CHAPTER 4

DATA AND METHODOLOGY

4.1 Introduction

In this chapter, the data used in this thesis as well as their sources are presented. It also reiterates the research questions and hypotheses, in addition to discussing the methodology and formulae used to test them. Hypotheses were developed for each research question. Section 4.2 discusses the data and methodology related to fund family performance, Section 4.3 fund family flow, Section 4.4 future performance of star fund family, and Section 4.5 overall summary.

4.2 Fund Family Performance

Three main hypotheses and three sub-hypotheses were developed for the first research question (How is the performance of mutual funds at the fund family level?) based on theoretical and empirical literature on performance. Section 4.2.1 presents the research question and hypothesis development, Section 4.2.2 data and sample selection, Section 4.2.3 description of variables, Section 4.2.4 selectivity skills models, Section 4.2.5 market timing ability models, Section 4.2.6 fund family performance and star (poor) fund model, and Section 4.2.7 Shows fund family performance persistence method.

4.2.1 Research Question and Hypothesis Development

Fund family performance measured using two approaches. First, selectivity skills, which reflect the fund manager's ability to select a mispriced assets. Second, market

timing ability, which measures the manager's ability to time and reacts to market movements. This section also seeks to investigate the impact of star and poor funds on fund family performance. Finally to exploring performance persistence at the fund family level. The first question as follows:

RQ1: How is the performance of mutual funds at the fund family level?

Fund families act as financial intermediaries that offer a selection of mutual funds marketed under a common brand and through common marketing and distribution channels (Bhattacharya et al. 2013). Due to its structure, a fund family enjoys economies of scale in distributing, servicing, and promoting its funds. It can also more flexibly relocate its resources in response to market opportunities (Cici et al. 2018; Benson et al. 2008; Kempf & Ruenzi 2008).

The investigation on the portfolio diversification and fund family performance is grounded on the Modern Portfolio Theory. Markowitz (1952) found that a diversified portfolio induces risk-reduction benefits. He also identified the relationship between risk and return that maximizes the expected return based on a given market risk level. The extent to which diversification may reduce risks is dependent on the correlation between asset returns. The impact of including a new asset into the portfolio is more important than the total risk of an asset. In other words, purchasing an asset with a relatively lower or higher risk is still worthwhile if its returns are weakly correlated to those of other assets in the portfolio. Markowitz (1952) showed that investment involves the selection of securities and right combination of assets, as well as right timing.

To cater to different investors, fund families offer a considerable amount of funds, each with its own strategy (Gaspar & Massa 2006; Ritter & Zhang 2007). According to Bhojraj et al. (2011), there are many advantages to investing in funds within a single fund family. Fund family are can be a "one-stop" market for investors as they offer a

multitude of funds. They also open more alternatives for fund family managers when they exercise selectivity skills and timing ability. All these are consistent with the modern portfolio theory, which states that returns can be maximized by diversifying into assets that provide the highest expected return based on a given level of market risk (Markowitz 1952).

Adrianto et al. (2019) showed that funds with a good performance track record signals the skills of its fund managers and the fund family's managerial team. They also added that the information about the ability of the fund family to produce funds with good financial performance is valuable because it indicates the skills of the fund family's managers. All of these features may offer managers new investment opportunities and may reduce search and investment costs, allowing managers the right choices, the right diversification, and the right time to invest. From the above discussion, the first hypothesis for this section can be deduced as follows:

H1: Fund family managers exhibit good selectivity skills and market timing ability.

Families constituted of 67% or more Islamic funds according to the weighted average of total net assets are identified as Islamic focused families (IFF). That is, most of the funds managed by these families are Islamic funds. Studies at the fund level mentioned that Islamic funds have other goals in addition to traditional goals, like religious and ethics goals (Rubio et al. 2012; Rahim & Masih 2016; Azmi et al. 2018). This is also reflected in IFF as a whole. Previous studies have stated that such goals may limit the skills and abilities of managers in choosing and following market fluctuations (Hoepner et al. 2013; Makni et al. 2015). Consequently, the skills and abilities of IFF are expected to be lower than those of conventional focused family (CFF). Based on these discussions, the following hypothesis was developed:

H1A: Selectivity and timing ability of Islamic focused family (IFF) differs from conventional focused family (CFF).

Fund families issue many new funds to increase the fund family size and exploit economies of scale. The increase in funds and size of the families is a positive indicator for investors, signalling the efficiency and skill of managers (Adrianto et al. 2019). Most fund families employ the star fund strategy to attract investors and then improve performance (Nanda et al. 2004). Joo & Park (2011) explained that fund families continuously issue new funds and that these funds are not well known to investors. Therefore, investors would evaluate the attributes of the fund families before choosing which funds they will invest in (Benson et al. 2008). This also explains why fund families seek to improve their reputation in several ways, such as having star funds and increasing their size. At the same time having poor funds in the fund family could provide a bad signal about the fund family and their management team, which may affect the overall fund family performance. Study the fund family attributes like having star and poor funds is important because most fund family investors follow the top-down approach. This means that investors first choose fund families before deciding which individual funds to choose. So, from the above discussion, the second hypotheses can be developed as follows:

H2: Having star (poor) fund in the fund family impact positively (negatively) on fund family performance.

As mentioned above, the investment objectives differ between Islamic and conventional managers, which may affect the investment decisions of Islamic managers. Islamic managers are ready to give up some traditional goals, such as diversification and returns, in order to achieve religious and moral goals (Muñoz et al.

2015; Hammami & Oueslati 2017). This may also affect the how the star and poor funds impact on Islamic focused family performance. Based on these discussions, the following hypothesis was developed:

H2A: The impact of having star (poor) funds on performance is different between Islamic and conventional focused family.

Fund families attract investors by advertising the superior historical performance of their star funds. It is therefore assumed that past performance provides meaningful information to both investors and fund managers. Some authors (e.g. Grinblatt & Titman 1992; Brown & Goetzmann, 1995; Gruber 1996) argue that past performance predicts future performance, hence families with historically good performance are expected to continue their upward trajectory. However, Cheng & Wort (1999) were unable to substantiate this argument from their investigation of Hong Kong fund families. Fama, (1970) stated that if the efficient market hypothesis (EMH) holds, then analysing past returns would not be meaningful, since it posits that security prices reflect all available information. Carhart (1997) explained that performance persistence is a result of differences in expenses and transaction costs and load fees, not the stock-picking skills of the manager.

It seems reasonable to assume that there is heterogeneity in the average fund performance of fund families and that a substantial portion of this heterogeneity is due to decisions, and processes adopted at the fund family level. This will check whether some fund families are more skilled than others. Skilled fund families may be able to create an environment where the average returns of funds in the fund family are persistently higher (or persistently lower) than the average returns of funds in other fund families. So, the third hypothesis developed as follows:

H3: Well-performing (bad performing) fund family continue to perform well (badly) in the subsequent periods.

In general, Islamic managers take into account both financial and non-financial considerations in investment decisions. Additionally, Islamic mutual funds (IMFs) are an important niche of the fund market, characterised by selecting companies with certain environmental, social, and religious criteria. It is not clear whether Islamic managers perform differently than conventional managers due to the coverage of non-financial objectives (Kempf & Osthoff, 2007; Jones et al. 2008; Charfeddine & Khediri 2016). Alijani & Karyotis (2019) indicate that investors and managers, among others, may be subjected to different business, social and environmental constraints. Consequently, the IFF manager may outperform due to specialisation skills. Specifically, these managers concentrate their efforts on one kind of fund; hence, they may better know their singularities, and respond to both the financial and non-financial purposes of IMF investors (Azmi et al 2018). Based on these discussions, the following hypothesis was developed:

H3A: Performance persistence in Islamic focused family (IFF) is different from the conventional focused family (CFF).

4.2.2 Data and Sample Selection

Data

The data were sourced by Bloomberg, which provides news and comprehensive data on IMFs and other Islamic instruments. The initial sample was 160 fund families in different countries (Table 4.1) between January 2007 and December 2018. To compare the performance of these fund families, two benchmarks were also collected

from Bloomberg. They were the FTSE Global Islamic Index, used as a global Islamic benchmark, and FTSE All-World Index used as a global conventional benchmark. The latter was chosen as it offers the most comprehensive coverage of global equity markets (Wilson & Jones 2002). The three-month T-bill rate of each country are used, similar to Elfakhani et al. (2005), the three-month T-bill rate are used was used. This measure has been employed by various studies on mutual fund performance. Monthly returns were calculated using the following formula:

$$Return_{i,t} = \frac{price_{i,t} - price_{i,t-1}}{pricei, t-1} \quad (4.1)$$

where $P_{i,t}$ is the price of fund *i* in period *t* and $Pi,t-1$ is the price of fund *i* in period *t-1*.

Sample Selection

Table 4.1 shows that there are 160 fund families and 1007 equity mutual funds. Saudi Arabia has 41 fund families (25% of total), Indonesia has 29 fund families 18%, Malaysia has 21 fund families 13%, and Pakistan has 13 fund families 8%. These four countries have altogether 104 fund families, representing 65% of the total, and 802 equity mutual funds, or 79% of total equity mutual funds. So, the selected initial sample was 104 fund families from Saudi Arabia, Malaysia, Indonesia, and Pakistan.

Table 4.1: Number of Families and Equity Funds of Different Countries (2018)

Country	No of family	No of funds	Country	No of family	No of funds
Australia	1	5	**Qatar**	2	7
Bahrain	2	12	**Singapore**	4	20
Bangladesh	3	7	**South Africa**	6	22
Cayman Islands	3	9	**Sri Lanka**	2	5
Egypt	2	9	**Saudi Arabia**	41	234
France	1	6	**Ireland**	1	3
Guernsey	1	6	**Japan**	1	5
Hong Kong	1	5	**Jersey**	2	8
India	3	11	**Kuwait**	2	6
Indonesia	29	170	**Luxembourg**	5	12
Malaysia	21	267	**Thailand**	3	7
Mauritius	1	5	**Turkey**	2	5
Morocco	2	8	**UAE**	2	8
Oman	1	5	**UK**	1	5
Pakistan	13	131	**USA**	2	6
	Total funds		**1007**		
	Total families		**160**		

Source: Bloomberg Database

The equity funds data collected from the Bloomberg database, one of the limitation of thesis is the availability of data, for that the representatively of the sample from the population is checked. The total equity funds sample is 62% of all population, and the Islamic equity funds sample is 79% of Islamic population, that summarize on table 4.2. For sample and population details see appendix 2.

Table 4.2: Population and Sample

Country	Population		Sample	
	All Funds	**Islamic Funds**	**All Funds**	**Islamic Funds**
Saudi Arabia	234	169	162	137
Malaysia	267	125	170	88
Indonesia	170	49	83	44
Pakistan	131	60	87	50
Total	802	403	502	319

Source: Bloomberg Database

After that, following Hunter et al (2020) families with just one or two equity mutual funds are excluded because of the small size of these families, resulting in the final sample shown in Table 4.3. Table 4.3 reports the final sample used in this thesis, included four countries (Malaysia, Saudi Arabia, Indonesia, and Pakistan). The final sample consists of 70 fund families that contain 502 equity mutual funds. The number

of equity funds chosen from the population depends on two criteria. First, according to the data availability on the Bloomberg database. Second, the age of funds, the fund whose launch date was after January- 2016 has been excluded. Islamic equity mutual funds represent 64% of the total sample equity mutual funds, i.e. 319 Islamic equity mutual funds. The table also shows that the number of fund families in Saudi Arabia is 25 fund families contain 162 equity mutual funds, and the number of Islamic equity mutual funds is 137 funds represent 84% of total equity mutual funds in Saudi Arabia. In Malaysia, the number of fund families is 20 fund families contain 170 equity mutual funds, and the number of Islamic equity mutual funds is 88 funds represent 52% of total equity mutual funds in Malaysia. In Indonesia, the number of fund families is 14 fund families contain 83 equity mutual funds, and the number of Islamic equity mutual funds is 44 funds represent 53% of total equity mutual funds in Indonesia. Finally, the number of fund families in Pakistan is 11 fund families contain 87 equity mutual funds and the number of Islamic equity mutual funds is 50 funds represent 57% of total equity mutual funds in Pakistan.

Table 4.3: Fund Family and Equity Funds of the Four Sample Countries

Country	Number of families	Number of funds	Number of Islamic funds	% of Islamic funds
Malaysia	20	170	88	52%
Saudi Arabia	25	162	137	84%
Indonesia	14	83	44	53%
Pakistan	11	87	50	57%
Total	70	502	319	64%

Figure 4.1 show the number of fund family, total equity funds, and Islamic equity fund on the four countries under study. The figure explains the majority of Islamic equity funds number in the sample. The percentage is 64% of the total number of equity funds as its show in the Table 4.3. The data and sample are will be used for all three objectives.

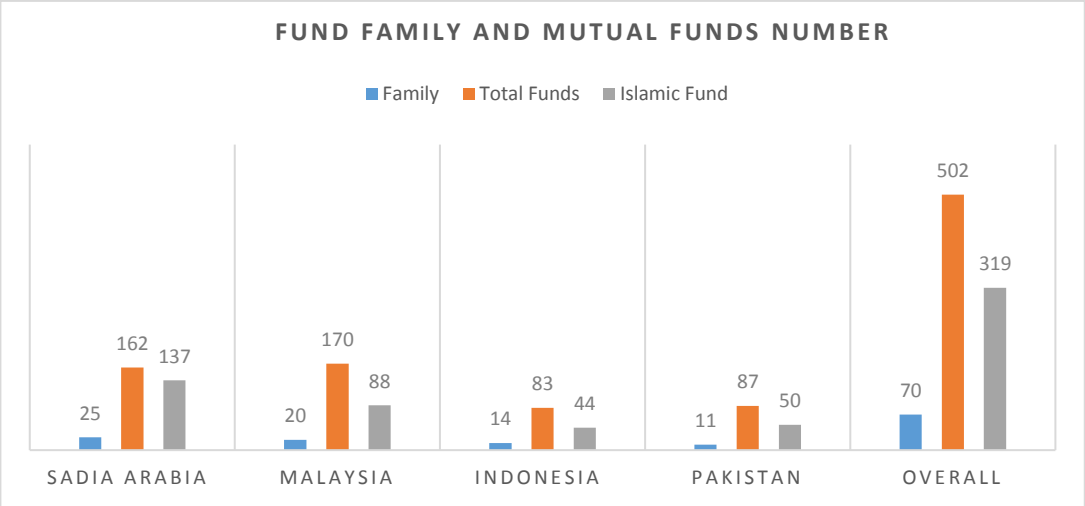

Figure 4.1: Number of Fund Family, Total Funds, and Islamic Funds

Definition of Islamic- and Conventional-Focused Family

This thesis contributed to the literature by providing new concepts Islamic focused family (IFF) and conventional focused families (CFF). First, calculate the weighted average of all funds in the fund family according to the total net asset. Then if the weighted average of conventional equity funds in the fund family less than 33%, the fund family is consider as Islamic focused family. While if the weighted average of conventional funds in the fund family equal 33% or more, fund family is consider as conventional focused family. The Islamic focused family is one whose Islamic equity funds constitute at least 67% of its total net assets, while the conventional focused family is that whose Islamic funds constitute 67% or less of its total net assets. Islamic and conventional focused family were compared in three aspects: fund family performance, fund family flows, and future performance of star fund family.

This definition adopted using *Sharia*-compliant screening practices. Previous studies indicate that the most frequently applied threshold on the Sariah-compliant screening is at a level of 33% (Obaidullah 2005; Derigs & Marzban 2008). The reasoning behind this rule is based on the *Hadith*: The Prophet PBUH [8] advised Abu

Bakr not to donate more than one-third of his wealth, and commented that "One third is too much.

After applied that, the final sample related to Islamic and conventional focused family showed on Table 4.4. Table 4.4 shows that all families in Saudi Arabia are IFF that due to the percentage of the total net assets of conventional equity funds less than 33% in these families. The number of funds in the IFF is more the number of funds in the CFF. That due to the number of IFF is more than the number of CFF, which reflect the Islamic nature of the market on the sample because the sample included four Islamic countries contain more 65% of equity Islamic mutual funds around the world. Table 4.4 also shows that Saudi Arabia and Malaysia lead the sample, these two countries have the largest number of Islamic mutual funds around the world.

Table 4.4: Islamic and Conventional Fund Focused Family Profile

Country	IFF	N. of Funds in IFF	CFF	N. of Funds CFF
Saudi	25	162	0	0
Malaysia	8	75	12	95
Indonesia	5	34	9	49
Pakistan	3	33	8	54
Total	41	304	29	198

Figure 4.2 shows the number of Islamic and conventional focused family and the number of equity funds in each type of fund families in the four countries under study. The figure explains the majority of funds numbers in the IFF. The number of equity funds in IFF is 304 compared to 198 equity funds in the CFF. The number of IFF is 41 families compared to 29 CFF.

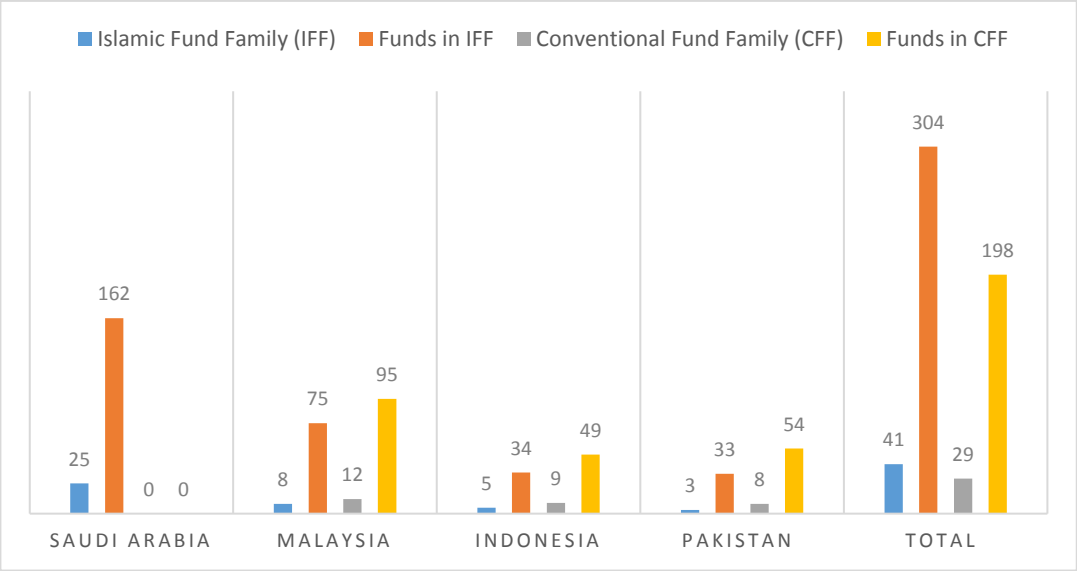

Figure 4.2: Number of Islamic and Conventional Focused Family and their Equity Funds

Definition of "Star" and "Poor" Fund Family

This thesis focuses on the fund family-level and star fund family phenomena; therefore, it is important to define the term 'star fund family'. At the fund level, Nanda et al. (2004) have defined star funds as the top 5% of funds based on the three-factor adjusted return over the preceding twelve months. They also define families with at least one-star fund as a 'star fund family' (SFdummy) and those with at least one-poor fund as a 'poor fund family' (DFdummy).

Nonetheless, the thesis focuses on star families, not star funds. Borrowing the definitions of prior studies: in this thesis, star funds are the top 5% funds, while poor funds are the bottom 5% (Nanda et al. 2004; Joo & Park 2011). This thesis attempts to examine the contribution of star and poor funds to the fund family. After applied that the final sample related to star (poor) Islamic and conventional focused family as showed on table 4.5.

Table 4.5 summaries the number of star IFF (number of Islamic star funds), and the number of poor IFF (number of Islamic poor funds). In addition, the number of star

CFF (number of conventional star funds), and the number of a poor CFF (number of conventional poor funds).

Table 4.5: Summary of the Star and Poor IFF and CFF Profile (2007-2018)

Year	Star Family (Fund)	Poor Family (Fund)	Star IFF (Fund)	Star CFF (Fund)	Poor IFF (Fund)	Poor CFF (Fund)
2007	15 (25)	15 (25)	10 (15)	5 (10)	9 (15)	6 (10)
2008	15 (25)	16 (25)	9 (15)	6 (10)	10 (15)	6 (10)
2009	15 (26)	15 (25)	9 (16)	6 (10)	10 (15)	5 (10)
2010	14 (26)	15 (25)	8 (16)	6 (10)	9 (15)	6 (10)
2011	14 (25)	13 (26)	8 (15)	6 (10)	8 (16)	5 (10)
2012	14 (25)	15 (26)	8 (15)	6 (10)	10 (16)	5 (10)
2013	15 (25)	14 (25)	10 (15)	5 (10)	9 (15)	5 (10)
2014	15 (25)	14 (25)	10 (15)	5 (10)	9 (15)	5 (10)
2015	16 (25)	15 (25)	11 (15)	5 (10)	10 (15)	5 (10)
2016	16 (25)	15 (25)	10 (15)	6 (10)	9 (15)	6 (10)
2017	15 (25)	14 (25)	9 (15)	6 (10)	9 (15)	5 (10)
2018	16 (25)	14 (25)	9 (15)	7 (10)	10 (15)	4 (10)

Table 4.5 shows that the number of star IFF (number of Islamic star funds) is greater than the number of star CFF (number of conventional star funds). This can be attributed to the fact that the sample of the thesis represents the Islamic society, then most of the participants care about Islamic products, and then helps us to analyse the contribution are seeking to add in this section.

Figure 4.3 shows the star and poor fund family profile, including Islamic and conventional focused families at the end of the 2018 year. The figure presents that number of star IFF and funds is more than star CFF and funds. However, the number of poor IFF and funds is more than poor CFF and funds also. For star and poor fund family details see appendix 3.

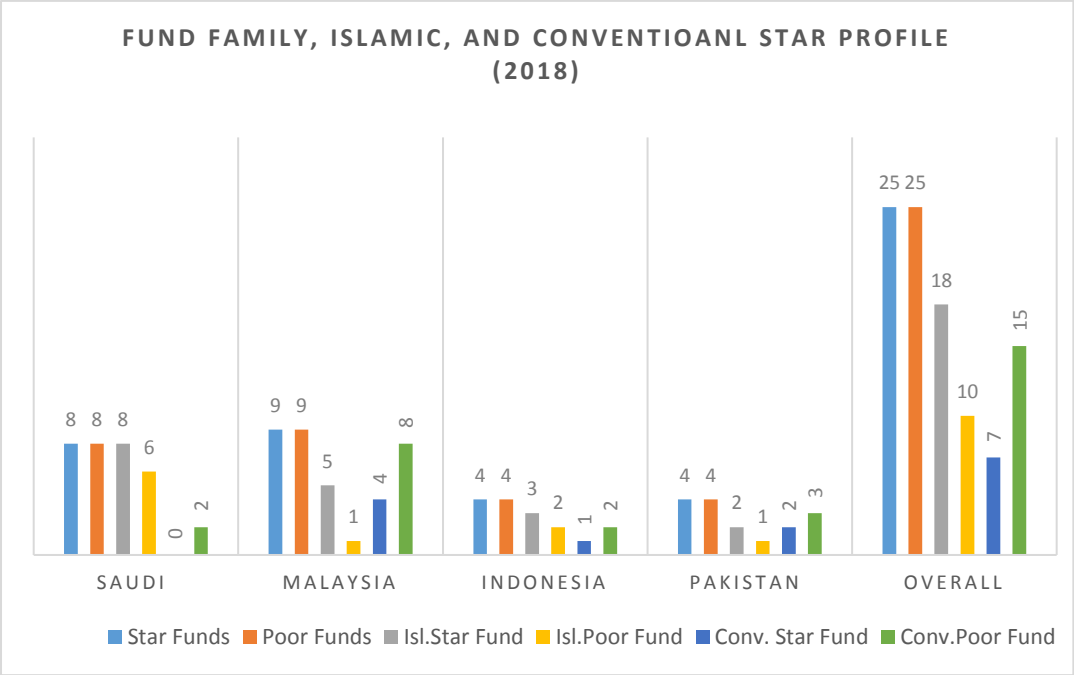

Figure 4.3: Islamic and Conventional Focused Family Star (Poor) Profile

4.2.3 Description of Variables

This subsection presents the definition for the dependent, independent, and control variables used to assess fund family performance.

Dependent Variable

According to most previous studies on the fund family performance (Nanda et al. 2004; Tower & Zheng 2008; Joo & Park 2011; Premachandra et al. 2012; Antonio et al. 2019), fund family performance is the weighted average of all equity mutual funds belonging to the same fund family assessed using eight measures. These eight measures will be explained in the next two subsections.

Independent Variables

Star and Poor Fund Family

Star fund family is a dummy variable equals one if a fund family has at least one star fund and zero otherwise. Poor fund family is a dummy variable equals one if a fund

family has at least one poor fund and zero otherwise. It's expected that the star fund provides good signal about the management team of fund family, and help the management team to improve the overall fund family performance. At the same time, poor fund expected to provides bad signal about the management team of fund family. Hunter et al. (2020) indicate that star fund offerings earn significantly higher abnormal returns, star fund offerings significantly improve fund family returns, fund family managers have a strong incentive to both obtain star funds and to deploy their manageable resources to maintain their star funds' status.

Past Performance

Past performance is an essential component in organizational decision-making and behavioural theory of the firm (Cyert & Feigenbaum 2007; Lages 2008). It generally refers to the historical performance of a fund family. Greve (2003) viewed past performance as an indicator of how well a company can and should perform. The variable relates to the intrinsic ability of an organization and provides a criterion for organizations adapting to the external environment (Kraatz et al. 2001; Melnyk & Flynn 2010).

Moreover, past performance provides insight into past managerial and operational activities, and is, as well, a foundation for the planning of future strategy (Stephen et al. 2009). It thus has a strong attachment with sustainable growth and decision-making processes. Researchers have posited a positive relationship between past performance and organizational profitability (Hu et al. 2011). Good past performance tends to make organizations and managers to become more conservative in their tactical approaches and risk-taking behaviors, which may lead to stable, sustainable growth in organizational performance (Tower & Zheng, 2008).

Control Variables

Fund Family Age (FFA)

Fund family age is a proxy measure of the families' ability to survive amidst intense competition. The starting point of a fund family's age is its launch date. Belgacem & Hellara (2011) and Agnesens (2013) argued that young funds are less competitive due to their minimum experience and substantial marketing costs. The correlation between fund family age and performance would, therefore, be positive; older funds tend to have superior performance. Gasper et al. (2006 USA) find statistically significant and positive for old families and statistically significant and negative for young families. This indicates that the established track record of old families allows them to help young funds, while in mostly young families it's the relatively older funds that the fund family wants to favour, presumably in an attempt to create flagship funds. Hunter et al. (2020 USA) find a negative relation between fund family age and fund performance, but it was insignificant.

Fund Family Size (FFS)

Fund family size refers to the sum of asset under management (AUM) by a particular fund family. Big families are able to offer more investment opportunities to investors at lower prices, and their managers are also equipped with good selectivity and timing skills (Bhojraj et al. 2011). Fund family size and performance should thus have a positive relationship. Even so, a large fund family may also perform poorly because its managers are unable to optimally manage it (Marc-André 2016). Funds with larger fund families will pay special attention to trade commissions and benefit from higher lending charges, larger fund families can use the same economic data and experts to interpret data across many funds, leading to economies of scale and higher returns

(Malhotra & McLeod, 1997; Chen et al. 2004; Tower & Zheng, 2008; Ferreira et al. 2012; Cici et al. 2018). Even so, a large fund family may also perform poorly because its managers are unable to optimally manage it (Berk & Green, 2004; Marc-André 2016; Filip, 2018).

Number of Funds in Fund Family (NF)

It refers to the number of funds managed by a fund family. A fund family with a large number of funds may offer more investment opportunities at reduced costs, increasing inflows. Guedj & Papastaikoudi (2004) found that the number of constituent funds (which they used as a measure of latitude that a fund family has to unevenly allocate resources among its funds) relates positively to performance persistence. This variable thus could be positively linked to fund family performance. Hunter et al. (2020) and Gasper et al. (2006) and Yaqoob et al. (2017) find a positive relationship between the number of funds and fund performance.

Total Risk (TR)

Total risk is the annualized standard deviation of fund family monthly returns over the sample period. According to Premachandra et al. (2012), the fund family total risk calculated used the transpose of a matrix of returns over 3 years. Markowitz's portfolio theory (1952) indicated that the portfolio with the maximum expected return is not necessarily the one with minimum variance (or risk). Treynor (1965), Sharpe (1966), and Jensen (1968) were the first to evaluate fund performance in relation to risk. Sharpe (1966) concluded that there are differences among funds, and to a major extent, could be explained by differences in expense ratio, skill, and past performance. Jensen (1968) shows the funds returned worse when adjusted for systematic risk. Chang (2004)

showed that small funds with low beta and low standard deviation provide investors with higher returns. Accordingly, funds with low risk were shown to give higher returns. Peterson et al. (2001), concluded that risk positively affecting performance. They believe that investors are rewarded for taking on risk in the long run. Pui & Ruzita, (2012) showed the same results, the risk positively and significantly influences fund performance.

4.2.4 Selectivity Skills Models

This subsection describes the techniques used to assess the selectivity skills of fund family managers. This section also includes the measures of raw and excess returns. In this section, three main hypotheses and three sub-hypothesis were developed to answer the first main research question (How are the performance of mutual funds at the fund family level?). Chapter three in section (3.2.2, page 41) has stated that mutual fund performance is usually measured using stock selection models, otherwise known as risk-adjusted measures. Among the commonly used models in recent empirical papers are the Sharpe ratio, Treyner ratio, Jensen's alpha, Fama-French model, and Carhart's four-factor model. The thesis used all measures to evaluate performance at the fund family level. The measures are applied to two samples: first, the overall fund family includes individual country sample; and second, Islamic focused family (IFF) versus conventional focused family (CFF). Similar to previous studies, fund family performance was calculated as the weighted average of all funds in the fund family.

Raw Returns and Excess Returns

Following Nanda et al. (2004) and Adrianto et al. (2019), raw returns are the returns for each fund family. It is the summation of the vale-weighted averages of the raw returns of all equity funds in the fund family:

$$FR_t = \sum_{i=1}^{n} W_i * Raw\ returns_i \quad (4.2)$$

where FR_t is the raw returns for the fund family; W_i the weight of fund i calculated by the TNA of fund i divided by the TNA of fund family; and N is the number of funds in the fund family. Excess returns are measured using the following equation:

$$Excess\ returns_f = FR_t - R_{f,t} \quad (4.3)$$

where FR_t is the raw returns of the fund family over period t and $R_{f,t}$ is the risk-free rate of returns over period t.

Sharpe Ratio (1966)

The Sharpe (1966) ratio is a widely used measure to rank mutual fund performance. It is expressed by the following equation:

$$Sharpe_t = \frac{FR_t - RF_t}{\sigma_{fam,t}} \quad (4.4)$$

where FR_t is the mean return of the fund family over period t; RF_t is the risk-free rate of returns over period t; and $\sigma_{fam,t}$ is the standard deviation of the mean excess returns of the fund family.

Treynor Ratio (1965)

The Treynor (1965) ratio is similar to the Sharpe ration: the risk-free rate is subtracted from fund family returns, but the result is divided by the beta instead of standard deviation. The beta is a measure of systematic risk between the fund family and market index. The ratio is expressed thus:

$$Treynor_t = \frac{FR_t - RF_t}{\beta_{fam,t}} \quad (4.5)$$

where FR_t is the mean returns of the fund family over period t; RF_t is the risk-free rate of returns over period t; $\beta_{fam,t}$ is the beta coefficient for the fund family. The beta is estimated using the following formula:

$$Beta_{fam} = \frac{Cov\ (FR, RM)}{Var_{rm}} \quad (4.6)$$

Beta is a measure of sensitivity between a fund family and the market. It is obtained by dividing the covariance between the returns of the fund family and the market (as indicated by a benchmark) with the variance of the market returns. The resulting figure indicates the degree of association between the fund family and the market; a score lower than one means that the fund family tends to be less volatile than

the market. As for the result of the Treynor ratio: a higher ratio suggests that the fund family has a higher ranking and better performance.

Single Factor CAPM Model (Jensen, 1968)

Jensen's alpha (1968) is the first measure of risk-adjusted returns used in this section. The alpha measures risk-adjusted abnormal performance in the market by capturing the abnormal excess returns of a fund family. It is expressed as follows:

$$Jensen\ Alpha = FR_t - RF_t = \alpha_i + \beta(RM_t - RF_t) + \varepsilon_{fam,t} \quad (4.7)$$

where FR_t is "the returns of the fund family; RF_t is the risk-free rate of the returns; RM_t is the returns of the relative market benchmark; β measures the sensitivity between the excess returns of the market benchmark with the fund family; α_i captures any excess returns above market benchmark; and $\varepsilon_{i,t}$ is the term error. Jensen's alpha measures the over- or underperformance of a fund family. If the result is positive and significant, it means that the fund family is over performing, suggesting that its managers manage to generate extra returns due to their stock selection ability.

FF Three-factor Model (1993)

Fama and French's (1993) approach accounts for different factors. Their model builds on Jensen's model and incorporates additional parameters: size and book-to-market value. It is expressed as follows:

$$FR_t - RF_t = \alpha_i + \beta_1(RM_t - RF_t) + \beta_2 SMB_t + \beta_3 HML_t + \varepsilon_{fam,t} \quad (4.8)$$

where FR_t is the mean return of the fund family over period t; RF_t is the risk-free rate of returns over period t; RM_t is the return of the relative market benchmark; SMB_t is the difference in return between a small-cap portfolio and a large-cap portfolio at period t; HML_t is the difference in return between a portfolio of high-book-to-market and a low-book-to market at period t; β_1 measures the sensitivity between the market and the fund family (if positive and significant then the fund family is highly associated with market movement); β_2 is a coefficient that measures fund family exposure (if positive and significant then the fund family is associated with small-capitalization stocks); β_3 is a coefficient that measures fund family exposure (if positive and significant then the fund family is exposed to high-book-to-market stocks); and α_i measures stock selection ability (if positive and significant, then the fund family has superior stock selection ability).

Carhart's Four-factor Model (1997)

Carhart (1997) expanded the FF three-factor model by adding the momentum factor. The model is defined as follows:

$$FR_t - RF_t = \alpha_i + \beta_1(RM_t - RF_t) + \beta_2 SMB_t + \beta_3 HML_t + \beta_4 MOM_t + \varepsilon_{fam,t} \quad (4.9)$$

where $MOM_t$the difference in is return between high and low momentum (lagged one year return) at period t; and β_4 is the coefficient that measures fund family exposure, if positive and significant then the fund family is exposed to high momentum. The factors for the four-factor models are not easily available, so this thesis used the data available on the Fama and French website, which, in turn, employs the FSTE All-World database to construct monthly for the four-factor risk factors. Fama and French website provide

the data for the four factors depend on the region, international, and some of the developed countries. This thesis uses international data from the website. These data used by some previous studies such as (Hou et al. 2011; Hammami & Oueslati, 2017). Fama & French (2012) show that this model performs well in explaining expected returns.

4.2.5 Market Timing Models

In this thesis, two market timing models were used: Treynor & Mazuy (TM) (1966) and Henriksson & Merton (HM) (1981). These models assess whether fund family managers have the ability to strategically time capital shifts between safe and risky securities based on their predictions of future market movements. Over performing fund families are able to forecast entry and exit strategies. The two measures are applied to two samples: first, the overall fund family includes individual country sample; and second, Islamic focused family (IFF) versus conventional focused family (CFF).

Treynor and Mazuy (TM) Model (1966)

The model approximates the market timing of fund families by squaring market returns. This model is estimated using OLS regression technique as follows:

$$T.M = FR_t - RF_t = \alpha_i + \beta_i RM_t - R_f + \gamma_i (RM_t - RF_t)^2 + \varepsilon_{fam} \quad (4.10)$$

Where FR_t is the mean return of the fund family over period t; RF_t is the risk-free rate of returns over period t; $RM_t$is the return of the relative market benchmark; α_i measures selectivity ability; $\gamma_{i,t}$ indicates market timing (if positive and significant then the fund

family is successful and exposure to the market is increased when markets are doing well). Treynor and Mazuy argued that if the above regression is carried out with $FR_t - RF_t$as the dependent variable, and the estimated value of the parameter γ_i will act as a measure of the market timing ability of the fund manager. If the fund manager is unable to time the market correctly, then the estimated value of γ_i should not be significantly different from zero. Their argument was that when the fund manager is not attempting to time the market and concentrating only on stock selection, the average beta of the portfolio over time should remain fairly constant, and the plots of the fund's excess returns versus that of the market's excess returns over the risk-free rate would be a straight line.

Henriksson and Merton (HM) Model (1981)

In addition, for robustness, also employ an alternative test for market timing ability following Henriksson and Merton (1981). This model is estimated using OLS regression as follows:

$$HM = FR_t - RF_t = \alpha_i + \beta_i RM_t - R_f + \delta_i (RM_t - RF_t) D_t + \varepsilon_{fam} \quad (4.11)$$

where FR_t is the mean return of the fund family over period *t*; $R_{f,t}$ is the risk-free rate of returns over period *t*; $R_{m,t}$ is the return of the relative market benchmark; α_i measures selectivity ability; δ_i is the market timing coefficient; D_t is a dummy variable that take a value of one if the market returns is positive and zero otherwise; and $\varepsilon_{fam,t}$ is the error term. Henriksson and Merton proposed a similar but simpler model to test the market timing abilities of the fund manager. In their model took a more qualitative approach to market timing. They assumed that the market timers are required to forecast whether

$RM_t - RF_t$ (up-markets) or forecast$RM_t - RF_t$; (down-markets) and select a fund beta accordingly (a large value if the market is expected to do well, i.e., when $RM_t \geq RF_t$; (upmarkets) and a small value otherwise, i.e., when$RM_t \leq RF_t$.

4.2.6 Fund Family Performance and Star (Poor) Funds

This section explains how hypothesis two was tested. The hypothesis examines the influence of having star and poor funds on performance of fund family, IFF, and CFF using the pooled least square and panel fixed/random effect regression models. Other fund family attributes were used as control variables, they are fund family age, number of funds in the fund family, fund family size, total fund family risk. Lagrange Multiplier (LM) tests used to choose between the model of pooled (OLS) and the model of random effect. Then, the Durbin-Wu-Hausman test used to choose the appropriate panel static model for each regression. In panel data, the Hausman test was used to distinguish between the model of fixed effects and the model of random effects.

By increasing the number of constituent funds, the fund family incentives investors to shift their capitals to funds in the same fund family and to diversify. The model was used to test the relationship between the variables using two types of sample. First, the overall fund family samples includes individual country analysis; and second, Islamic focused family (IFF) versus conventional focused family (CFF). The relationship was tested using the following panel regression model:

$$FR_{f,t} = \alpha_f + \beta_1 FR_{f,t-1} + \beta_2 NF_{f,t-1} + \beta_3 FFA_{f,t-1} + \beta_4 FFS_{f,t-1} + \beta_5 TR_{f,t-1} + \beta_6 SFdummy_{f,t-1} + \beta_7 PFdummy_{f,t-1} + \varepsilon_{f,t} \quad (4.12)$$

where $FR_{f,t}$ is the fund family *f* performance at time *t*; $FR_{f,t-1}$ is the past fund family *f* performance; and ε_t is the error term, $FFA_{f,t-1}$ is the log number of years since the fund's family inception; $NF_{f,t-1}$ is the number of funds in the fund family; $FFS_{f.t-1}$ is the fund family size; $TR_{f,t-1}$ is the total fund family risk; $SF\ dummy_{f,t-1}$ is a dummy variable that takes the value of one if the fund family has a star fund and zero otherwise; $PF\ dummy_{f,t-1}$ is a dummy variable that takes the value of one if the fund family has a poor fund and zero otherwise.

4.2.7 Fund Family Performance Persistence

This sub-section explains how hypothesis three was tested. To track persistent performance, a contingency table has been set up in accordance to Cheng et al. (1999). This table has previously been used by Goetzmann & Ibbotson (1994), Brown & Goetzmann (1995), Malkiel (1995), and Walker (2006) in similar studies. The contingency table was used to determine the frequency with which winning and losing funds maintain their rating over subsequent time periods. The persistence measure indicates to the status of winners and losers in a specific period and their status in the subsequent period. The performance of each fund family was assessed on a rolling monthly basis. Funds were ranked according to each fund family monthly returns. This thesis evaluated the average monthly returns of equity funds in a fund family between January 2007 and December 2018.

Monthly returns were used to maximize the number of observations. It was based on the premise that the fund managers strive on a monthly basis to outperform their peers. To ensure a valid comparison, only equity funds were included in the analysis. Specifically, the analysis covered only fund families with two or more equity funds.

The returns of the fund family were then ranked, and the median return was made as the benchmark. The performance of the families was also evaluated on a rolling semi-annual and annual bases. This was intended to evaluate the length of persisting performance in winners and losers alike. The outcome of this analysis allow investors to explore if past returns can be used as a guide in the selection of funds.

The fund families were classified into four groups: (1) superior in one month and in the following month (WW); (2) inferior in one month and in the following month (LL); (3) superior in one month and inferior in the following month (WL); and (4) inferior in one month and superior in the following month (LW). Families whose funds had an average return equal to or higher than the median return were categorized as "winners", while those with an average return below the median were "losers". A two-by-two table of fund family returns was formed to identify whether the winners (W) or losers (L) in a given period were also winners (W) or losers (L) in subsequent periods.

"Hot-hand" is defined as funds that wins in a given month and in the succeeding month, while "cold-hand" is those that lose in a given month and in the subsequent month. The former indicates positive persistence, whereas the latter negative persistence. The 2x2 contingency table is illustrated in Table 4.6.

Repeat-winner is the ratio of fund families being winners in two consecutive months, whereas repeat-losers is the ratio of fund families being losers in two successive months. If the chance for a fund family to repeat its superior performance in the next period is significantly higher than 50 percent, it is considered as a hot-hand fund family. The repeat winner ratio is calculated as the count of winning in two consecutive months (WW) divided by the sum of WW and LL (WW / (WW + WL)).

Table 4.6: Contingency Table

		Period (t+1)		
		Winner	**Loser**	**Total**
Period (t)	**Winner**	WW	WL	WW+LW
	loser	LW	LL	WL+LL
	Total	WW+LW	WL+LL	WW+WL+LW+LL

Following prior studies (Brown & Goetzmann 1995; Malkiel 1995; Cheng et al. 1999) z-scores were used to test statistical significance. Repeat winners and losers were first calculated, then the z-scores for both were computed. The z-score was used to examine the significance of return persistence. It follows a normal distribution with a mean of zero and standard deviation of one. If the chance of a winning fund family to win in the subsequent period is above 0.50 indicates the presence of performance persistence. Otherwise, if the value is below 0.50, it indicates that the fund family may perform poorly in the next period, suggesting the absence of performance persistence. The z-statistic of the repeat winning ratio is calculated as:

$$Z=\frac{W_{t+1}-W_{tp}}{\sqrt{W_{tp}(1-P)}} \quad (4.13)$$

Where W_{t+1} is the fund family's count of winning in period t+1; W_t is the fund family's total count of winning in period t; and P is the probability of the fund family to repeat winning. The z-statistic of the repeat losing ratio is calculated as:

$$Z=\frac{L_{t+1}-L_{tp}}{\sqrt{L_{tp}(1-P)}} \quad (4.14)$$

Where L_{t+1} is the fund family's count of losing in period t+1; L_t is the fund family's total count of losing in period t; and P is the probability of the fund family to repeat losing.

Performance persistence (or absence thereof) is significant if the resulting z-score is larger than the critical value of 1.645. The calculation of the ratio and its z-score was similar for both winners and losers. Since the random variable z of the number of continuously winning funds follow a binomial distribution of b (n,p), it is possible to determine the probability of persistent winning (ratio of > 0.5). The number of winner-winner (Wt+1) becomes larger. The random variable z follows an approximately normal distribution with a mean of zero and standard deviation of one. A large positive z-statistic is observed when a winner continues to be a winner in the following period. Conversely, a large negative z-statistic is observed when a winner becomes a loser. If the proportion of winner-winner and loser-loser is exactly similar, the z-statistic would be zero. Small z-statistics are observed if no clear patterns can be observed in the returns. This method was applied for overall fund family sample includes individual country; and second, Islamic focused family (IFF) versus conventional focused family (CFF).

4.3 Fund Family Flow

In this section, three main hypotheses and one sub-hypothesis were developed to answer the second main research question (How is the relationship between flow and performance of mutual funds at the fund family level?). The hypotheses were developed from both theoretical frameworks and empirical literature. Fund family flows are the movement of cash into or out of a fund family when investors purchase or sell their mutual fund units. Section 4.3.1 presents the research question and hypothesis

development. Section 4.3.2 discusses the description of variables. Section 4.3.3 discusses the star (poor) funds and new money growth rate of fund families. Section 4.3.4 discusses the measurement of the spillover effects of star funds.

4.3.1 Research Question and Hypothesis Development

The main research question for this section concerns the investigation of the flow-performance relationship at the fund family level. At the fund level, the relationship between the two variables is generally linear, which means that funds that perform well tend to obtain higher inflows, while those performing poorly tend to experience more outflows (Sirri & Tufano 1998; Lynch 2003; Ferreira et al. 2012; Gupta & Jithendranathan 2012; Filip & Pochea 2015; Casavecchia 2016).

To test the flow-performance relationship at the fund family level, it is necessary to determine whether having a star or poor fund in the fund family affects its new money growth, and whether this effect is isolated to the star or poor fund or also to other constituent funds. Based on this statement, question two was formulated:

RQ2: How is the relationship between flow and performance of mutual funds at the fund family level?

Some fund families are able to attract more capital than their peers (Ciamarra & Hornstein, 2015). Such a phenomenon may happen because its constituent funds, or the fund family itself, are popular among investors (Adrianto et al. 2019; Nanda, et al. 2004; Khorana & Servaes 1999). It is reasonable to assume that the popularity of a fund or fund family depends on its superior yield. Therefore, to attract more capital inflows, the fund or fund family must convince investors that its future yield is positive as signaled by its good past performance (Zheng 1999; Khorana & Servaes 2005; Kaniel et al. 2007).

There is evidence that fund families try to create star funds (Nanda et al. 2004). This strategy is useful as star funds can increase the inflow of new money into the fund family. Having a star fund is expected to induce spillover effects, attracting new capital not only into the star fund but also to other funds owned by the fund family. There are two possible explanations for this phenomenon. First, the performance of the star funds may signal to investors of the good management quality and research capability of the fund family. Second, perhaps due to media attention, a fund family with a star fund becomes more visible, reducing the searching costs of investors (Sirri & Tufano 1998).

From a behavioural viewpoint, Barber et al. (2005) argued that investors are influenced by representativeness heuristics, which pushes them to make overly optimistic decisions. For that reason, investors tend to make their investment decisions based on the past performance of mutual funds. Behavioural finance arrives to the conclusion that investment decisions are generally made irrationally, motivated by the fear of losing. It is thus reasonable to expect that star funds would attract create more new money inflows into a fund family. Likewise, it is also reasonable to suppose that poor funds have the opposite effect. From the above discussion, the fourth hypothesis was developed:

H4: A star (poor) constituent fund contributes positively (negatively) to fund family new money growth.

In this thesis, the fund families are classification into two types according to the funds focused on the fund family. Islamic focused family, the fund family focused on Islamic mutual funds according to the total net asset of these funds. Since the financial objective of Islamic investors is differs (Hamilton et al. 1993). The prediction is the star and poor contributes to the new money growth of the Islamic focused family differs from contributes to the new money growth of the conventional focused family. This

hypothesis is motivated by the existence of non-financial constraints which affect the flow-performance relationship for Islamic mutual fund (IMF) (Azmi et al. 2018). These non-financial constraints may prevent Muslim investors from directing their money to families that contain conventional star funds, which affects the impact of the presence of conventional star funds on new money of fund families. So, a hypothesis was developed:

H4A: The contribution of existence star (poor) funds to IFF new money growth differ from CFF new money growth.

By generating or closing a star fund, a fund family can signal its superior performance and induce spillover effects, diverting investor capital to other funds in the fund family. A few studies have examined whether the presence of a star fund can attract more capital inflows to other funds belonging to the same fund family (Massa 1998; Sirri & Tufano 1998; Zhao 2004; Nanda et al. 2004; Verbeek & Huij 2007). Investors that are confident with the good performance of the star fund may hold the same perception for other funds managed by the same fund family. In other words, the star fund attracts the inflow of new money into the non-star funds: this is the spillover effect. If the inflow of cash into the star fund comes from cannibalizing the cash flows of other non-star funds in the fund family, the new money growth of the non-star funds in the star fund family will be lower than similar non-star funds in other families.

Fund families use several active marketing strategies to induce positive spillover effects within the fund family. These include fund proliferation, market segmentation, and making use of investor heterogeneity (Massa 1998). Spillover effects may also emerge due to the desire of investors to minimize searching costs. Having invested in a star fund, investors may find it more cost-effective to invest in other funds of the fund family (Khorana & Servaes 2005; Joo & Park 2011). Zhao (2004) found that some fund

families close their star funds to induce spillover effects, shifting the attention and capital of investors to other funds managed by the fund family. The star status also increases capital flow to the star fund itself and other funds in the fund family. Due to this spillover effect, less competent families may be motivated to employ star-creating strategies (Nanda et al. 2004). Huij & Verbeek (2007) found that funds with large marketing costs could create spillover effects, increasing more capital inflow to member funds with small marketing expenses.

It can then be concluded that non-star funds in a star fund family can generate more new money compared to those from a non-star fund family. Non-star funds in a star fund family can share the resources used by the overall fund family. Additionally, such funds are more visible to investors, and as such they can attract more capital inflows. Therefore, spillover effects are presumed to exist in star families. Since most fund families offer both Islamic and conventional funds, it is interesting to see how Islamic star (poor) funds and conventional star (poor) funds affect the cash inflow of other member funds. Because non-Muslims can invest in Islamic funds, they can attract two types of investors (Muslims and non-Muslims). On the contrary, conventional funds can attract more non-Muslim investors, as Muslims are prohibited from investing in them. This restriction may reduce investment opportunities for Muslim investors and thus reduce diversification, which may deprive Muslim investors of benefiting from some of the advantages offered by the fund family. Accordingly, the fifth and sixth hypotheses were developed as follows:

H5: Islamic star (poor) fund positively (negatively) contributes to the new money growth of peer funds in the same fund family.

H6: Conventional star (poor) fund positively (negatively) contributes to the new money growth of peer funds in the same fund family.

4.3.2 Description of Variables

Dependent Variable

New Money Growth Measure

Following Nanda et al. (2004) and Adrianto et al. (2019), new money of a mutual fund family is calculated as the sum of new money of all member funds. For each member fund, new money is defined to be the change in TNA, net of price appreciation in the fund assets. Assuming that new money is invested at the end of each month, the cash flow for fund i in month t is given by (Eq. 4.15). For any fund family *f*, the family-level new money are calculated as (Eq. 4.16). Finally, normalizing the new money by TNA at the beginning of the month gives a measure for new money growth (Eq. 4.17).

$$Newmoney_{i,t} = TNA_{i,t} - TNA_{i,t-1} * (1 + R_{i,t}) \quad (4.15)$$

$$Newmoney_{f,t} = \sum_{i=1}^{n} Newmoney_{i,t} \quad (4.16)$$

$$NewmoneyGrowth_{f,t} = \frac{Newmoney_{f,t}}{\sum_{t-1}^{n} TNA_{i,t-1}} \quad (4.17)$$

where $TNA_{i,t}$ is the total net asset value of fund i at period t; $TNA_{i,t-1}$ is the total net asset value of fund i at period $t-1$; and $R_{i,t}$ is the raw return of fund i at period t.

Independent Variables

Performance measure

Following the most of previous studies like Nanda et al., (2004) and Joo & Park (2011), fund family performance was measured as the weighted average of four-factor adjusted returns of all member funds in the fund family. A rational investor allocates

their capital in funds with good past performance: they are attracted to good historical performance (Ippolito 1992; Hendricks et al. 1993; Gruber 1996; Chevalier & Ellison 1997; Sirri & Tufano 1998; DelGuercio & Tkac 2001). Representativeness heuristics Tversky & Kahneman (1973) occur when investors rely heavily on past performance to make their decisions. In other words, they hold the assumption that funds with good (poor) historical performance will continue their upward (downward) trajectory. Mutual fund managers have also been found to pick and invest in funds with superior past performance (Grinblatt et al. 1995). Beson et al. (2008) proposed that the superiority shown in the management of a given fund can be expanded to other constituent funds; hence, there is an incentive to expand the fund if one or more of its member funds are performing well. It can thereby be expected that there is a positive relationship between a fund family's new money growth and its past performance.

Star and Poor Fund

Star fund family is a dummy variable equals one if a fund family has at least one star fund and zero otherwise. Poor fund family is a dummy variable equals one if a fund family has at least one poor fund and zero otherwise. Nanda et al. (2004) indicate that the fund family uses the strategy to create star funds. They said this strategy is useful to increase the inflow of new money into the fund family. Sirri & Tufano (1998) noticed that the fund family with a star fund becomes more visible, which leads to reducing the searching costs of investors.

Islamic Star Fund (ISF) and Islamic Poor Fund (IPF) variables

ISF is dummy variable equal one if the Islamic fund family have at least one-star fund and zero otherwise. IPF is dummy variable equal one if the Islamic fund family have at least one-poor fund and zero otherwise.

Conventional Star Fund (CSF) and Conventional Poor Fund (CPF) variables

CSF is dummy variable equal one if the conventional fund family have at least one-star fund and zero otherwise. CPF is dummy variable equal one if the conventional fund family have at least one-poor fund and zero otherwise.

Control Variables

Fund Family Age (FFA)

Fund family age is a proxy measure of the families' ability to survive amidst intense competition. The starting point of a fund family's age is its launch date. At the fund level, several studies investigate the relationship between fund age and fund flows. Some of them found insignificant relationship (Jank, 2012; Marzuki & Worthington, 2015). However, other found significant negative relationship (Huang et al. 2007; Shrider, 2009; Jiang & Yuksel, 2019), which indicates the investors prefer to invest in younger funds. However, Benson et al. (2008) examine the impact of fund family age on the fund flows and observed that older fund family attract more flow. They justified that by less sophisticated investor using fund family age as a quality signal for an individual fund.

Fund Family Size (FFS)

Fund family size refers to the sum of asset under management (AUM) by a particular fund family. Product proliferation can be an effective strategy for a mutual fund to increase its market share (Massa 1998; Khorana & Servaes 2005). Fund families are thus expected to introduce and manage as many funds as possible to gain additional income (Khorana & Servaes 1999). Through such a strategy, as well, fund families can reduce their fees. Additionally, they can attract more capital inflows, since investors tend not to invest in a single-fund family (Elton et al. 2007; Park et al. 2010). They invest in large families to reduce economic costs and for convenience and simplicity, especially when the families offer a wide array of funds. Benson et al. (2008) the fund with the large fund family attract more flows. Further, investors appear to have a preference for specialisation within a fund family.

Number of Funds in Fund Family (NF)

It refers to the number of funds managed by a fund family. It's the anther measurement of fund family size. It possible to play as a signal to attract the investors and more new money growth to the fund family. The growth of new money for a fund family is therefore responsive to the number of funds that it manages. A fund family with a large number of funds may offer more investment opportunities at reduced costs, increasing inflows (Guedj & Papastaikoudi, 2004).

Total Risk (TR)

Total risk is the annualized standard deviation of fund family monthly returns over the sample period. According to Premachandra et al. (2012), used the transpose of a matrix of returns over 3 years. Risk is one of the important factors considered by risk-

averse investors when selecting the funds. Several researchers study the relationship between flows and fund risk. Some of them show that the insignificant relationship (Cashman et al. 2012; Jun et al. 2014). While, in Malaysia Marzuki & Worthington (2015) found significant positive relationship. They indicate that investors attempt to obtain large returns by investing in high-risk equity funds. However, other studies record a significant negative relationship, which mean that low risk funds attract large fund flow (Jank 2012; Jiang & Yuksel, 2019).

4.3.3 Star (Poor) Funds and New Money Growth of Overall Fund Family

This section explains how hypotheses four were tested. Hypothesis four tests the influence of star or poor funds on the fund family's new money growth, while hypothesis (4. *A)* test the contribution of existence star (poor) funds to IFF flows differ from CFF flows. In addition to other fund family attributes as control variables (past fund family performance, number of funds in the fund family, fund family age, fund family size, and total fund family risk). The relationship is tested using the following panel regression model:

$$Newmoney_{f,t} = \alpha_f + \beta_1 perf_{f,t-1} + \beta_2 NF_{f,t-1} + \beta_3 FFA_{f,t-1} + \beta_4 FFS_{f,t-1} + \beta_5 TR_{f,t-1} + \beta_6 SFdummy_{f,t-1} + \beta_7 PFdummy_{f,t-1} + \varepsilon_{f,t} \quad (4.18)$$

where $Newmoney_{f,t}$ is the money inflow of fund family at time t; $perf_{f,t-1}$ is the returns of the fund family at time .$_{t-1}$; $NF_{f,t-1}$ is the number of funds managed by the fund family; $FFA_{f,t-1}$ is the log number of years since the inception of the fund family; $FFS_{f,t-1}$is the fund family size; $TR_{f,t-1}$ is the total fund family risk; $SFdummy_{f,t-1}$ is a dummy variable whose value is one if fund family f has at

least one fund that belongs to the top 5% group based on Carhart four-factor; $PFdummy_{f,t-1}$ is a dummy variable whose value is one if fund family *f* has at least one fund that belongs to the bottom 5% group based on Carhart four-factor; and $\varepsilon_{i,t}$ is the error term. If the regression coefficient of $SFdummy_{f,t-1}$ is positive, there is more cash inflow when fund family *f* is a star fund family. Likewise, if the regression coefficient of $PFdummy_{f,t-1}$is negative, there is less cash inflow (or even cash outflow) when fund family *f* is a poor fund family.

4.3.4 Measuring the Spillover Effect

This section describes how hypothesis five and six are tested; the effect of star and poor funds on other member funds was tested. While a star fund could increase cash inflow, it remains ambiguous whether the new inflow goes toward the star fund itself or other member funds. The same effect is similarly unclear for poor funds, do they decrease their own cash inflow or that of other member funds? To ascertain this effect, the thesis first composed a portfolio containing all funds belonging to the same fund family, excluding any star or poor funds. The cash flow to this portfolio was then examined. The spillover effect of Islamic and conventional star and poor funds were also evaluated. The spillover effect of Islamic star (poor) funds was tested using the following regression model:

$$Newmoney_{f(non),t} = \alpha_{f(non)} + \beta_1 perf_{f(non),t-1} + \beta_2 NF_{f(non),t-1} + \beta_3 FFA_{f(non),t-1} + \beta_4 FFS_{f(non),t-1} + \beta_5 TR_{f(non),t-1} + \beta_6 ISF\ dummy_{\ f,t-1} + \beta_7 IPF\ dummy_{f,t-1} \varepsilon_{f(non),t} \quad (4.19)$$

Where $Newmoney_{f(non),t}$ is the cash flow growth rate for fund family f in period t. This is the sum of cash flows to all equity funds in the fund family in period t, except those that belong to Islamic star and poor funds, divided by the sum of net asset values of all funds in the fund family (except those of star and poor Islamic funds) at period t, In addition, $perf_{f(non),t-1}$ is the risk-adjusted return of fund family f, measured using Carhart four-factor, calculated from all funds in the fund family, excluding Islamic star and poor funds, $FFS_{f(non),t-1}$ is the fund family size, calculated from all funds in the fund family, excluding star and poor Islamic funds. $TR_{f(non),t-1}$ is the total fund family risk, $ISFdummy_{f,t-1}$ is a dummy variable, where one indicates that fund family *f* holds at least one Islamic fund that belongs to the top 5% group based on the four-factor model, $IPF\ dummy_{f,t-1}$ is a dummy variable, where one indicates that fund family *f* holds at least one Islamic fund that belongs to the bottom 5% group based on the four-factor model, $\alpha_{f(non)}$ is a constant term whose value is fixed for fund family *f;* and $\varepsilon_{f(non),t}$ is an error term with average and variance. If the regression coefficient of $ISF\ dummy_{\ f,t-1}$ $(IPF\ dummy_{yf,t-1})$ in Eq. (4.17) shows a statistically significant, positive (negative) value, then there is a spillover (reverse spillover) effect from Islamic star (poor) funds to other funds in the fund family. The next model tests the spillover effect of conventional star and poor funds:

$$Newmoney_{f(non),t} = \alpha_{f(non)} + \beta_1 perf_{f(non),t-1} + \beta_2 NF_{f(non),t-1} + \beta_3 FFA_{f(non),t-1} + \beta_4 FFS_{f(non),t-1} + \beta_5 TR_{f(non),t-1} + \beta_6 CSF\ dummy_{\ f,t-1} + \beta_7 CPF\ dummy_{f,t-1} \varepsilon_{f(non),t} \quad (4.20)$$

$CSFdummy_{f,t-1}$ is a dummy variable, where one indicates that fund family *f* holds at least one conventional fund that belongs to the top 5% group based on the four-factor model, $CPF\ dummy_{f,t-1}$ is a dummy variable, where one indicates that fund family *f* holds at least one conventional fund that belongs to the bottom 5% group based on the four-factor model, If the regression coefficient of $CSF\ dummy_{f,t-1}$ $(CPF\ dummy_{f,t-1})$ shows a statistically significant, positive (negative) value, then there is a spillover (reverse spillover) effect from conventional star (poor) funds to other funds in the fund family.

4.4 Future Performance of Star Fund Families

In this section, two hypotheses were developed to answer the third main research question (How is the future performance of fund family with star funds?). This section describes how fund family investors successfully identify and invest in well-performing families, as well as to determine whether star fund families are able to maintain their status. Section 4.4.1 presents the research question and hypothesis development. Section 4.4.2 describes the future performance of star fund family model. Section 4.4.3 measuring star fund holding persistence.

4.4.1 Research Question and Hypothesis Development

The main question of this section is how is the future performance of fund family with star funds? It help to attempts to examine whether investors of fund families are able to predict and invest in families that perform well in the future. Investors would generally prefer fund families with star funds, as such families are expected to continue their good performance in the future. In addition, the thesis examines whether star fund families are able to maintain their status in the future:

RQ3: How is the future performance of fund family with star funds?

If the coefficients of dummy star are positive and statistically significant in model (4.20), it means that investors expect a fund family with star funds to have superior performance in the future.

Previous research has found that star funds that have maintained their status tend to perform better than other funds in the future (Khorana & Servaes 2005; Zhang 1999; Gruber 1996). However, at the fund family level, this trend remains ambiguous. Unlike star funds, the future performance of star fund families is unclear (Joo & Park 2011). While a fund family that manages a sizeable number of funds may have at least a star fund, the overall fund family performance is altogether a different matter (Wang 2017; Change & Goo 2013). Therefore, it is necessary to test whether the fund family with star funds perform better in the future. The finding could ascertain whether the strategy of fund families to market their star funds to induce spillover effects is valid. Therefore, hypothesis seventh was formulated as follows:

H7: Fund family with star (poor) funds continue to outperform (underperform) in the future.

At the fund level, there is some evidence supporting the future performance persistency in Islamic funds (Marzuki & Worthington 2017; Azmi et al. 2018). They conclude that there are restrictions on Islamic investment because Islamic investments seek to achieve religion and morels objectives besides the traditional objectives (profit and liquidity). These restrictions may reduce investment opportunities for Muslim investors and thus reduce diversification, which may deprive Muslim investors of benefiting from some of the advantages offered by the fund families. However, the

general evidence is mixed, and as such this thesis attempts to discover whether the effect does exist in Islamic focused families. Following Hypothesis was formulated thus:

H7A: Future performance of Islamic focused family (IFF) with star (poor) funds differs from conventional focused family (CFF).

If star funds do raise the cash inflows of a fund family, this would imply that a fund family with star funds can generate more returns (Nanda et al. 2004; Joo & Park 2011). This benefit will encourage fund families to maintain their star funds and/or attempt to generate new ones (Joo & Park 2011). Even so, both tasks are not simple: a fund family has to consistently outperform the market to accomplish either goal (Zambrana & Zapatero 2017; Elton et al. 2007). Therefore, the eighth hypothesis was developed as follows:

H8: Fund family have the capability to maintain their star fund family status in the future.

4.4.2 Future Performance of Star Fund Family

This section explains the techniques used to test the future performance of star fund family, that is, whether fund families with star funds outperform other fund families, as investors would expect (hypothesis seven). Fund family attributes were used as control variables. They include the number of funds in the fund family, fund family age, fund family size, and total fund family risk. The model was used on two samples: first, the overall fund family and by individual countries; and second, Islamic versus conventional focused families. The relationship was tested using the following panel regression model:

$$Performance_{f,t+11} = \alpha_f + \beta_1 perf_{f,t-1} + \beta_2 FFS_{f,t-1} + \beta_3 FFA_{f,t-1} + \beta_4 NF_{f,t-1} + \beta_5 TR_{f,t-1} + \beta_5 SFdummy_{f,t-1} + \beta_6 PFdummy_{f,t-1} + \varepsilon_{f,t}$$

(4.21)

where "$Performance_{f,t+11}$ is the risk-adjusted return for fund-family *f*, calculated from the twelve-month returns for the period between *t* and *t+11* (inclusive) using Carhart's four-factor model; $perf_{f,t-1}$is still included as an independent variable to check whether persistent performance exists at the fund family level as it often exists at the fund level. If the regression coefficient of $SFdummy_{f,t-1}$ is positive and statistically significant, a star fund family performs better than other families in the future. Similarly, if the regression coefficient of $PFdummy_{f,t-1}$ is negative and statistically significant, a poor fund family performs worse than other families in the future.

4.4.3 Measuring Star Fund Holding Persistence

This section seeks to last hypothesis by examining whether star fund families have the capability to maintain their star fund family status in the future. Similar to the previous section, fund family attributes were also used as control variables. These include the number of funds in the fund family, fund family age, fund family size, and total fund family risk. A fixed-effect logistic regression was used to model this relationship:

$$SFdummy_{f,t+11} = \alpha_f + \beta_1 perf_{f,t-1} + \beta_2 FFS_{f,t-1} + \beta_3 FFA_{f,t-1} + \beta_4 NFs_{f,t-1} + \beta_5 TR_{f,t-1} + \beta_6 SFdummy_{f,t-1} + \beta_7 PFdummy_{f,t-1} + \varepsilon_{f,t}$$

(4.22)

where $SFdummy_{f,t+11}$ is a binary variable that takes the value of one when a fund family is a star fund family based on the risk-adjusted return for the next twelve months (between t and t+11, inclusive) and 0 otherwise. If the regression coefficient for $SFdummy_{f,t-1}$ ($PFdummy_{f,t-1}$) is positive (negative) and statistically significant, the current star fund family has a high (low) chance of owning a star fund in the next twelve months.

4.5 Overall Summary

This chapter has discussed the development of research questions and hypotheses based on the gap found in the literature. This chapter has also described the data collection procedures and research design of three separate analyses used to examine the performance, flow, and future performance of the star fund family. The first empirical methodology outlines how the performance of the fund family was assessed. The first empirical method discusses selectivity skills and market timing ability models. Additionally, the contingency table method was used to test performance persistence at the fund family level. The first empirical method also applied two global market benchmarks on the four sample countries. First is the Islamic benchmark (FTSE global Islamic) and the second is FTSE All-World.

The second empirical methodology details how the influence of star and poor funds to fund family flows (new money growth of the fund family) was investigated. The thesis firstly investigated how the existence of star and poor funds in the fund family contributes to the overall new money growth in the fund families. Secondly, it investigated how the existence of star and poor funds in the fund family contributes to the flows of other funds in the fund family (spillover effect). In this empirical section,

the differential spillover effects of Islamic and conventional star and poor funds were also examined.

The third empirical methodology details how the future performance of star fund family. The rationality of investors' behaviour was examined. Fund family investors choose families with star funds because they expect these families to perform well in the future. This empirical section also shows how the thesis determined whether fund families have the capability to maintain their star status in the future. Figure 4.4 summarizes the framework of this thesis.

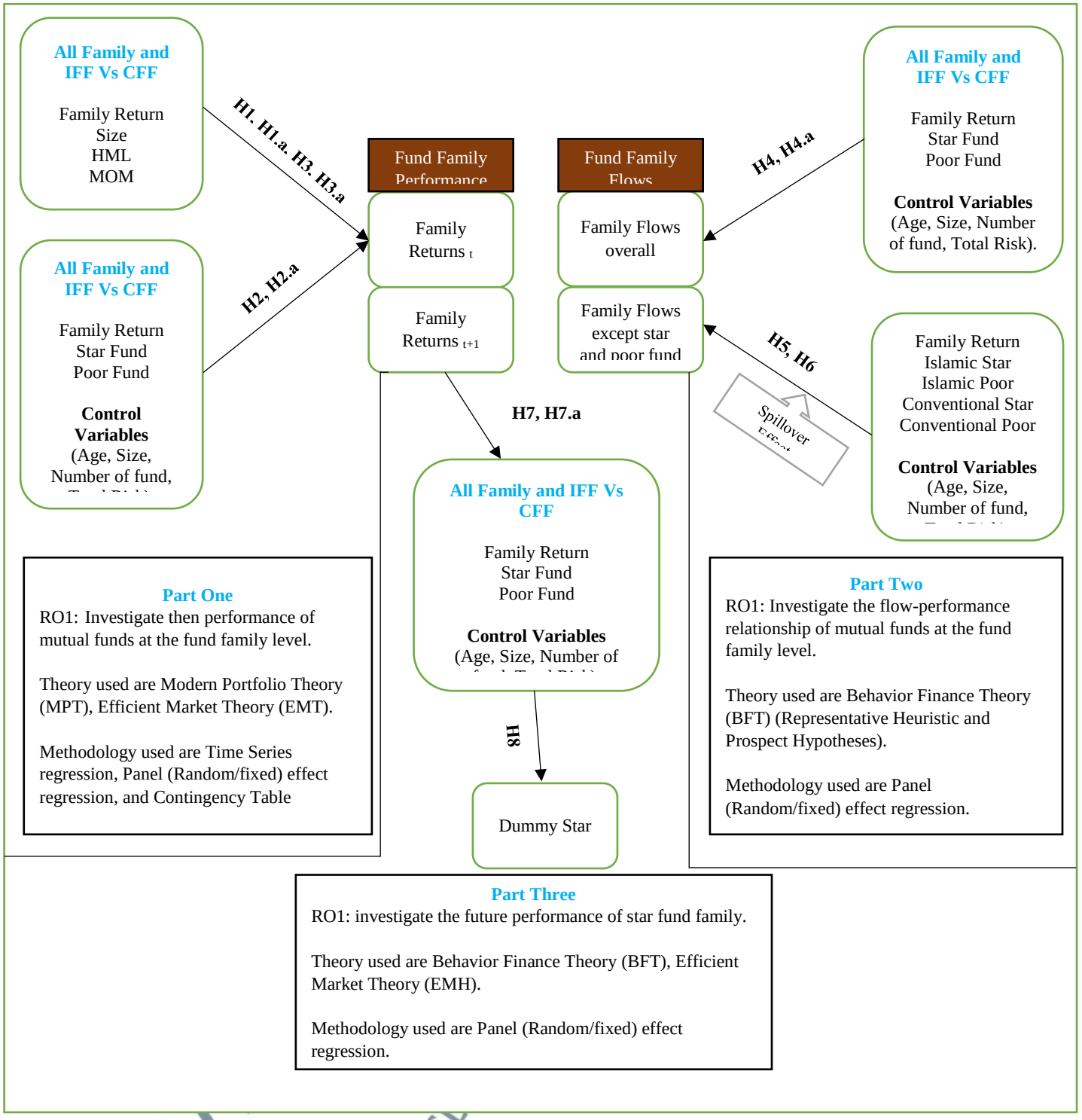

Figure 4.4: Research Framework