent variables, indicating no collinearity concern. We deploy the following equation:

$$shift_{i,t} = \alpha_{i,t} + \delta_1 return_{i,t} + \delta_2 TNA_{i,t} + \delta_3 TNF_{i,t} + \delta_4 age_{i,t} + \delta_5 fee_{i,t} + \delta_6 status_{i,t} + \delta_7 std_{i,t} + \varepsilon_{i,t} \quad (2)$$

In this setup, we use logit, along with probit models, where the conditional probability of the dependent variable is considered a function of the explanatory variables (Horowitz & Savin, 2001). In practice, the logit and probit regressions lead to analogous insights (McCulloch, Polson, & Rossi, 2000). There is no theoretical sustenance of why either logit or probit should be regarded as superior. The only disparity arises in their behaviour in the 0–1 probability range severity that does not imply one functional preference over the other (Laton & Katsuura, 2001). Logit and probit models have been widely utilised in typical fund studies; see Ferris and Yan (2007) and Cumming et al. (2009), among others.

Considering cross-section and time dimensions in our dataset, we employ panel logit and probit regressions with random effects. Two main reasons lead to our choice. First, we have data constraints. One of our critical variables is the management fee, and this data is static for a fund. Management fee rarely changes, and currently, no database provides a time-varying management fee for Islamic funds. Second, the panel fixed-effects estimate is not consistent under probit, and most data analysis software does not provide an option for fixed-effects.

4. Empirical analyses and findings

In this section, first, we analyse the portfolio holdings by specifics over the lifetime of the fund to explore the investment styles. We then highlight the underlying aspects of the investment styles. In the second part, we estimate the typical style drift score. After that, we uncover the shift in style based on historical holdings to investigate the underlying reasons for the style shift.

4.1. IEF investment styles: preliminary investigation

Over time, both theory and practice have settled on two salient dimensions that define a fund's style: the inherent attributes (i.e., the value-growth-blend dimension) and the market capitalisation (i.e., the small-mid-large size dimension) of the portfolio holdings (Brown & Harlow, 2002; Chan et al., 2002). We decompose the portfolio holdings over the lifetime of the fund, first, by asset type (i.e., value, growth, blend) and then by size (i.e., small, mid, large).¹¹ It is premised on the Morningstar style box, which schemes nine categories with which to classify as investment styles. Previous IEF studies overlook the time variation of investment styles and heavily rely on returns-based style analysis. Our study mitigates these shortcomings. Fig. 1 reflects the time series exposures of investment styles for Islamic and non-Islamic jurisdictions separately and the entire sample from Q12004 to Q42018. Even from a preliminary examination, we can easily spot the variation and evolution of investment styles in the IEF over time.

In the early years (till 2012), IEFs overwhelmingly tilt their portfolios toward high-BM value stocks in Islamic countries (see Fig. 1 a.i). However, that tilt vanishes abruptly over the year as portfolios significantly shift their investment objectives toward core stocks, i.e., blend funds. There has been little exposure to growth stocks until recently (from 2014); nearly 25% of funds are identified as growth funds. Then again, initially, the majority of the portfolios considered mid-cap stocks (see Fig. 1 b.i), consistent with the widely held view of small-cap bias (as earlier studies categorise either small-cap or large-cap funds (Hayat & Kraeussl, 2011; Hoepner et al., 2011).

¹⁰ See Appendix B for the model derivation.

¹¹ the two methodologies to style characteristics, i.e., portfolio holdings and factor sensitivities to return, by and large, provide a similar reading of a fund's styles.



Fig. 1. Historical Evolution of Styles.

Notes: The Stack plots display the investment styles over the sample period Jan. 2004–Dec. 2018. Y-axis is, in percentage, refers frequency distribution of the investment Styles.

Nevertheless, we see a steadily increasing tilt to large-cap till 2014, and that tilt has been stable over the recent year; nearly 50% of funds hold large-cap stocks, in consonance with [Pastor et al. \(2020\)](#) as in the typical mutual fund market. In contrast, non-Islamic country funds tilt their portfolios primarily toward high-MB growth stocks (see [Fig. 1 a.ii](#)). This is consistent with [Walkshäusl and Lobe \(2012\)](#) and [Wan-Ni \(2012\)](#), who report that Islamic indices in developed markets (the US and the EU) exhibit a strong growth orientation in their investment behaviour. There has been invariably slight exposure to value funds. Incidentally, [Lettau et al. \(2018\)](#) find that value funds are almost missing from the US equity market. Though we see an increasing tilt towards blend funds, not as abruptly as in the case of the Islamic country. In the case of size exposure, except for a relatively small number of small- and mid-cap tilt (nearly 25%), most funds (almost 75%) overwhelmingly hold large-cap stocks (see [Fig. 1 b.ii](#)).

The conditional distribution of investment styles imparts some puzzling insights. First, we find IEFs initially significantly tilted to value stocks in Islamic countries, but in contrast to growth stocks in non-Islamic domiciles. In keeping with the behavioural aspect of risk avoidance, as [Ferruz et al. \(2012\)](#) hypothesised, it also raises the religious norms on the risk-return contention, posed only in Islamic countries. Over the recent year, Islamic fund managers are moving to portfolios more tilted to the blend funds (see [Fig. 1 a.iii](#)). This signifies an increasing trend of diversified portfolios. Moreover, most IEFs invest heavily in large-cap stocks (see [Fig. 1 b.iii](#)), implying that most fund managers do not exploit the small-cap stock premium, in consonance with [Lettau et al. \(2018\)](#). An alternative explanation is that large-cap stock is more stable than mid- or small-cap stock, thus the safest bet for risk-averse investors. Looking over [Fig. 1 a.i-ii](#) and [Fig. 1 b.i-ii](#), we notice, broadly, there is a qualitative sense of style consistency in non-Islamic countries. This requires a more in-depth analysis to ascertain whether the variances we find are intensifying from the shift in style, as we explain later in sections [4.3](#) and [4.4](#).

4.2. Underlying style aspects: further analysis

First, we plot the frequency of styles, i.e., the joint distribution of asset types and asset sizes of the sampled funds in [Fig. 2](#). We find the lowest frequency distribution for small-cap growth funds. This category regularly reports relatively higher risk. This typifies the religious orientation, viz, risk avoidance in Islamic investments. Large-cap blend funds have the highest frequency distribution, unsurprising since they are typically the safest style. We set this category as the BASE OUTCOME in our multinomial regressions. The rest of the categories are intuitive.

We report the regression coefficients of the Multinomial Logit (MNL) and Multinomial Probit (MNP) models in [Table 2](#). We find the return coefficients of mid-cap growth (MG), mid-cap value (MV) as well as large-cap growth (LG), and large-cap value (LV) funds positively significant. Earlier, we have seen portfolios of IEFs more tilted towards value funds in Islamic countries and growth funds in non-Islamic countries. Thus inherently, value funds from Islamic countries and growth funds from non-Islamic countries experience a higher style likelihood in the sight of positive return in comparison to the BASE OUTCOME. These relationships hold mostly in mid-to large-cap funds. We find negatively insignificant coefficients for the small-cap funds (SG, SV, SB). This streamlines the lack of small-cap funds in comparison to large-cap funds. Fund flow is primarily negligible, except for the small-cap value (SV) funds (positively significant), indicating a higher likelihood. In the case of age, we find primarily positive and significant coefficients, except the large-cap

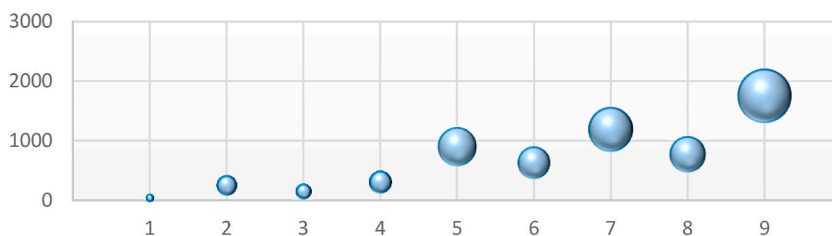


Fig. 2. Frequency Distribution of Styles

Notes: The bubble chart plots the frequency distribution of investment styles where 1 refers Small Growth, 2 refers Small Value, 3 refers Small Blend, 4 refers Mid Growth, 5 refers Mid Value, 6 refers Mid Blend, 7 refers Large Growth, 8 refers Large Value, and 9 refers Large Blend.

Table 2

Investment styles over fund fundamentals.

Style	MNL				MNP			
	return	TNA	TNF	age	return	TNA	TNF	age
SG	-0.0307 0.0169	0.1899 0.1911	-0.0126 0.0233	0.0049* 0.0011	-0.0107 0.0075	0.0622 0.0881	-0.0066 0.0118	0.0025* 0.0005
SV	-0.0059 0.0078	-0.2033* 0.0883	0.0222* 0.0076	0.0028* 0.0006	-0.0014 0.0043	-0.1195* 0.0494	0.0117* 0.0053	0.0017* 0.0003
SB	-0.0032 0.0097	-0.1850* 0.1108	0.0123 0.0125	0.0056* 0.0006	-0.0002 0.0049	-0.1092* 0.0580	0.0074 0.0070	0.0031* 0.0003
MG	0.0053* 0.0075	-0.3946* 0.0823	0.0020 0.0136	0.0018* 0.0006	0.0040* 0.0040	-0.2196* 0.0456	0.0011 0.0076	0.0012* 0.0003
MV	0.0140* 0.0049	-0.4431* 0.0544	-0.0085 0.0094	0.0044* 0.0004	0.0097* 0.0033	-0.2962* 0.0371	-0.00527 0.0064	0.0029* 0.0002
MB	-0.0033 0.0054	-0.3441* 0.0607	-0.0096 0.0103	0.0035* 0.0004	-0.0013 0.0035	-0.2234* 0.0396	-0.0061 0.0068	0.0022* 0.0003
LG	0.0077* 0.0045	0.1425* 0.0527	0.0042 0.0066	-0.0028* 0.0005	0.0059* 0.0032	0.1043* 0.0365	0.0023 0.0046	-0.0019* 0.0003
LV	0.0156* 0.0051	-0.0093 0.0574	-0.0057 0.0081	0.0022* 0.0004	0.0104* 0.0034	-0.0106 0.0379	-0.0039 0.0056	0.0014* 0.0003
LB	BASE OUTCOME Prob > chi2 = 0.00; Pseudo R-squared = 0.025 Log Likelihood: -10429.803				BASE OUTCOME Prob > chi2 = 0.00; Pseudo R-squared = N/A Log Likelihood: -10426.972			

Notes: This table reports the results of multinomial regressions where the dependent variable is nine underlying investment styles (small-growth (SG), small-value (SV), small-blend (SB), mid-growth (MG), mid-value (MV), mid-blend (MB), large-growth (LG), large-value (LV), large-blend (LB)) and the independent variables are return, total net asset (TNA), net flow (TNF) and age. MNL and MNP denote Multinomial Logit and Probit, respectively. Standard errors are reported underneath coefficients. * $p < 0.1$.

growth (LG) and large-cap blend (LB) with negatively significant coefficients, signifying a higher probability of employing such styles by the younger funds.

Collectively, mid-to large-cap value funds, which are primarily in Islamic countries and growth funds, which are mostly in non-Islamic countries, experience a higher style likelihood in the sight of positive return. Having investigated underlying investment styles in IEFs, we next turn our attention to inspecting the aspects of the apparent shift in style over the period in sections 4.3 and 4.4.

4.3. IEF style consistency: style drift score analysis

Maintaining a consistent investment style is an important aspect of portfolio management (Brown & Harlow, 2002). Studies over time confirm a positive relationship between investment style consistency and performance. At this point, first, we investigate IEF

Table 3

Style drift and score.

Focus	Islamic Domicile		Typical Domicile		Entire Sample	
	number	%	number	%	number	%
Style Drifts	120.00	90	64.00	71	184.00	82
Score	30.38	-	25.89	-	28.82	-
Not Drifted	14.00	10	26.00	29	40.00	18

Notes: This table reports the style drift and score statistics of Islamic and non-Islamic countries as per Idzorek and Bertsch (2004).

consistency employing the style drift (RBSA) score approach of [Idzorek and Bertsch \(2004\)](#). The style drift score measures the variability of a fund's effective asset style in conjunction with the average effective asset style. We calculate the average style drift score (SDS) based on 36-month moving windows by month as:

$$\overline{SDS} = \sqrt{\frac{1}{T-1} \cdot \sum_{i=1}^n \cdot \sum_{t=1}^T \cdot (w_{it} - \bar{w}_i)^2} \quad (3)$$

where T is the total number of quarters, n is the number of asset classes, w_{it} is asset class weight for asset class i at period t , and \bar{w}_i is the average asset class weight for asset class i .

[Table 3](#) reports Islamic and non-Islamic countries' style drift and mean score statistics and the entire sample. We find that nearly 82% of funds drift in style, which is higher in Islamic countries (90%) than in non-Islamic countries (71%). Collectively, nearly 18% of funds do not drift, indicating perfect style consistency, which is again higher in non-Islamic countries. This is, to some extent, consistent with our historical style analysis (see [Fig. 1 a.i-ii](#) and [Fig. 1 b.i-ii](#)). Note that a lower score indicates lower amounts of style drift, and a higher score indicates higher amounts. We find the mean drift score as high as 28.82, compared to the typical fund ([Idzorek & Bertsch, 2004](#)), which is once again higher in the Islamic countries (30.38) compared to non-Islamic countries (25.89). On a related note, [Chan et al. \(2002\)](#) report that style shift is more notable in value funds (i.e., in Islamic countries). All in all, they explain this disparity with the agency or behavioural safeguards in fund management.

[Fig. 3](#) displays the frequency distribution of style drift scores (minimum 7.48 and maximum 58.13), highlighting the magnitudes.

Second, we check style shift as the evolution of a fund's investment style over time and separately mark if they shift in asset types (growth, value, blend) and asset sizes (small, medium, large). Consistent with style drift, nearly 80% of funds shift from their stated styles. Notably, the shifting propensity is higher in asset type than in asset size dimensions.

4.4. IEF style shift: in-depth testing and discussion

[Table 4a](#) reports the results for the style shift in asset types, and similarly, [Table 4b](#) reports the style shift in asset sizes to expose the underpinnings of the style shift. Subsequently, we also report the marginal effects. Additionally, we split our analysis into Islamic and non-Islamic countries to seek more insights.

First, we find the negatively significant coefficient for return in both Islamic and non-Islamic countries, indicating the likelihood of a shift in investment style. Specifically, funds with negative returns are more likely to shift than those with positive income. In that sense, Islamic fund managers seek to change their exposure to the market when they experience negative returns. To some extent, it refers to consciously deviating from the stated objective to secure higher relative performance ([Annaert & Van Campenhout, 2007](#)). However, this finding is inconclusive as we find insignificant coefficients in Islamic and non-Islamic countries and collectively when we test shifts in asset sizes. Regarding fund size, we find consistently negative and primarily significant coefficients regardless of Islamic and non-Islamic countries. It suggests that investment size is an important issue of the size effect in style shift ([Mirza, Rizvi, Saba, Naqvi, & Yarovaya, 2022](#)). Islamic funds are more likely to shift with a drop in total asset value. The coefficient of fund flow is positively significant for the entire sample but only when the fund shifts in asset types. Therefore, collectively it might specify that IEFs shift in asset types more often once they secure an increase in fund flow, consistent with the style shift in the private equity funds

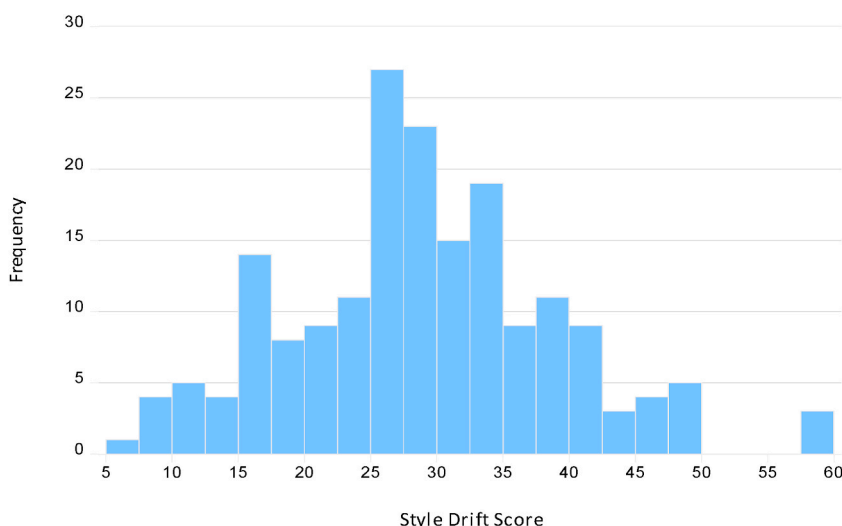


Fig. 3. Frequency Distribution of Style Drift Scores

Notes: This chart plots the distribution of style drift scores, the Y-axis shows frequency, and X-axis shows style drift scores. The average style drift score is based on 36-month moving windows by monthly from 2004 to 2018.

Table 4a
IEF Style Shift in asset types.

Variables	Islamic Domicile		Typical Domicile		Entire Sample	
	Logit	Probit	Logit	Probit	Logit	Probit
return	−0.0133*	−0.0067*	−0.0183*	−0.0100*	−0.0144*	−0.0075*
	0.0065	0.0034	0.0081	0.0044	0.0050	0.0026
TNA	−0.0447	−0.0243	−0.1001*	−0.0570*	−0.0736*	−0.0402*
	0.0326	0.0173	0.0456	0.0252	0.0246	0.0132
TNF	0.0173	0.0098	0.0130	0.0084	0.0145*	0.0086*
	0.0122	0.0067	0.0093	0.0053	0.0073	0.0041
fee	−0.3836*	−0.2137*	0.0468	0.0223	−0.2155*	−0.1161*
	0.1339	0.0719	0.1334	0.0707	0.0796	0.0425
age	0.0008*	0.0004*	0.0001	0.0001	0.0005	0.0003
	0.0004	0.0002	0.0011	0.0006	0.0004	0.0002
status	−0.2638	−0.1490	0.1648	0.0857	0.0117	0.0048
	0.1926	0.1016	0.1947	0.1029	0.1342	0.0707
std.	−2.1082	−1.0768	−4.7262*	−2.5137*	−2.9862*	−1.5461*
	1.5273	0.7835	2.0829	1.0716	1.2197	0.6264
Obs.	3641	3641	2140	2140	5781	5781
Prob > chi2	0.000	0.000	0.020	0.020	0.000	0.000
Pseudo R-squared	0.097	0.098	0.011	0.012	0.074	0.075
Log-Likelihood	−1235.035	−1234.604	−727.223	−726.871	−1968.899	−1967.587
Marginal Effects (at the Mean)						
return	−0.0013*	−0.0013*	−0.0020*	−0.0021*	−0.0015*	−0.0015*
	0.0006	0.0006	0.0009	0.0009	0.0005	0.0005
TNA	−0.0045	−0.0047	−0.0110*	−0.0118*	−0.0077*	−0.0080*
	0.0032	0.0033	0.0050	0.0052	0.0025	0.0026
TNF	0.0017	0.0019	0.0014	0.0017	0.0015*	0.0017*
	0.0012	0.0013	0.0010	0.0011	0.0008	0.0008
fee	−0.0382*	−0.0408*	0.0052	0.0046	−0.0224*	−0.0230*
	0.0132	0.0136	0.0147	0.0147	0.0083	0.0084
age	0.0001*	0.0001*	0.0001	0.0001	0.0001	0.0001
	0.0000	0.0000	0.0001	0.0001	0.0000	0.0000
status	−0.0263	−0.0285	0.0182	0.0178	0.0012	0.0009
	0.0192	0.0194	0.0215	0.0214	0.0140	0.0140
std.	−0.2101	−0.2058	−0.5214*	−0.5220*	−0.3110*	−0.3063*
	0.1519	0.1496	0.2280	0.2218	0.1266	0.1240

Notes: This table reports the results of panel random-effects logit and probit regressions where the dependent variable is style shift (equal to 1 if a fund shifts in asset types and 0 otherwise) and the independent variables are return, TNA (fund size), and TNF (fund flow), management fee, fund age, status (equal to 1 if live or 0 if dead fund) and market condition (as Islamic equity market volatility). Standard errors are reported underneath coefficients. *p < 0.1.

(Cumming et al., 2009). However, the coefficients are individually insignificant in Islamic and non-Islamic countries; fund flow is not strongly related to style shift.

The fee coefficient is negatively significant for Islamic countries, indicating that funds with relatively lower management fees are more likely to shift in their investment styles. In contrast, we find the opposite sign for non-Islamic countries, indicating that funds with higher management fees are more likely to shift. The impact of fund age is positive but significant only for Islamic countries. This result can be explained by the learning rationale resulting from the development of Islamic markets. More established funds are more likely to style shift as they mature. An alternative explanation is that young funds will style-drift less often to signal the screening ability within the stated objectives. Moreover, surviving funds are more likely to shift in asset sizes, considering a significant and robust positive correlation with fund age (see Table A3).

Annaert and Van Campenhout (2007) report that the style shift is mainly induced by the response of a fund's investment strategies to publicly available information variables and particularly to volatility shocks. This signposts that the mutual fund manager alters market exposure in the sight of market conditions (Mirza et al., 2022), i.e., volatilities. Accordingly, we extract volatility of the MSCI World Islamic Index, which reflects Shari'ah investment principles and is designed to measure the performance of the world Islamic equity market (with 484 constituents from 24 countries) as a proxy of the Islamic market condition. We extract quarterly volatilities based on weekly returns in the sample period. We find negative coefficients, but results are statistically significant only in the non-Islamic country segment and the entire sample when funds shift in asset types. Islamic funds from non-Islamic countries are more likely to shift in asset type when the market is relatively less volatile. This is probably for the reason that it is easier to find valuable securities when market conditions are particularly steady (Cumming et al., 2009). While the variable has a negative sign, in neither instance is the coefficient statistically significant in Islamic domicile. In other words, the Islamic country fund is not susceptible to

Table 4b
IEF Style Shift in asset sizes.

Variables	Islamic Domicile		Typical Domicile		Entire Sample	
	Logit	Probit	Logit	Probit	Logit	Probit
return	0.0065	0.0031	−0.0057	−0.0036	0.0030	0.0012
	0.0094	0.0044	0.0125	0.0057	0.0074	0.0034
TNA	−0.2244*	−0.1052*	−0.2955*	−0.1451*	−0.2404*	−0.1158*
	0.0501	0.0236	0.0684	0.0335	0.0370	0.0178
TNF	−0.0013	−0.0005	0.0026	0.0014	0.0003	0.0004
	0.0245	0.0111	0.0207	0.0099	0.0152	0.0070
fee	−0.6568*	−0.3206*	0.4847*	0.2092*	−0.2139*	−0.1073*
	0.2107	0.1056	0.2392	0.1076	0.1312	0.0611
age	0.0011*	0.0006*	0.0008	0.0005	0.0013*	0.0007*
	0.0005	0.0003	0.0020	0.0009	0.0005	0.0002
status	2.5069*	1.0261*	0.3937	0.1729	1.2025*	0.5310*
	0.7350	0.2697	0.3464	0.1553	0.2866	0.1210
std.	−0.0042	−0.0203	−2.0065	−0.9723	0.1220	0.0376
	2.0853	0.9850	3.2725	1.5119	1.7332	0.8108
Obs.	3641	3641	2140	2140	5781	5781
Prob > chi2	0.000	0.000	0.000	0.000	0.000	0.000
Pseudo R-squared	0.048	0.049	0.043	0.044	0.034	0.035
Log-Likelihood	−666.884	−665.995	−323.671	−322.315	−1003.812	−1002.696
Marginal Effects (at the Mean)						
return	0.0003	0.0003	−0.0002	−0.0003	0.0001	0.0001
	0.0004	0.0004	0.0004	0.0005	0.0003	0.0003
TNA	−0.0086*	−0.0093*	−0.0104*	−0.0117*	−0.0097*	−0.0105*
	0.0019	0.0020	0.0023	0.0026	0.0014	0.0016
TNF	−0.0001	−0.0001	0.0001	0.0001	0.0001	0.0001
	0.0009	0.0010	0.0007	0.0008	0.0006	0.0006
fee	−0.0252*	−0.0283*	0.0171*	0.0169*	−0.0086*	−0.0097*
	0.0079	0.0091	0.0082	0.0086	0.0053	0.0055
age	0.0001*	0.0001*	0.0001	0.0001	0.0001*	0.0001*
	0.0000	0.0000	0.0001	0.0001	0.0000	0.0000
status	0.0962*	0.0905*	0.0139	0.0140	0.0485*	0.0481*
	0.0240	0.0215	0.0122	0.0126	0.0109	0.0106
std.	−0.0002	−0.0018	−0.0709	−0.0788	0.0049	0.0034
	0.0800	0.0869	0.1153	0.1222	0.0699	0.0735

Notes: This table reports the results of panel random-effects logit and probit regressions where the dependent variable is style shift (equal to 1 if a fund shifts in asset sizes and 0 otherwise) and the independent variables are return, TNA (fund size), and TNF (fund flow), management fee, fund age, status (equal to 1 if live or 0 if dead fund) and market condition (as Islamic equity market volatility). Standard errors are reported underneath coefficients. * $p < 0.1$.

trending market conditions.

Note, in the binomial regressions, Logit and Probit coefficients vary by a level¹²; therefore, we sidestep to interpret the magnitudes. Instead, we estimate their marginal effects; although statistically significant, the scales in terms of economic impact seem negligible for both fund-specific variables and variables closely related to management. However, we find noticeable significant implications of market volatility on style shift (negative, nearly 30% collectively, and 52% in non-Islamic domicile). We also estimate OR (Appendix A Table A4), and the results remain mostly consistent.

The separate analysis based on fund orientation explores the substance of some standard variables for style shifts in the IEF. Though any shift inevitably means an attempt to increase investment yield, it also alters the risk-return profile of the investor's (Chan et al., 2002; Chan & Lakonishok, 2004).¹³

5. Conclusion

This study investigates the investment styles in IEFs based on a survivorship bias-free sample of 224 funds across Islamic and non-Islamic countries from January 2004 to December 2018. We consider the study to be pertinent for several reasons. First, there are theoretical arguments on whether IEFs tilted towards specific investment styles, given that they typically implement negative

¹² According to Norton and Dowd (2018), the logit coefficients are more significant by about 1.6, resulting from variances in normalisations.

¹³ Several studies confirm a positive relationship of a fund's investment style consistency with the persistence of performance over time.

screening and monitoring strategies. Some facts stand out in our empirical analyses, and results can be explored from various standpoints.

First, from the historical portfolio holdings perspective, we find Islamic funds initially overwhelmingly tilted to high-BM value stocks in Islamic countries (in consonance with Ferruz et al. (2012) and high-MB growth stocks in non-Islamic domiciles (in consonance with Wan-Ni (2012)). However, over recent years, Islamic fund managers have been moving to portfolios more tilted to blend types. This is a new finding, signalling increasing diversification attempts in IEFs. Similarly, Islamic funds initially overwhelmingly picked mid-cap stocks in Islamic countries, but the majority have been heavily skewed to large-cap stocks over recent years. However, we find consistent large-cap bias in non-Islamic domiciles, implying most IEFs, by and large, do not exploit the small-cap stock's premium, quadrate with the test of Pastor et al. (2020) and Lettau et al. (2018) in conventional counterparts. Further, our multinomial regressions confirm that these subtleties are instrumental in the underlying variables, particularly past performance.

Second, we find notable variants from the style drift inspection in Islamic and non-Islamic countries. Collectively, nearly 82% of sampled Islamic funds drift in style, but the drift rate is higher in Islamic countries compared to non-Islamic domiciles. In addition, the mean drift score is higher in Islamic countries than non-Islamic domiciled funds. This is not entirely surprising, given that IEFs typically implement negative screening and continuous monitoring. Importantly, we examine the style shift in a binomial structure. We find that the propensity to shift is higher in asset types than in asset sizes of portfolio holdings. Islamic fund managers are more likely to alter their portfolio exposure to the market when they undergo negative returns and in the sight of a drop in asset value. Collectively, they shift in asset types more often once they secure an increase in fund flow. The more established fund will likely shift style in Islamic countries as it matures. Notably, IEFs from non-Islamic countries are more likely to shift in asset types when the market is relatively less volatile. Finally, we note that the style shift in IEFs is similar to that in conventional counterparts (Annaert & Van Campenhout, 2007; Cumming et al., 2009).

Apart from scholarly contributions to the related literature, this study offers important, though broad, implications for individual and institutional investors, Shari'ah scholars, and market regulators. First, the study can help investors comprehend the subsequent comportment of their investments; for instance, the common tilt to the asset class of Islamic portfolios. We believe that historical portfolio holding-based style analysis presents more helpful insight to investors exploring investment styles. However, we echo Naingolan et al. (2016) and reiterate the need for IEFs to improve their portfolio disclosure practices. As reported earlier, around half of our initial sample of IEFs did not release style-related portfolio holdings information. However, such disclosure shortcomings are at odds with the high level of transparency called for in the principles of Islamic finance. Therefore, heightened attention to improved IEF portfolio disclosure is a recommendation from the study.

Second, from the viewpoint of Islamic scholars and market regulators, the study provides insight into investment commitment and continuous monitoring. For instance, Shari'ah regulators mandate Islamic portfolios adhere to the stated screening strategies alongside investment style (Alotaibi, Helliari, & Tantisantiwong, 2022; Peillex et al., 2018). Investors rely on the published statement on investment style in a fund's prospectus when selecting a fund by their investment objectives or strategies. Therefore, a shift in investment style indicates that investors might not acquire what they projected during the investment (Bams, Otten, & Ramezanifar, 2016). A longstanding argument has been that a manager's ability to execute the style mandate consistently might also significantly impact investment success. This would be a valuable IEF analysis; we leave it for future work. Another compelling extension of our study would be to examine other patterns of style shift, for instance, those that arise from an industry emphasis. Further, our analysis was limited to Islamic equity funds. Other major Islamic funds, such as index funds and fixed income funds, may similarly provide valuable insights on portfolio holdings related style shift.

Potential conflict of interest

None.

Appendix A

Table A1
Initial Selection Criteria

<i>Ethical Issue Strategy Focus</i>	We extract IEFs from the Morningstar database via Ethical Issue Strategy Focus, which allows for identification of the sub-style within ethical investing - Shari'ah Focus. Shari'ah funds emphasize compliance with Islamic law for investment practices. A fund may have both Shari'ah Compliant and Socially Responsible attributes but can only have a single Ethical Issue Focus. If Shari'ah Compliant is indicated, the fund must receive the Shari'ah Ethical Issue Focus. Morningstar extracts this information from the Investment Objective Section of a fund's prospectus.
<i>Global Broad Category Group</i>	We rely on Global Broad Category Group, which is broader or more granular than the local categories that constitute the global category to screen equity fund.
<i>Share Class</i>	We take the oldest share class for a fund that aligns with the oldest share class criteria. We exclude 'Virtual Class', also known as a convenience class. A Virtual Class is an investment whose performance is quoted in another currency or allows investors to purchase shares in a currency other than the base currency. Thus such a class does not have a separate financial profile but rather is merely a currency translation of another share class.

Notes: Data Point Definition, Morningstar Direct, 2019–2020

Table A2
Definitions of Variables

Abbreviation	Variable	Definition
style	<i>Morningstar Style Box</i>	Morningstar classifies fund style as large-cap, mid-cap, or small-cap based on the market capitalisation of the fund's stock holdings; and as value, blend, or growth based on the value-growth orientation of the stock holdings. The nine possible combinations of these characteristics correspond to the nine squares of the Morningstar Style Box - size is displayed along the vertical axis, and style is displayed along the horizontal axis. Note, blend means a mixture of growth and value stocks or mostly core stocks.
return	<i>Total Return</i>	Return is computed each month by taking the change in monthly net asset value (NAV), reinvesting all income and capital gains during that month, and dividing by the starting NAV. Reinvestments are made using the actual reinvestment NAV, and the daily payoff is reinvested monthly. Morningstar does not adjust total returns for sales costs (such as front-end loads, deferred loads, and redemption fees), providing a clearer picture of a fund's performance. However, the total returns do account for management, administrative, 12b-1 fees, and other costs taken out of the fund's asset.
TNA	<i>Net Assets - Share Class</i>	Size is estimated using share-class level total net assets.
TNF	<i>Estimated Fund - Level Net Flow</i>	Flow is estimated using share-class level total net flows.
fee	<i>Management Fee</i>	The management fee is the most recently reported actual percentage that was deducted from an investment's average net assets to pay the investment's management.
age	<i>Fund Age</i>	Age is determined based on the fund's inception date.
status	<i>Survivalism</i>	Status is whether the fund is live or dead based on dormancy, obsolescence, or liquidation data points.
std.	<i>Market Condition</i>	We extract volatility of the MSCI World Islamic Index, which reflects Shari'ah investment principles and is designed to measure the performance of the world Islamic equity market (with 484 constituents from 24 countries) as a proxy of the market condition.

Notes: Data Point Definition, Morningstar Direct, 2019–2020.

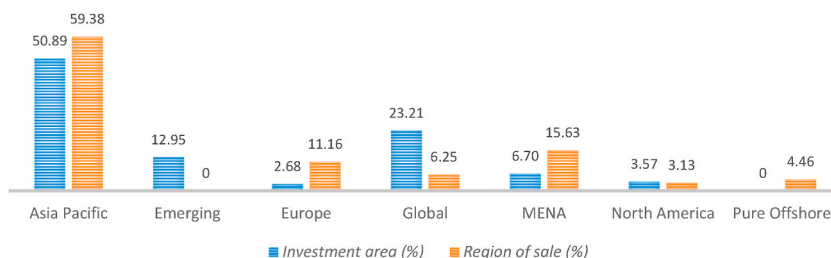


Fig. A1. Investment Area and Region of Sale.

Table A3
Correlation Coefficients

Variable	return	size	flow	fee	age	status	standard deviation
return	1						
TNA	0.0089	1					
TNF	-0.0144	0.0792*	1				
fee	-0.0203	-0.1155*	-0.0031	1			
age	0.0180	0.0623*	-0.0142	-0.0464*	1		
status	0.0143	0.2598*	0.0422*	0.1192*	0.3064*	1	
standard deviation	-0.2623*	-0.0837*	0.0089	-0.0491*	0.0561*	-0.1173*	1

Notes: This table reports the coefficients of ordinary correlations for the independent variables. *p < 0.1.

Table A4
Odds Ratios (Logistic Regressions)

Variables	Islamic Domicile	Typical Domicile	Entire Sample
(Table: 4.1)			
return	<1	<1	<1
TNA	<1	<1	<1
TNF	≈1	≈1	≈1
fee	<1	>1	<1
age	>1	>1	>1
status	<1	>1	>1
std.	<1	<1	<1
(Table: 4.2)			
return	>1	<1	>1
TNA	<1	<1	<1
TNF	≈1	≈1	≈1
fee	<1	>1	<1

(continued on next page)

Table A4 (continued)

Variables	Islamic Domicile	Typical Domicile	Entire Sample
age	>1	>1	>1
status	>1	>1	>1
std.	≈1	<1	>1

Notes: <1 means negative relationship, ≈1 means independent relationship, >1 means a positive relationship, and boldface refers to statistical significance.

Appendix B

The logit model is based on the cumulative logistic probability function in which the probability of Y is given as:

$$P(Y_i) = F(x_i'\beta) = \frac{\exp(x_i'\beta)}{1 + \exp(x_i'\beta)}$$

where the predicted probability of Y is limited to 0 and 1, conditional on the values of the explanatory variables, $F(x_i'\beta)$ is the cumulative distribution function (i.e., CDF) of the logistic distribution, x_i' contains the explanatory variables, and β is a set of parameters to be estimated by maximum likelihood estimation (i.e., MLE). This setup is typically stated as a binomial logit model.

However, the probit model is instead based on the cumulative standard normal distribution function where the variable Y is directly modelled as:

$$P(Y_i) = F(x_i'\beta) = \Phi(x_i'\beta)$$

where $F(x_i'\beta)$ is the CDF of the standard normal distribution, $\Phi(\cdot)$ symbolises the value of the cumulative standard normal distribution. Similarly, the parameters are to be estimated by MLE, and the setup is typically stated as the binomial probit model.

We estimate the marginal effects in conjunction with the coefficients from the logit and probit regressions, as the interpretation of the coefficients is complicated in a sense that such coefficients cannot be interpreted as the marginal effects on the dependent variable. Specifically, it is the slope of the probability for a covariate at a set point of the covariate. The average marginal effect is calculated as:

$$\partial p_i / \partial x_i = F'(\bar{x}_i'\beta)\beta_i$$

where $F'(\bar{x}_i'\beta) > 0$, which is why the coefficients and marginal effects of the logit and probit regressions have the same signs.

An important extension of the binomial response is the multinomial regressions, where the dependent variable takes more than two discrete values. The multinomial logit structure is stated as:

$$\text{the } P_{ij} = P(Y_i = j) = \frac{\exp(w_j'Y_i)}{\sum \exp(w_j'Y_i)}$$

In the process, one set of coefficients will be normalised to 0, so $j-1$ sets of coefficients will be estimated. The coefficients of other alternatives are interpreted in reference to the normalised coefficient, the base outcome. Similarly, the multinomial probit structure is specified as:

$$P_{ij} = P(Y_i = j) = \Phi(x_{ij}'\beta)$$

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