The relationship between size and performance of South African unit trust funds

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ABSTRACT

This study investigates the relationship between unit trust fund size and the net of fee performance of actively managed South African unit trust funds. Although a slight, yet significant, negative relationship between unit trust fund size and performance is documented, no difference was found between the mean performance of small and large South African unit trust funds. This finding suggests that the slight negative impact of fund size on unit trust performance was most likely outweighed by the positive impact of fund family size on unit trust performance. Therefore, depending on the characteristics of the organisation to which a fund belongs, increased fund size should not necessarily detract from fund performance. Furthermore, fund size was found to be a weak determinant of unit trust performance, with more than 99% of the variation in unit trust performance explained by factors other than fund size. The findings of this study suggest that fund size should be given very little, if any, consideration when assessing the future return potential of South African unit trust funds.

Keywords

Unit trusts, fund size, performance

DECLARATION

I declare that this research project is my own work. It is submitted in partial fulfilment of the requirements for the degree of Master of Business Administration at the Gordon Institute of Business Science, University of Pretoria. It has not been submitted before for any degree or examination in any other University. I further declare that I have obtained the necessary authorisation and consent to carry out this research.

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CHAPTER 1: INTRODUCTION TO THE RESEARCH PROBLEM

1.1.   Introduction

According to Meyer-Pretorious and Wolmarans (2006), unit trusts are professionally managed, cost-effective investment vehicles, that offer investors the opportunity to invest in shares, bonds, listed property and other asset classes to achieve inflation-beating returns on their capital over a reasonable investment term. The first unit trust fund was launched in South Africa (SA) in 1965 (Meyer-Pretorious & Wolmarans, 2006). Since then, unit trust funds have become popular investment and savings vehicles for millions of South Africans, with the Association for Savings and Investment South Africa (ASISA) reporting that as at end March (Q1) 2019, close to R2.4 trillion in assets were invested across 1599 South African unit trust funds (ASISA, 2019).

Numerous studies have analysed unit trust fund performance and the factors that impact unit trust performance (Sharpe, 1966; Barber, Huang & Odean, 2016). One of the factors that have drawn a lot of research attention is unit trust fund size and its impact on unit trust fund performance (Bessler, Kryzanowski, Kurmann & Luckoff, 2016). With past top performing unit trust funds often ranking amongst the most preferred investment options amongst investors, such past winners become the beneficiaries of large investment inflows, increasing fund assets under management (AUM), or fund size. This raises the question of whether scale is a contributing or detracting factor to unit trust fund performance, and if so, to what extent.

According to Ferreira, Miguel and Ramos (2013) unit trust fund size and its impact on unit trust fund performance are amongst the most studied variables in unit trust fund research. This might be explained by the inconsistency of results that have been attained by previous studies that have analysed the relationship between unit trust fund size and fund performance. Previous studies on the topic have either found: 1) a negative relationship between fund size and performance (Zhu, 2018); 2) no relationship between fund size and performance (Basso & Funari, 2017); 3) a positive relationship between fund size and performance (Filip, 2017); or 4) a quadratic and concave relationship between fund size and performance (Indro, Jiang, Hu & Lee, 1999). In addition to these contrasting findings, the relationship between unit trust fund size and performance is not pervasive across countries (Ferreira et al., 2013).

This study will attempt to determine the relationship between unit trust fund size and unit trust fund performance of South African unit trust funds between the period 2009 and 2019. The results of this study will provide valuable insights as to whether unit trust fund

size is a determinant of performance of South African unit trust funds, and if so, to what extent. Apart from the inconsistency of findings amongst prior studies, and by implication, the uncertainty and confusion that it might cause amongst unit trust investors, the topic has enjoyed limited scholarly attention in the South African unit trust industry. As such, the study is of interest to both the South African unit trust industry as well as to current and prospective investors in unit trust funds, as it is unlikely that the results from prior studies can be extrapolated to the South African context without giving due consideration to the fundamental characteristics of the South African unit trust industry.

1.2. Research problem

According to ASISA, as at Q1 2019 the South African unit trust industry comprised of 1599 funds, which collectively managed close to R2.4 trillion in total assets (ASISA, 2019). This contrasts to Q1 2009 when there were approximately R658 billion invested across 891 funds in the South African unit trust industry (ASISA, 2009). The South African unit trust industry has experienced significant growth over the past decade, not only in terms of the amount of assets that are invested in unit trust funds, but also in terms of the absolute number of unit trust funds available to South African investors. In turn, this has led to significant growth in the number of institutions managing unit trust funds on behalf of investors (ASISA, 2019).

The proliferation of the unit trust industry has increased the competitive landscape amongst providers of unit trust funds in SA. Despite the increased competition, the unit trust industry in SA remains highly concentrated, with the ten largest actively managed unit trust funds, excluding money market funds, accounting for more than a quarter of the R2.1 trillion in assets that were managed by South African focused unit trusts as at Q1 2019 (ASISA, 2019). Amongst South African focused unit trust funds, individual fund sizes ranged from well over a hundred billion rand in AUM for the largest fund, to only several million rand in AUM for the smallest funds (ASISA, 2019). South African focused unit trust funds exclude unit trust funds with global, worldwide or regional investment mandates and accounts for the overwhelming majority of industry AUM (ASISA, 2018).

The concentrated nature of the South African unit trust industry point to a small number of funds that have attracted an inordinate amount of capital over the past decade, with this trend set to continue (Cairns, 2019). From an expected performance point of view, this raises the question of whether there are any advantages or disadvantages associated with increased fund size. The extent to which unit trust fund size impacts unit trust fund returns, if any, introduces important implications for investors as it could help inform the expected return outcomes of those investors who have committed a

substantial amount of capital to a small number of very large unit trust funds in the South African unit trust industry.

Chen, Hong, Huang and Kubik (2004) studied the relationship between unit trust fund size and fund performance and concluded that a negative relationship exists between fund size and performance. This finding implies that as fund AUM grows, the returns of such funds are negatively impacted. Given the structure and competitive dynamics of the South African unit trust industry, the findings of Chen et al. (2004) and those of Chan, Faff, Gallagher and Looi (2009), who also found a negative relationship between unit trust size and performance, institutions managing smaller unit trust funds in SA have increasingly pointed to the perceived benefits that smaller unit trust funds enjoy over their larger competitors (Clayton, 2019).

South African institutions managing smaller unit trust funds point to benefits such as a larger investment opportunity set, superior flexibility and nimbleness that smaller funds enjoy over their larger competitors. It is argued that these benefits should result in smaller funds achieving superior investment performance relative to their larger peers (Clayton, 2019). However, these assertions ignore factors such as fund manager skill in identifying superior investment opportunities as well as other unique characteristics at the fund organisation level, such as the ability of a fund organisation to employ superior analysts and portfolio managers. They also ignore other potential benefits that become more prolific as AUM grows, such as achieving economies of scale on numerous fixed costs such as brokerage fees, research costs, marketing expenses and distribution costs, amongst others (Yan, 2008).

Contrary to the performance benefits claims made by the proponents of smaller unit trust funds, prior studies that have attempted to establish the relationship between unit trust fund size and performance of South African unit trust funds have also produced mixed results. Both Hibbert (2003) and Molelekoa (2013) found no relationship between unit trust fund size and performance. In a less formal study, and with a subsequent note to clients, van Andel (2014), did not find a relationship, either positive or negative, between the size of a unit trust fund and the performance it was able to generate. These findings contradict the claims made by industry participants such as Clayton (2019).

In contrast, Pillay, Muller and Ward (2010), who conducted a simulated study of equally weighted equity portfolios in South Africa during the period 1991 to 2008, found that fund size was a determinant of fund performance and that an optimal fund size did exist. This speaks to the existence of a concave relationship between unit trust fund size and performance whereby funds must first reach a minimum level of AUM to achieve

satisfactory returns, but where returns are adversely impacted after a fund exceeds its optimal size. The research conducted by Pillay et al. (2010) in the South African context was based on simulated, equally weighted portfolios, and not actual unit trust data. As such, the results must be interpreted with caution.

In light of the mixed results that this topic has produced as well as the limited scholarly attention that it has enjoyed in the South African context do date, financial market participants and investors in unit trust funds that ascribe to the theory that increased unit trust fund size negatively impacts returns, may incorrectly rely on unit trust fund size data to inform their investment decisions. As a matter of fact, marketing campaigns of smaller fund managers in SA have often pointed to their relative size advantage, clearly alluding to the fact that a smaller level of AUM could lead to better investment outcomes (Clayton, 2019). The implications of such assertions are that they could adversely impact the investment returns of those investors who base their investment decisions on factors that have not been verified in the South African context. Moreover, larger funds, or the institutions that these funds belong to, could negatively be impacted should investors misleadingly allocate funds to smaller unit trust funds, at the expense of larger funds, in the hope of achieving superior performance. To clarify some of these issues, this study will attempt to determine whether unit trust fund size is indeed a reliable determinant of investment performance in the South African unit trust industry.

1.3.   Research objectives

The growth in the South African unit trust industry, the concentrated nature of the industry, together with the inconsistent results produced by prior studies on the size-performance relationship of unit trusts, raises the interesting question of whether a relationship exists between fund size and performance of South African unit trust funds, and if so, whether small or large unit trust funds in South Africa are in a better position to deliver superior returns to investors. Furthermore, given the large fund size of several unit trust funds in SA, the question is raised whether those funds have reached a point where their size have become a hindrance to generating superior performance relative to their smaller counterparts.

By analysing the relationship between fund size and performance of South African unit trust funds over the ten-year period from 2009 to 2019, this study will attempt to shed light on these questions. This study will therefore attempt to establish and quantify the relationship between unit trust fund size and performance of South African unit trust funds. In doing so, the study will further establish whether unit trust fund size is a reliable determinant of investment performance in the South African unit trust industry. The

findings of the study offer potential benefits to current and prospective investors in unit trust funds as well to the fund organisations, or fund families, to which these unit trust funds belong, especially when considering the absence of any recent academic studies on the topic within the South African context.

1.4.   Relevance of study

The findings of the study will add valuable insights to the South African unit trust industry as it offers insights as well as potential benefits to not only current and prospective investors in unit trust funds but also to the fund organisations, or fund families, to which these funds belong. These insights and potential benefits are discussed below.

The literature fails to produce any recent studies on the relationship between unit trust fund size and performance of South African unit trust funds. In the absence of recent studies and conclusive results, investors might misleadingly conclude that fund size is an important consideration when selecting between alternative funds or for identifying future outperforming funds. Thus, fund size could be relied on, either correctly or incorrectly, to inform investment decisions, or as a key factor when assessing the return potential of alternative unit trust funds. Therefore, this study will attempt to establish whether fund size should be given any consideration by investors when deciding between investment alternatives.

Secondly, unit trust funds, or the institutions that these unit trust funds belong to, may use the fact that they possess favourable size attributes as part of their marketing campaigns in an attempt to gain competitive advantages over competitors (Filip, 2017). In turn, this holds implications for those fund organisations that do not possess "appropriate" size attributes, and as such, those institutions could consider altering their business strategies or calibrating the sizes of their funds, amongst others, in order to achieve more appropriate size attributes. In the absence of concrete evidence on the relationship between fund size and performance, such actions might prove to be fruitless, or worse, yield unintended consequences.

Given the potential impact on various stakeholders in the South African wealth management and asset management industries, the importance of research on the relationship between fund size and performance of South African unit trust funds cannot be overstated. As such, the study will attempt to contribute to both the wealth management and asset management industries, which includes, but is not limited to, individual investors, financial advisors, pension fund trustees, asset allocators as well as the institutions to which individual unit trust funds belong.

As opposed to previous South African studies on the topic, which have focused exclusively on equity funds, this study will be extended to include multi-asset high equity, or balanced funds, as part of the study. This is particularly relevant as the balanced fund sector was the single biggest unit trust fund sector within the South African unit trust industry as at Q1 2019, with a total of R523bn invested across all balanced funds (ASISA, 2019). Given the popularity of these funds amongst South African investors, a study on the relationship between fund size and performance of balanced funds is not only relevant, but necessary, as the results of the study could help better inform the future decisions of both investors and fund organisations within this unit trust category.

In addition, balanced funds represent the largest individual unit trust funds in the South African unit trust industry, as measured by AUM (ASISA, 2019). Therefore, the study will add to the literature by establishing whether any of the prior findings within the South African equity fund universe can be extended to the fund sector that boasts the largest individual unit trust funds in the industry. Including the largest individual unit trust funds as part of the sample, should not only improve the validity of the results, but should a relationship between unit trust fund size and performance indeed exist, it is expected to be most pronounced amongst the largest funds in the industry.

1.5. Structure of paper

The remainder of the document is set out as follows. Chapter 2 provides an overview of the South African unit trust fund industry as well as an overview of the literature on the relationship between unit trust fund size and performance in both the global and the South African context. The South African unit trust industry is discussed, together with an explanation of the various classifications of unit trust funds. In addition, apart from discussing the results of previous studies, Chapter 2 further attempts to provide details as to why those results were found.

From the literature, several hypotheses are formulated. In Chapter 3, these hypotheses are proposed. The hypotheses set out in Chapter 3 informs the core objectives of the study. Chapter 4 describes the research methodology, where the data, sampling and analysis technique(s), amongst others, will be discussed.

Chapter 5 presents the results of the study. In Chapter 6 those results, and their implications, are discussed. The document concludes with Chapter 7, which contains a summary of the principal findings of the research and the implications of those findings for various stakeholders. The various limitations of the study are documented and suggestions for future research are provided.

CHAPTER 2: LITERATURE REVIEW

2.1. Introduction

The following topics will be covered in this chapter. Firstly, the chapter provides a comprehensive, yet essential, overview of the South African unit trust industry. The various classifications of unit trust funds in SA are discussed, together with the structure of the industry. This is followed by a detailed review of the literature on the relationship between unit trust fund size and performance. The main findings of prior studies that have analysed the relationship between unit trust fund size and performance, in both the international and South African contexts, are presented and discussed. The chapter concludes with a summary of the main findings, from which several hypotheses are developed, as outlined in Chapter 3.

2.2. The South African unit trust industry

According to Coronation Fund Managers (n.d.), one of the foremost managers of unit trust funds in SA, a unit trust pools money from a large group of individual investors to invest in financial assets such as shares, bonds, cash instruments and listed property. Unit trusts, or collective investment schemes as they are also known, are managed by investment professionals, offering individual investors the benefit of not having to analyse and select individual investments themselves (Coronation Fund Managers, n.d.). As such, unit trust funds serve as savings and investment vehicles for millions of South Africans who are not investment professionals themselves.

In terms of comparison, unit trusts in SA are very similar to mutual funds in the United States (US), with the only difference between the two being their underlying structures (Meyer-Pretorius & Wolmarans, 2006). According to Meyer-Pretorius and Wolmarans (2006), unit trusts are administered and overseen by a trust company, whereas for a mutual fund, the directors of the mutual fund company are responsible to ensure that fund managers adhere to their fiduciary responsibility towards investors. The result for investors under both structures are the same, however, with both unit trusts and mutual funds offering investors the opportunity to outsource their investment decisions to professional managers of unit trust funds and to achieve real returns on their savings over the medium to long-term in accordance with their individual risk profiles (Meyer-Pretorious & Wolmarans, 2006).

The first unit trust in SA was launched in 1965 (Meyer-Pretorious & Wolmarans, 2006). Since then, the industry has grown significantly, with close to R2.4 trillion invested across 1599 different unit trust funds as at Q1 2019 (ASISA, 2019). In SA, unit trust funds are classified according to South African, Worldwide, Regional and Global investment

mandates (ASISA, 2018). These fund classifications determine the geographical exposures, or mandates, of each unit trust fund that fall under the respective classifications and are known as Tier 1 classifications (ASISA, 2018).

In terms of investment mandates, unit trust funds classified as South African must have a minimum of 60% of its AUM invested in SA (ASISA, 2018). In contrast, unit trust funds classified as Regional must have a minimum of 80% of its AUM invested in a specific geographical location such as the US, Asia, Europe, or Africa, amongst others, at all times (ASISA, 2018). According to ASISA (2018), unit trust funds classified as Global must have 80% of their AUM invested outside of SA at all times, whereas Worldwide funds can invest in both SA and foreign markets without any restrictions. As such, there are no limits or minimum prescriptions set for Worldwide funds for investing in either SA or foreign markets (ASISA, 2018).

Table 1 below provides a detailed overview of the fund classifications for the South African unit trust industry as at Q1 2019. Table 1 also indicate the total AUM per fund classification in billions of rand as well as the absolute number of funds in existence within each fund classification as at Q1 2019. These figures are indicated, in this order, by the numbers in parenthesis in Table 1.

Table 1: ASISA fund classifications as at Q1 2019

Tier 1: Geographic	Tier 2: Asset Type	Tier 3: Category						
South Africa (2099 ; 1262)	Equity (401 ; 298)	General (352 ; 235)	Large Cap (30 ; 27)	Mid & Small Cap (6 ; 10)	Resources (4 ; 9)	Industrial (5 ; 6)	Financial (3 ; 8)	Unclassified (1 ; 3)
	Multi-Asset (1037 ; 757)	Income (168 ; 113)	Low Equity (227 ; 183)	Medium Equity (56 ; 104)	High Equity (524 ; 246)	Flexible (59 ; 100)	Target Date (4 ; 11)	
	Real Estate (65 ; 58)	General (65 ; 58)						
	Interest Bearing (597 ; 149)	Variable Term (71 ; 56)	Short Term (181 ; 43)	Money Market (344 ; 50)				
Worldwide (48 ; 118)	Equity (5 ; 8)	General (5 ; 8)	Unclassified (0 ; 0)					
	Multi-Asset (44 ; 110)	Flexible (44 ; 110)						
	Interest Bearing (0 ; 0)	Variable Term (0 ; 0)	Short Term (0 ; 0)					
Global (217 ; 183)	Equity (138 ; 84)	General (138 ; 83)	Unclassified (0,1 ; 1)					
	Multi-Asset (68 ; 66)	Income (1 ; 3)	Low Equity (6 ; 10)	Medium Equity (2 ; 3)	High Equity (28 ; 13)	Flexible (31 ; 37)		
	Real Estate (8 ; 20)	General (8 ; 20)						
	Interest Bearing (3 ; 13)	Variable Term (2 ; 8)	Short Term (1 ; 5)					
Regional (20 ; 36)	Equity (17 ; 24)	General (17 ; 24)						
	Multi-Asset (2 ; 3)	Flexible (2 ; 3)						
	Real Estate (0,2 ; 3)	General (0,2 ; 3)						
	Interest Bearing (0,4 ; 6)	Variable Term (0 ; 0)	Short Term (0,4 ; 6)					
Total (2384 ; 1599)								

Source: ASISA, n.d.; ASISA, 2019.

As illustrated in Table 1, unit trust funds classified as South African account for the overwhelming majority of industry AUM as well as the absolute number of unit trust funds

within the South African unit trust industry. As at Q1 2019, South African focused unit trust funds comprised 1262 funds, collectively responsible for close to R2.1 trillion in total assets (ASISA, 2019). As such, South African focused unit trust funds account for approximately 79% of the total number of unit trust funds in existence in SA, which collectively comprise 88% of total industry AUM. Table 1 further subdivides the South African unit trust industry according to ASISA's Tier 2 and Tier 3 classifications of unit trust funds. These classifications are further discussed below.

Figure 1 below provides a detailed overview of the South African unit trust industry from Q1 2013 to Q1 2019, as per ASISA's Tier 1 classifications. Before 2013, ASISA used different Tier 1 classifications, and as such, Figure 1 only shows data from 2013. The increase in total industry AUM over the period can be observed from Figure 1. In addition, the table in Figure 1 indicates the total AUM in billions of rand as well as the percentage of total industry AUM for each Tier 1 classification for the period Q1 2013 to Q1 2019. Unit trust funds classified as South African will be the focus of this study, since they account for the overwhelming majority of industry AUM.

Total AUM per ASISA Tier 1 classification

	Q1 2013	% Total	Q1 2014	% Total	Q1 2015	% Total	Q1 2016	% Total	Q1 2017	% Total	Q1 2018	% Total	Q1 2019	% Total
Global	58 830	4%	90 392	6%	123 384	7%	159 320	8%	175 559	8%	184 960	8%	216 938	9%
Regional	12 751	1%	17 337	1%	19 667	1%	17 600	1%	17 279	1%	16 837	1%	19 777	1%
Worldwide	13 725	1%	23 205	2%	29 492	2%	35 574	2%	40 171	2%	38 644	2%	48 292	2%
South African	1 229 2	94%	1 407 4	91%	1 602 0	90%	1 707 5	89%	1 836 7	89%	1 937 8	89%	2 099 1	88%

■ South African ■ Worldwide ■ Regional ■ Global

Figure 1: Total AUM of the South African unit trust industry as per ASISA Tier 1 classifications (ASISA, 2019).

As illustrated in Table 1 on the previous page, unit trust funds classified as South African are further divided into equity, multi-asset, real estate and interest-bearing classifications, or sectors, which are known as Tier 2 classifications (ASISA, 2018). Tier 2 classifications determine the type of asset, or asset class, such as equity, real estate, interest bearing, or multi-asset classes, in which the underlying unit trust funds may

invest (ASISA, 2018). As the classifications imply, equity funds invest in listed equities, real estate funds invest in shares issued by listed property companies and real estate investment trusts, whereas interest bearing unit trust funds invest exclusively in money market, bond and other interest earning securities (ASISA, 2018). In contrast, multi-asset funds are unit trust funds that invest across the spectrum of asset classes such as listed equities, government bonds, corporate bonds, listed property and money market instruments (ASISA, 2018).

Figure 2 below depicts the AUM of South African focused unit trust funds as per their Tier 2 classifications for the period Q1 2013 to Q1 2019. Before 2013, ASISA used different Tier 2 classifications, therefore Figure 2 only shows data from 2013. The table in Figure 2 illustrates the total AUM in billions of rand as well as the total number (#) of unit trust funds in each South African Tier 2 classification as at the end of each period. As can be seen from Figure 2, South African focused unit trust funds are dominated by equity and multi-asset funds, which collectively comprised a combined 1055 funds as at Q1 2019. Those 1055 funds collectively accounted for close to 69% of the R2.1 trillion that was invested in South African focused unit trust funds as at Q1 2019 (ASISA, 2019). According to ASISA (2019), equity funds made up more than R400 billion in AUM as at Q1 2019, whereas multi-asset funds accounted for more than R1 trillion in AUM.

AUM of South African focused unit trust funds as per ASISA Tier 2 classification

	Q1 2013	# Funds	Q1 2014	# Funds	Q1 2015	# Funds	Q1 2016	# Funds	Q1 2017	# Funds	Q1 2018	# Funds	Q1 2019	# Funds
Interest Bearing	384 719	101	396 510	108	394 086	139	405 422	142	461 211	153	514 646	150	596 507	149
Real Estate	49 295 3	32	47 036 6	38	67 756 1	44	69 644 1	52	75 802 9	56	69 187 3	57	64 631 8	58
Multi Asset	533 252	491	655 849	506	778 925	587	872 624	667	932 149	732	959 308	739	1 037 25	757
Equity	262 023	223	308 031	246	361 255	258	359 853	273	367 586	308	394 715	315	400 712	298

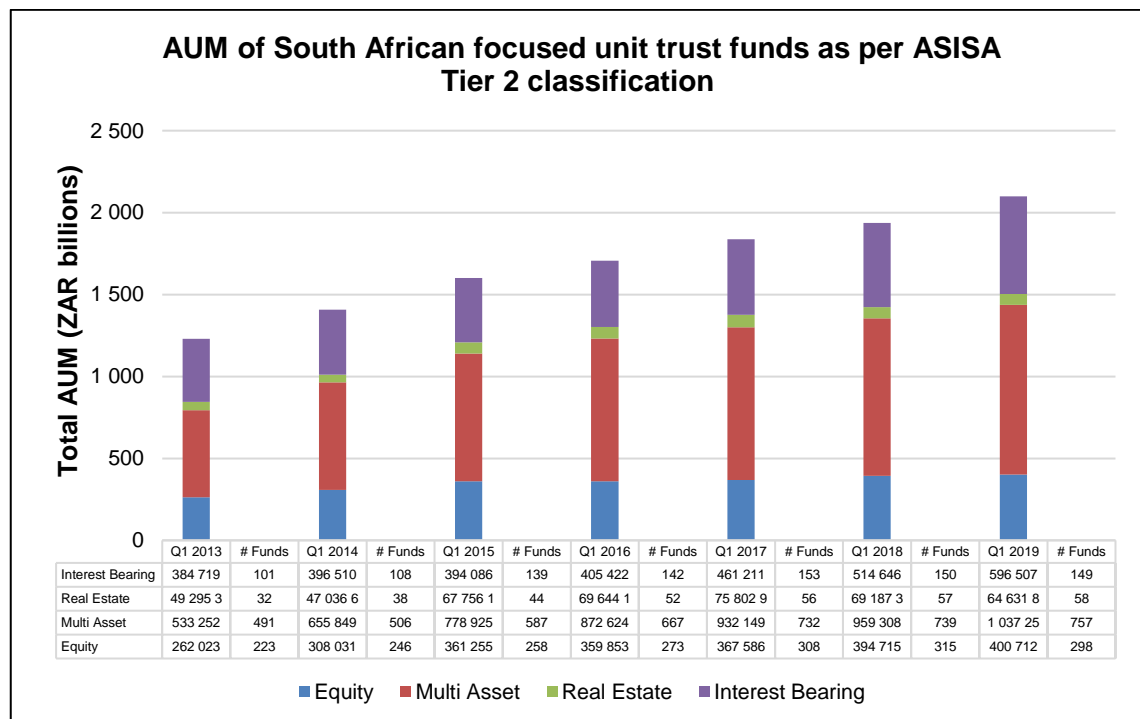■ Equity   ■ Multi Asset   ■ Real Estate   ■ Interest Bearing

Figure 2: Total AUM and number of funds of South African focused unit trust funds as per ASISA Tier 2 classifications (ASISA, 2019).

Within the equity fund classification, general equity funds accounted for more than 87% of the R400,7 billion that were invested in the equity fund sector as at Q1 2019 (ASISA, 2019). Within the multi-asset classification above, multi-asset high equity funds, which are better known as balanced funds in SA, accounted for more than 50% of the R1,037 trillion that were invested in the multi-asset sector as at Q1 2019 (ASISA, 2019). This information is presented in Figure 3 and in Figure 4 on page 12, respectively. In addition to the above statistics, the largest individual unit trust funds in SA, as measured by AUM, existed in the multi-asset high equity sector as at end Q1 2019 (ASISA, 2019).

General equity funds are mandated to invest in listed equites across all industries and across the entire range of large capitalisation, medium capitalisation and small capitalisation shares (ASISA, 2018). Balanced funds are mandated to invest in listed equity, bond, money market and property markets and can have a maximum effective equity exposure of up to 75% (ASISA, 2018). General equity funds and balanced funds fall under ASISA's Tier 3 fund classifications, which subdivides Tier 2 classifications into narrower categories which more accurately describes the core investment focus of the underlying unit trust funds (ASISA, 2018).

Figure 3 on page 12 categorises South African equity funds according to their Tier 3 classifications, whereas Figure 4 on page 12 categorises South African multi asset funds according to their Tier 3 classifications. Figure 3 and Figure 4 both provide a breakdown of AUM per Tier 3 classification between the period Q1 2014 and Q1 2019. The table in each figure illustrates the total AUM in billions of rand as well as the number (#) of funds per Tier 3 classification as at the end of each period. Before 2014, ASISA used different Tier 3 classifications. Therefore, both Figure 3 and Figure 4 only show data from 2014.

As can be seen from Figure 3 and Figure 4, respectively, general equity funds and multi-asset high equity (balanced) funds represent the two largest fund classifications in the South African equity and multi-asset sectors. In addition, general equity and balanced funds represent the two largest fund sectors in the South African unit trust industry, with more than R351 billion and R523 billion, respectively, invested in these funds as at Q1 2019 (ASISA, 2019). As at Q1 2019, there were 235 general equity funds and 246 balanced funds in existence SA (ASISA, 2019). Since general equity funds and multi-asset high equity funds make up the two largest fund sectors in terms of AUM amongst South African focused unit trust funds, they will be the focus of this study.
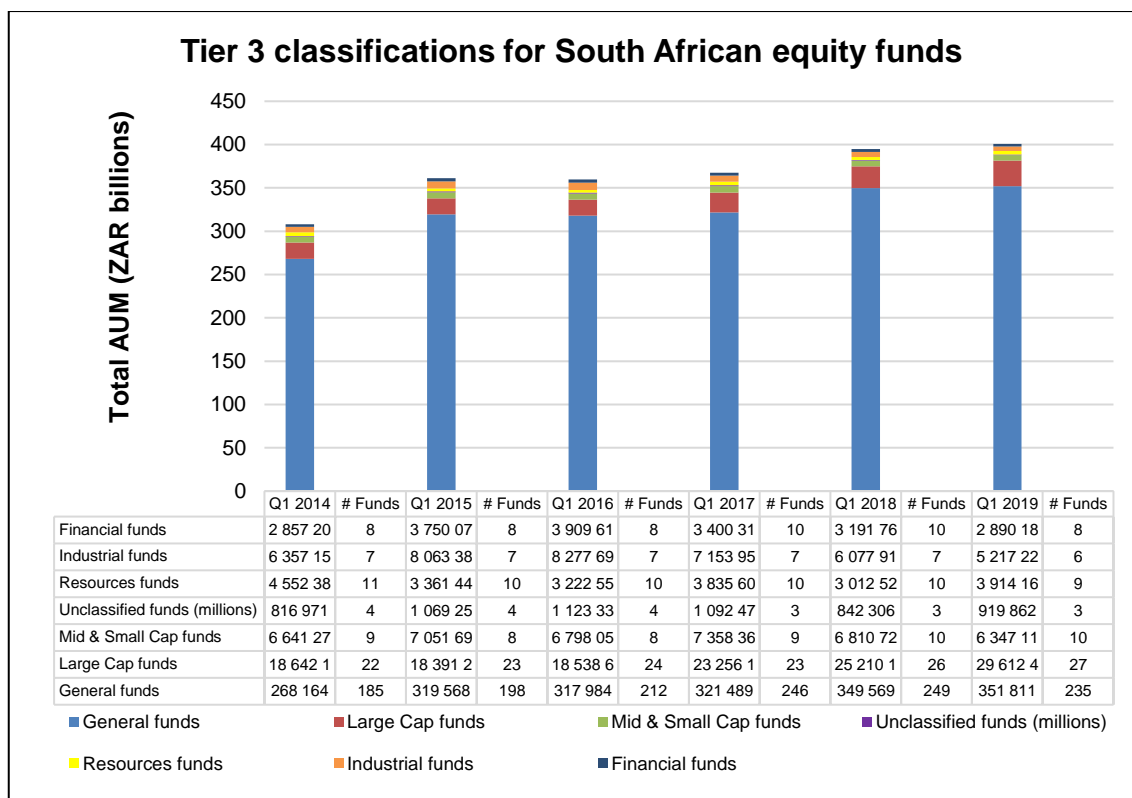
Tier 3 classifications for South African equity funds

	Q1 2014	# Funds	Q1 2015	# Funds	Q1 2016	# Funds	Q1 2017	# Funds	Q1 2018	# Funds	Q1 2019	# Funds
Financial funds	2 857 20	8	3 750 07	8	3 909 61	8	3 400 31	10	3 191 76	10	2 890 18	8
Industrial funds	6 357 15	7	8 063 38	7	8 277 69	7	7 153 95	7	6 077 91	7	5 217 22	6
Resources funds	4 552 38	11	3 361 44	10	3 222 55	10	3 835 60	10	3 012 52	10	3 914 16	9
Unclassified funds (millions)	816 971	4	1 069 25	4	1 123 33	4	1 092 47	3	842 306	3	919 862	3
Mid & Small Cap funds	6 641 27	9	7 051 69	8	6 798 05	8	7 358 36	9	6 810 72	10	6 347 11	10
Large Cap funds	18 642 1	22	18 391 2	23	18 538 6	24	23 256 1	23	25 210 1	26	29 612 4	27
General funds	268 164	185	319 568	198	317 984	212	321 489	246	349 569	249	351 811	235

■ General funds ■ Large Cap funds ■ Mid & Small Cap funds ■ Unclassified funds (millions)
■ Resources funds ■ Industrial funds ■ Financial funds

Figure 3: ASISA Tier 3 classifications for South African equity funds (ASISA, 2019).

Tier 3 classifications for South African multi-asset funds

	Q1 2014	# Funds	Q1 2015	# Funds	Q1 2016	# Funds	Q1 2017	# Funds	Q1 2018	# Funds	Q1 2019	# Funds
Income funds	105 065	77	114 822	85	126 375	97	127 637	106	138 807	105	167 754	113
Flexible funds	45 064 5	104	47 898 3	111	50 532 7	111	59 045 7	119	60 982 6	109	59 458 1	100
High Equity funds	298 605	136	363 307	165	414 337	197	457 309	222	482 114	235	523 597	246
Medium Equity funds	37 524 9	63	47 953 1	76	48 465 5	90	52 997 1	94	47 700 8	101	55 953 1	104
Low Equity funds	168 405	118	203 127	142	230 927	163	232 738	182	226 889	180	226 651	183
Target Date funds	1 183 58	8	1 817 03	8	1 985 37	9	2 420 55	9	2 814 12	9	3 838 81	11

■ Target Date funds ■ Low Equity funds ■ Medium Equity funds ■ High Equity funds ■ Flexible funds ■ Income funds
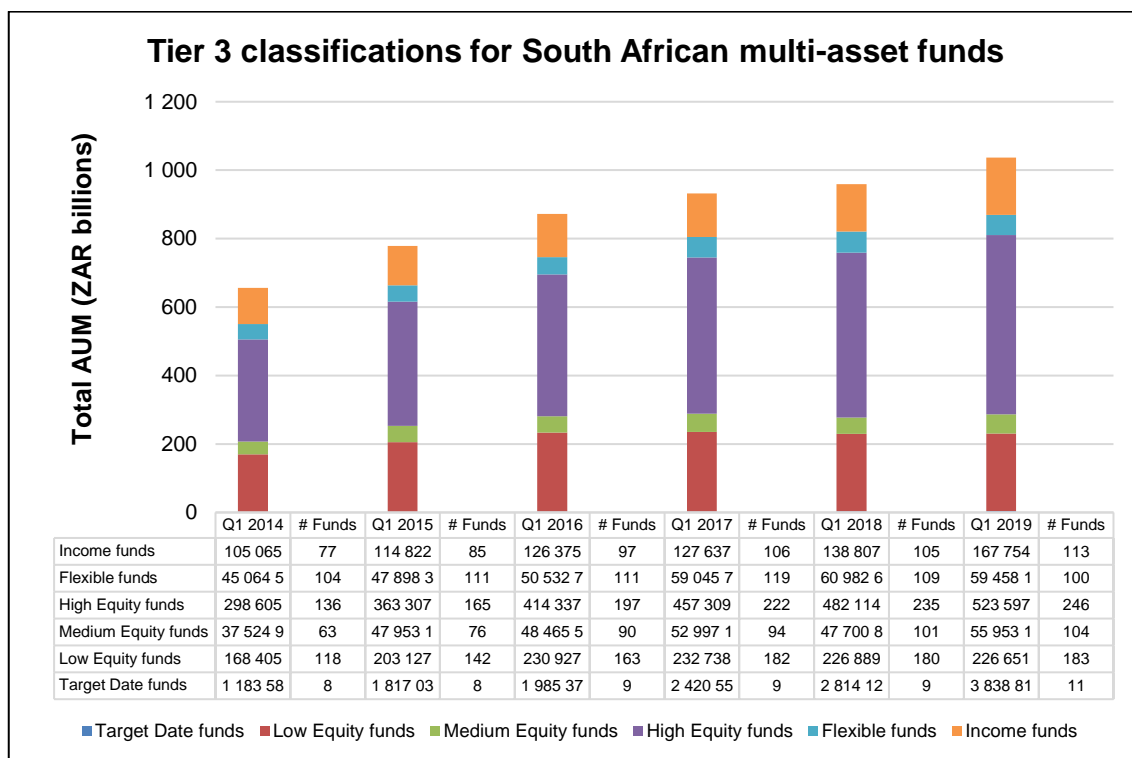
Figure 4: ASISA Tier 3 classifications for South African multi-asset funds (ASISA, 2019).

Despite the large number of general equity and balanced funds available to South African investors, these unit trust sectors remain highly concentrated, with the ten largest funds in each sector accounting for 43% and 84% of total sector AUM, respectively, as at Q1 2019 (ASISA, 2019). Table 2 below lists the ten largest funds in each of the South African general equity and balanced fund sectors as well as the percentage of total classification AUM that the ten largest funds in each classification account for as at Q1 2019.

Table 2: AUM of the ten largest funds in each of the general equity and balanced fund sectors as at Q1 2019

General Equity Funds	Fund Size	Balanced Funds	Fund Size
Allan Gray Equity A	R41 517 784 954	Allan Gray Balanced A	R157 413 547 161
Coronation Top 20 A	R20 802 854 316	Coronation Balanced Plus A	R91 687 345 144
Prudential Core Value F	R20 114 857 898	Investec Opportunity A (Spliced)	R44 226 542 990
Old Mutual Investors A (Spliced)	R12 218 073 871	Foord Balanced A	R32 262 554 437
Nedgroup Inv Rainmaker A	R11 872 977 017	Discovery Balanced	R26 332 967 799
Fairtree Equity Prescient A1	R11 252 563 380	Prudential Balanced A	R23 389 888 867
Investec Equity A (Spliced)	R9 317 227 841	PSG Wealth Moderate FoF D	R20 597 719 505
PSG Wealth Creator FoF D	R7 672 968 687	SIM Balanced A (Spliced)	R18 604 751 332
SIM General Equity A (Spliced)	R7 607 264 024	Investec Managed A (Spliced)	R15 118 763 065
Coronation Equity A (Spliced)	R7 250 887 425	PSG Balanced A	R12 280 877 865
Top 10 Total	**R149 627 459 413**	Top 10 Total	**R441 914 958 165**
ASISA Classification Total	**R351 811 289 182**	ASISA Classification Total	**R523 597 268 062**
Top 10 Concentration	**43%**	Top 10 Concentration	**84%**
Total number of funds in sector	**235**	Total number of funds in sector	**246**

Source: Morningstar, 2019.

Interestingly, Table 2 illustrates the preference for active management in South Africa, as all the funds listed in Table 2 are actively managed unit trust funds. Active unit trust funds make active investment decisions as they endeavour to outperform a specific benchmark. In contrast, passive unit trust funds do not make active investment decisions and only strive to mimic the performance of a specific index such as the Johannesburg Stock Exchange (JSE) All Share Index (ALSI). Therefore, the objective of a passive fund, or a passive investment strategy, is to deliver returns as close to the index as possible.

Although the PSG Wealth Moderate FoF and the PSG Wealth Creator FoF are funds-of-funds, their underlying holdings are dominated by actively managed unit trust funds. Fund-of-funds, also known as multi-manager funds, are unit trust funds that invest in other unit trust funds, instead of investing directly in equites or other asset classes. As such, their returns are informed by the returns delivered by the underlying unit trust funds in which these funds invest.

More importantly, and specifically relevant for the purposes of this study, Table 2 points to the existence of several extremely large funds as well as the existence of a very long tail of smaller funds in both the general equity and balanced fund sectors, with individual fund size ranging from well over a hundred billion rand to as small as a few million rand (ASISA, 2019). This occurrence is best explained by the fact that past winners, or top performing funds, rank amongst the most preferred investment alternatives and therefore attract a large amount of fund inflows (Bessler et al., 2016).

However, authors such as Chen et al. (2004), Zhu (2018) and Bessler et al. (2016) have found that increased fund size negatively impacts fund performance. In contrast, Barber et al. (2016) posit that there is a strong positive relationship between fund flows and performance. Given the mixed results that have been delivered by previous studies that have attempted to analyse the relationship between unit trust fund size and performance, it would be interesting and valuable to determine whether the large fund sizes documented in Table 2 have had any impact on the performance achieved by those funds relative to their smaller peers.

With more commentators, such as Clayton (2019), pointing to the potential benefits that small unit trust funds enjoy over their larger peers, the question becomes whether those potential benefits have translated into superior performance and whether, in turn, there are any diseconomies to scale in the South African asset management industry. As such, this study will attempt to identify whether a relationship exists between unit trust fund size and performance in the South African asset management industry. The following section provides a detailed overview of the literature on the relationship between unit trust fund size and performance.

2.3.   The relationship between unit trust fund size and performance

Numerous studies have focused on analysing unit trust performance and the factors that contribute to unit trust performance (Sharpe, 1966; Ferreira et al., 2013; Barber et al., 2016). One of the factors that have drawn a lot of research attention is the impact of unit trust fund size on performance, with Ferreira et al. (2013) citing mutual fund size and its impact on fund performance as one of the most studied variables in mutual fund research. With past winner funds naturally ranking amongst the most preferred investment alternatives, such past winners become the beneficiaries of large investment inflows, increasing fund AUM. This raises the question to what extent does unit trust fund size impact fund performance, if any.

To date, many authors have studied the relationship between the size and performance of unit trust funds, pension funds and hedge funds. These studies have produced mixed

results and can broadly be summarised as follows: 1) a negative relationship exists between fund size and performance (Zhu, 2018); 2) no relationship exists between fund size and performance (Phillips, Pukthuanthong & Rau, 2018); 3) a positive relationship exists between fund size and performance (Basso & Funari, 2017); and 4) a quadratic and concave relationship exists between fund size and performance, which implies that an optimal fund size exists where fund performance is positively related to fund size up to a certain level of AUM, but where any increase in AUM beyond the optimal fund size has a negative impact on performance (Bodson, Cavenaile & Sougne, 2011).

The sections that follow will discuss the findings of previous authors who have studied the relationship between unit trust fund size and performance in more detail. In addition, the findings of studies that have focused on the unit trust size-performance relationship in the South African context will be discussed.

2.3.1. Negative relationship between unit trust fund size and performance

Numerous authors have found that a negative relationship exists between unit trust fund size and performance (Chen et al., 2004; Chan et al., 2009; Yan, 2008; Blake, Caulfield, Ioannidis & Tonks, 2014; Zhu, 2018; Bessler et al., 2016; de Resende Baima & da Costa Jr, 2006; Low, 2010). These findings imply that as unit trust fund AUM grows, the performance of such funds is adversely impacted.

In a study examining the relationship between unit trust fund size and performance using unit trust data spanning multiple decades, Chen et al. (2004) studied the size-performance relationship of US equity mutual funds between 1962 and 1999 and found that increased fund size erodes performance. However, Chen et al. (2004) found the effect of fund size on fund returns is more pronounced for funds that focus on small capitalisation stocks.

In another study of actively managed US equity mutual funds over the period 1995 to 2014, Zhu (2018) found a significant negative relationship between fund size and performance. Interestingly, Zhu (2018) found that the negative relationship between unit trust fund size and performance was more severe for small funds, whereas larger funds were characterised by lower decreasing returns to scale. Zhu (2018) does not provide any specific reason for this observation. However, considering the findings from Chen et al. (2004), it could be plausible that smaller funds have a bias towards small capitalisation stocks.

Chen et al. (2004) suggests that liquidity is one of the primary reasons why fund size erodes performance. Similarly, Yan (2008), who also found a negative relationship

between fund size and performance for actively managed US equity mutual funds, found liquidity to be the primary reason why increased fund size negatively impacts performance. This stems predominantly from a larger market price impact that is associated with larger trade orders initiated by larger funds, or due to funds holding less-liquid positions.

Consistent with the findings of Chen et al. (2004), Yan (2008) also found that the negative impact of fund size on performance is more severe for funds that hold less-liquid shares, such as small capitalisation shares, where liquidity is frequently lower than for large capitalisation shares. In fact, Yan (2008) did not find any evidence that small funds outperformed large funds where those large funds held the most liquid shares. Thus, Yan (2008) concludes that smaller funds only significantly outperform larger funds which are the least liquid. Both Chen et al. (2004) and Yan (2008) posit that an increase in the size of funds that hold small capitalisation shares, or illiquid holdings, increases both the trading costs and market impact costs of such funds, which subsequently impedes fund performance.

Related to liquidity, Chan et al. (2009) in their analysis of Australian equity funds during the period 1998 to 2001, found that large managers experienced market impact costs that were significantly more pronounced than those incurred by smaller managers. Thus, Chan et al. (2009) posit that large funds incur market impact costs, or transaction costs, that become prohibitively expensive as soon as a fund exceeds a certain fund size. Higher market impact costs may force fund managers to construct and manage their portfolios in a less than optimal way in an attempt to reduce the implicit market impact costs. As such, fund managers might have a bias towards larger and highly liquid stocks, they may be inclined to deviate less from their benchmark, or trade less than smaller funds, all of which could negatively impact fund performance (Chan et al., 2009). In contrast, smaller funds can trade a larger part of their portfolio more rapidly without incurring excessive transaction costs. As such, Chan et al. (2009) conclude that fund size does indeed detract from fund performance, citing the significant larger market impact costs incurred by larger funds as the primary reason for this phenomenon.

Where Chan et al. (2004) and Yan (2008) found that the impact of fund size on performance is more pronounced for funds focusing on small capitalisation shares, Chan et al. (2009) did not find this to be the case. Chan et al. (2009) found that the performance erosion effect due to increased fund size was the same for all funds in their sample, irrespective of whether the funds had low or high exposures to small capitalisation shares. Interestingly, however, Chan et al. (2009) found that large funds following an

active trading strategy are impacted more severely by increased fund size than those funds that are managed according to a less active strategy, such as a buy and hold, or passive, strategy. This observation should make intuitive sense as the reduction in trading activity significantly reduces the market impact costs (Chan et al., 2009).

In a study of equity funds in the United Kingdom (UK) spanning the period 1998 to 2008, Blake et al. (2014) also found that increased fund size negatively impacts fund performance. Consistent with other findings, Blake et al. (2014) conclude that the negative market impact costs incurred by the trading activities of larger funds is the most probable justification for the adverse effect that increased fund size has on performance.

Interestingly, and contrary to the findings at the individual fund level, both Chen et. al. (2004) and Yan (2008) found that increased AUM for the institution, or family, to which the fund belongs, increases individual fund performance. According to Chen et. al. (2004), this finding can mainly be ascribed to economies of scale that are achieved through lower trading commissions and higher lending fees that are obtainable at the organisational, or firm, level. In addition, fund institutions with higher AUM are in a much stronger position to employ specialised security analysts and provide professional trade execution, which could contribute towards superior fund performance (Bessler et al., 2016). Similarly, both Ferreira et al. (2013) and Yan (2008) found that fund performance is positively correlated to the size of the fund institution to which the fund belongs, citing economies of scale on fixed costs such brokerage fees, research expenses, marketing expenses and distribution costs at the family level.

The finding whereby a fund's own size erodes performance, but where increased AUM at the organisational level increases fund performance, is an important observation as it points to the fact that making an investment decision based on individual fund size alone might not be sufficient, nor prudent, for selecting future outperforming funds. Those making a case for the superior returns that can be achieved by smaller funds in the South African context, such as Clayton (2019), fail to point out the potential performance benefits that a fund might enjoy due to it being part of a large fund family.

In SA, the ten largest unit trust funds in both the general equity and multi asset high equity sectors, as listed in Table 2, all form part of a significantly larger fund organisation, or family (ASISA, 2019). Interestingly, the two largest equity funds as well as the two largest balanced funds in SA belonged to the two largest fund organisations, Allan Gray and Coronation Fund Managers respectively, as measured by total organisation AUM (ASISA, 2019). Therefore, individual fund size alone might fail to fully explain fund performance and it might be prudent to consider characteristics at the organisational

level alongside individual fund size characteristics, before making definitive conclusions about the relationship between unit trust fund size and performance (Ferreira et al., 2013; Yan, 2008).

Bessler et al. (2016) analysed fund size and the performance of US equity mutual funds spanning the period 1992 to 2007 at both the individual fund level as well as at the fund organisation level. At the organisational level, they distinguished between two measures of family size, namely, total AUM for the organisation as well as the absolute number of funds at the organisational level, known as family breadth. Consistent with the findings of Chen et al. (2004), Bessler et al. (2016) found that smaller funds outperform their larger peers. However, Bessler et al. (2016) also found that funds belonging to fund organisations with high total AUM generated higher returns than funds belonging to organisations with low total AUM although the difference in performance was found to be insignificant. Bessler et al. (2016) therefore concludes that increased returns to scale at the fund organisation level is inconsequential, which is contrary to the findings of Chen et al. (2004).

When family breadth was considered, Bessler et al. (2016) found that funds managed by organisations that manages only a few additional funds (low family breadth), significantly outperformed peer funds which formed part of fund organisations with high family breadth. This phenomenon is explained by the fact that high family breadth could cause diseconomies and complexity at the organisational level. According to Bessler et al. (2016) this can primarily be ascribed to "inefficient decision-making processes and higher coordination costs relative to their smaller peers" (p. 2). Moreover, organisational conflicts in organisations with high family breadth, such as where the organisation extend more support and resources to recently outperforming funds in an attempt to sustain their superior performance record, at the expense of other funds, could further explain this finding (Bessler et al., 2016). As a result, the greater the family breadth, the greater the probability of finding conflicts of interest among funds, and therefore, the greater the likelihood of finding unequal distribution in terms of research capacities and management resources between funds (Bessler et al., 2016).

Considering studies outside of the US and UK, de Resende Baima and da Costa Jr (2006) found a negative relationship between pension fund size and investment performance in their study of 28 Brazilian pension funds during the period 1998 to 2002. The authors posit that increased fund size reduces fund flexibility, which outweighs increased trading power and other economies of scale, such as a reduction in expense ratios, that come with increased fund size. Similarly, Low (2010) in her analysis of 65

Malaysian unit trust funds from 1999 to 2004, concluded that an increase in fund size negatively impacts fund performance. Low (2010) concludes that "as funds become larger, they tend to become less efficient in their operations" (p. 40).

To conclude, the literature reviewed points to the fact that individual fund size alone might not fully explain the relationship between fund size and performance. The findings from authors such as Chen et al. (2004), Ferreira et al. (2013), Yan (2008) and Bessler et al. (2016) suggest that fund performance could be more accurately explained when combining information on both fund size as well as the characteristics of the fund organisation to which the fund belongs. An important conclusion that can be drawn from the literature is that it would be prudent for investors and financial market participants to consider total AUM at the fund organisation level alongside individual fund size characteristics before making definitive conclusions about the perceived negative relationship between unit trust fund size and performance.

2.3.2. No relationship between unit trust fund size and performance

In contrast to those who have found a negative relationship between fund size and performance, some authors find no, or a statistically insignificant relationship, between unit trust fund size and performance (Kleiman & Sahu, 1988; Gregoriou & Rouah, 2002; Basso & Funari, 2017; Phillips et al., 2018; Reuter & Zitzewitz, 2010; Pastor, Stambaugh & Taylor, 2015). Stated differently, these authors find no evidence of diseconomies of scale amongst unit trusts, nor do they find any evidence that any variation, either positive or negative, in unit trust fund size affects unit trust performance in a statistically significant manner.

In their study of the entire US mutual fund industry between the period 1996 and 2009, Reuter and Zitzewitz (2010) found no evidence of diseconomies of scale in the US mutual fund industry. Contrary to other authors who have found a statistically significant negative relationship between unit trust fund size and performance, Reuter and Zitzewitz (2010) in their regression discontinuity approach, found statistically insignificant evidence that fund size erodes returns. As such, the authors conclude that any impact of fund size on performance is likely to be immaterial (Reuter & Zitzewitz, 2010). Similarly, in a study of actively managed US equity mutual funds between 1992 and 2010, Phillips et al. (2018) did not find statistically significant evidence that fund size affected fund performance. As such, Phillips et al. (2018) conclude that fund size does not impact fund performance directly and that the reason(s) for the statistically significant diseconomies of scale regarding unit trust performance, as found by others, still appears to be missing.

In an earlier study using mutual fund data for the 1970 to 1984 time period, Kleiman and Sahu (1988) also studied the relationship between mutual fund size and performance and found that smaller funds did achieve superior returns relative to their larger counterparts, however, the results were not statistically significant. As such, one can conclude that, in general, smaller funds do not deliver superior returns relative to their larger counterparts (Kleiman & Sahu, 1988).

Pastor et al. (2015) studied actively managed US equity mutual funds between 1979 and 2011 and found mixed evidence of whether fund size erodes performance, depending on the methodology that was used. Following a simple ordinary leased squares regression approach, Pastor et al. (2015) found a statistically significant relation between fund size and performance. However, the coefficient values were economically small, since a $100 million increase in fund size was expected to decrease fund performance by 0,00014% per month. In contrast, when applying a recursive demeaning procedure which eliminates the biases such as the presence of serial correlation in an ordinary leased squares regression, the impact of fund size on fund performance was found to be statistically insignificant, although a very slight negative relationship between fund size and performance did exist (Pastor et al., 2015).

Interestingly, Pastor et al. (2015) found a statistically significant negative relationship between the size of the active fund management industry and individual fund performance, implying that an increase in the size of the active mutual fund industry is associated with a decrease in performance of individual mutual funds. According to Pastor et al. (2015) this phenomenon can be ascribed to the fact that as more capital at the industry level chase opportunities to outperform, such opportunities become more elusive, causing fewer funds to benefit from such opportunities. However, there were no other specific reasons given that could explain the negative relationship between unit trust industry size and individual fund performance. To their knowledge, Pastor et al. (2015) are the first authors to provide evidence of decreasing returns to scale at the industry level.

Studying the relationship between fund size and performance of 276 hedge funds and funds of hedge funds between the period 1994 and 1999, Gregoriou and Rouah (2002) found no evidence that size had any impact on the performance of hedge funds or on the performance of funds of hedge funds. A fund of hedge funds is a pooled fund which invests in an underlying basket of hedge funds with different strategies, instead of investing directly in underlying stocks, bonds and other asset classes (Gregoriou & Rouah, 2002). Importantly, Gregoriou and Rouah (2002) conclude that current and

prospective investors in hedge funds and funds of hedge funds should not consider fund size when deciding between different investment alternatives but should rather focus on the long-term performance that funds have delivered, irrespective of their size.

Outside of the US mutual fund industry, Basso and Funari (2017) in their study of Western European equity mutual funds between 2006 and 2009, did not find a significant linear relationship between fund size and performance. Interestingly, however, it was found that larger funds, on average, tended to outperform smaller funds, thus indicating the presence of scale economies amongst mutual fund returns (Basso & Funari, 2017). A criticism of their study could be that the time period over which the study was conducted was not long enough to fully reflect different market cycles and that the chosen time period might have been one in which the larger funds happened to outperform due to market conditions that were more conducive towards larger funds outperforming. The existence of a positive relationship between unit trust fund size and performance will be discussed in the next section.

2.3.3. Positive relationship between unit trust fund size and performance

Those who have found a positive relationship between unit trust fund size and performance point to the existence of scale economies amongst unit trust funds, implying that an increase in unit trust fund size contributes positively towards the performance of such funds (Sharpe,1966; Ferreira et al., 2013; Sing, 2007; Filip, 2017; Basso & Funari, 2017). Sharpe (1966), however, found the positive relationship between fund size and performance of US mutual funds to be statistically insignificant. Similarly, Sing (2007) found that large unit trust funds in Singapore outperformed smaller funds, but the variation in performance between large and small funds were found to be statistically insignificant.

In their analysis of 260 Western European equity mutual funds, Basso and Funari (2017) found that large funds produced better performance than small funds, although the positive linear relationship between fund size and performance was found to be statistically insignificant. However, the actual performance differential between large and small funds were found to be statistically significant, which suggests the existence of scale economies amongst Western European unit trust funds (Basso & Funari, 2017). These findings imply that the reduction in expense ratios and other administrative costs, together with the ability of larger funds to invest more in the research effort, outweighs the potential sources of diseconomies to scale such as liquidity and market impact costs, as cited by Chen et al. (2004), Yan (2008) and Chan et al. (2009), amongst others.

In a study that focused on the size-performance relationship of unit trusts in emerging markets, Filip (2017) analysed the relationship between mutual fund size and performance in the Czech Republic, Hungary and Poland from the year 2000 to the year 2015 and found a positive relationship between fund size and performance in each of the three markets. Filip (2017) concludes that the mutual fund industries in these nations are still relatively undeveloped and in their respective growth phases, and therefore, individual funds can increase their AUM whilst maintaining efficiency. In addition, and rather importantly, Filip (2017) also note a positive size-performance relationship for unit trusts in other emerging markets such as India and Taiwan. In fact, Filip (2017) suggests that most of the studies that have investigated the size-performance relationship of mutual funds in markets outside of the US, have found that increased fund size positively contributes to fund performance.

Ferreira et al. (2013) studied the size-performance relationship of 16316 active equity mutual funds across 27 countries from 1997 to 2007, in what they believed was the largest and most comprehensive sample ever used to study the relationship between mutual fund size and performance. Ferreira et al. (2013) found that larger non-US equity mutual funds perform better than smaller funds, whilst it was exclusively in the US that smaller funds outperformed larger funds. These findings support the claims made by Filip (2017) which states that most studies on the size-performance relationship of unit trust funds outside of the US have found a positive relationship between fund size and performance.

Importantly, the above findings point to the fact that the negative relationship between fund size and performance that was found for US mutual funds, is not consistent across countries and can therefore not be regarded as a universal truth. In fact, for non-US funds increased fund size was associated with improved performance (Ferreira et al., 2013). According to Ferreira et al. (2013) this could be explained by the fact that the average US mutual fund was much larger in size than the average non-US fund, which makes it plausible that the adverse effects of liquidity and market impact costs are more pronounced for US funds due to their larger size. This would be consistent with the findings of Chen et al. (2004) who suggests that the negative relationship between fund size and performance for US mutual funds were due to liquidity constraints.

In addition, and consistent with the findings of Chen et al. (2004), amongst others, Ferreira et al. (2013) also found a statistically significant positive relationship between fund performance and fund family size, citing the fact that large fund organisations benefit more from attractive trading commissions and lending fees relative to their

smaller counterparts. Fixed research expenses, administrative expenses and trading fees can also be shared amongst funds and will have a smaller economic impact when those expenses are shared amongst a larger asset base as opposed to a smaller asset base (Ferreira et al., 2013). This finding was statistically significant for both US and non-US funds. Therefore, funds that perform better are more likely to be managed by a larger organisation with more AUM. As such, increased AUM should not necessarily be associated with a decrease in performance, as increased AUM is not always bad for performance (Ferreira et al., 2013).

Since the relationship between fund size and performance is not pervasive across countries, Ferreira et al. (2013) posit that country attributes may be superior at explaining fund performance than individual fund attributes. More specifically, Ferreira et al. (2013) found that funds perform better in countries with high levels of financial market development, strong legal institutions, liquid stock markets, as well as investor protection, irrespective of their size.

The findings of Filip (2017) and Ferreira et al. (2013) suggests that the proposed size-performance study is of specific interest and relevance to the South African unit trust industry, as firstly, the evidence of decreasing returns to scale for US mutual funds is not a universal truth, and secondly, SA is classified as an emerging market, yet it possesses the characteristics of a developed and mature financial market system (Department of Trade and Industry, 2019). It is therefore impossible to assume, or conclude, the most likely relationship between fund size and performance of South African unit trust funds by merely relying on the results of studies that were conducted outside of the South African unit trust industry.

2.3.4. Concave relationship between unit trust fund size and performance

A final group of authors have found a quadratic and concave relationship between unit trust fund size and performance. This finding implies that an optimal fund size exists whereby funds must first reach a minimum size in order to achieve adequate returns, but where returns are adversely impacted after a fund exceeds a certain level of AUM (Bodson et al., 2011; Indro, Jiang, Hu & Lee, 1999; Ammann & Moerth, 2005; Robu & Sandu, 2011). As such, these authors conclude that unit trust investment performance does depend on the size of unit trust AUM.

In a study of 683 actively managed US mutual funds spanning the 1993 to 1995 period, Indro et al. (1999) conclude "that the efficiency of an active investment management strategy depends on the size of net assets under management" (p. 85). Indro et al. (1999) found that unit trust funds must first reach a minimum asset level to cover their

operational costs, but after reaching a certain fund size, liquidity and market impact costs negatively impacts fund performance. This finding implies that a concave relationship exists between unit trust fund size and performance.

In a more recent study spanning 2926 mutual funds between 2000 and 2010, Bodson et al. (2011) found that the relationship between mutual fund size and performance was quadratic and concave rather than linear. Again, this finding implies that an optimal fund size exists at which performance is optimised, or maximised (Bodson et al., 2011).

Ammann and Moerth (2005) studied the impact of fund size on the performance of US hedge funds. Their sample consisted of 4014 hedge funds, which they argue was a much more comprehensive representation of the US hedge fund industry than the sample of 204 hedge funds and 72 funds of hedge funds used by Gregoriou and Rouah (2003). Ammann and Moerth (2005) found evidence of a statistically significant negative relationship between hedge fund size and return, but also found that the smallest funds underperform medium and large sized funds. The reason for this phenomenon is explained by the relatively higher expenses, administration costs and operational costs that smaller funds are required to absorb (Ammann & Moerth, 2005). As such, very small funds are at a strong disadvantage when competing with medium and large funds (Ammann & Moerth, 2005). The fact that a negative relationship exists between fund size and performance, but that very small funds perform worse than their medium and larger sized counterparts, speaks to the existence of a quadratic relationship between fund size and returns.

Robu and Sandu (2011), in their analysis of the correlation between fund size and performance of Romanian pension funds found that performance increased with size up to a total fund size of €25 million, but that performance decreased gradually as fund size increased beyond €25 million. Again, this provides evidence of a concave relationship between fund size and performance.

Importantly, the existence of a concave relationship between unit trust fund size and performance is not prevalent in all unit trust markets. Filip (2017) explicitly tested whether an optimal fund size existed for Czech, Hungarian and Polish mutual funds by making use of a quadratic regression model. However, their results were statistically insignificant. Therefore, Filip (2017) conclude that an optimal fund size does not exist for mutual funds within these countries.

2.3.5. The relationship between unit trust fund size and performance in the South African context

The literature reviewed thus far have provided an overview of the relationship between unit trust fund size and performance in markets outside of SA. Although the relationship between unit trust fund size and performance has been the subject of previous studies in SA, it is important to note that the topic has received limited scholarly attention in the South African context to date.

Hibbert (2003) in his analysis of South African equity funds spanning the period from January 1990 to December 1999 found that no statistically significant relationship existed between equity fund size and total, or risk-adjusted, return. Given that a statistically significant relationship did not exist between fund size and return, Hibbert (2003) also dismissed the idea that an optimal fund size, where returns are maximised, exists in the South African unit trust industry.

In addition, Molelekoa (2013) studying South African general equity unit trust funds between the period 2001 and 2011, found inconclusive evidence that a relationship exists between unit trust fund size and its performance. By implication, these findings also dismiss the idea that an optimal fund size exists in the South African unit trust industry. Similarly, and with a subsequent note to clients, van Andel (2014), did not find a correlation, either positive or negative, between the size of South African unit trust funds and the performance they were able to generate.

This contrasts to the findings of Pillay et al. (2010) who conducted a simulated study of equally weighted equity portfolios in South Africa during the period 1991 and 2008 and concluded that fund size was indeed a determinant of performance and that an optimal fund size did exist for South African unit trust funds. The findings of Pillay et al. (2010) therefore points to the existence of a concave relationship between fund size and performance for South African unit trust funds. However, the study was based on simulated portfolios and not on actual unit trust data. Therefore, the results should be interpreted with caution.

Consistent with the results achieved in international studies, South African studies that have attempted to determine the relationship between fund size and performance have also produced mixed results. However, the amount of scholarly attention that this topic has enjoyed in SA is extremely limited. Finally, the majority of prior studies that have attempted to determine the relationship between fund size and performance of South African unit trust funds come to the conclusion that there is no relationship between the size and performance of South African unit trust funds.

2.4. Conclusion

The relationship between unit trust fund size and performance have been studied extensively in countries outside of South Africa, with the literature producing inconsistent results, depending mostly on the country in which the analysis was conducted as well as the time period over which the study was conducted. The results of these studies point to the existence of either a positive, negative, concave or no directional relationship between unit trust fund size and performance. In addition, the findings of previous authors seem to suggest that the literature has not been able to come to a decisive conclusion regarding the cause, or reason behind, any directional relationship between unit trust fund size and performance (Phillips et al., 2018). Interestingly, authors such Ferreira et al. (2013) and Filip (2017) posit that country attributes may have better explanatory power than fund attributes in explaining fund performance. As such, country attributes might be the source behind the existence of any directional relationship between unit trust fund size and performance.

Irrespective of the source(s) behind the directional relationship between unit trust fund size and performance, an investigation into the relationship between fund size and performance is particularly relevant in the South African context. Firstly, limited research has been done on the relationship between unit trust fund size and performance to date, with the findings of those studies also delivering mixed results. Secondly, the literature fails to produce any recent studies between the size-performance relationship of South African unit trust funds. Given the growth in individual fund sizes and the growth of the South African unit trust industry over the past decade, it is worthwhile to revisit the size-performance relationship in the South African context in the absence of any recent scholarly articles.

Thirdly, and probably most importantly, it is imperative that South African investors make investment decisions based on criteria that are accurate and that have been verified in the South African context. Given the competitive nature of the South African unit trust industry, managers of smaller unit trust funds and/or smaller fund organisations often point to the existence of a negative relationship between unit trust fund size and performance. Assertions such as these could prove irresponsible, should they cause either current or prospective investors to consider fund size as an important factor on which to base their investment decisions, especially when such claims have not been unanimously verified in the South African context. Such claims are also misleading in the absence of any recent scholarly articles in the South African context, especially given the findings that both fund family characteristics and country characteristics might be

more important in explaining unit trust fund performance than individual fund characteristics.

It is beyond the scope of this study to explore the impact of country characteristics on the performance of unit trusts, just as it is beyond the scope of this study to explore other possible determinants of unit trust performance such as portfolio manager skill, past performance or fund family size, amongst others. This study will attempt to test the relationship between fund size and performance of South African unit trust funds. The study will expand on previous studies to include multi-asset high equity funds. As documented, the multi-asset high equity unit trust sector is not only the largest unit trust sector in SA, but also home to the largest individual unit trust funds in SA. Consistent with the literature reviewed, the study will also include general equity funds in SA. Importantly, given the inconsistency in findings from the literature reviewed, it is unlikely that the results from prior studies can be extended to the South African context without giving due consideration to the actual fund size and performance data of the South African unit trust industry. As such, the importance of research on the relationship between fund size and performance in the current industry context cannot be overstated.

CHAPTER 3: RESEARCH HYPOTHESES

3.1. Introduction

The literature reviewed points to the existence of several possible directional relationships between unit trust fund size and performance, if any. The objectives of this study will be twofold. Firstly, the study will determine whether a directional relationship exists between fund size and fund performance, and if so, whether such a relationship is statistically significant. Secondly, the study will attempt to answer the question of whether there is a difference in mean performance between small and large South African unit trust funds. These objectives will be met by means of hypothesis testing. The scope of the study will be expanded beyond equity funds and will include South African multi-asset high equity, or balanced, funds. By expanding the study to include balanced funds, the largest unit trust funds in South Africa, as measured by AUM, will form part of the study.

3.2. Hypotheses

To meet the objectives of the study, four hypotheses will be tested. These hypotheses are formulated and presented below.

3.2.1. Testing for a significant linear relationship between fund size and performance

To meet the first objective of the study, the following hypothesis will be tested by means of a simple linear regression analysis:

H_0:   There is no statistically significant linear relationship between unit trust fund size (UTFS) and unit trust fund performance (UTFP)

H_A: There is a statistically significant linear relationship between UTFS and UTFP

The slope (β) of the regression line will be indicative of the relationship that exists between UTFS and UTFP. Therefore, H_0 and H_A can be stated differently as:

H_0:   The slope of the regression line (β) is equal to zero

H_A: The slope of the regression line (β) is not equal to zero

The hypothesis formulated above will be tested for South African general equity (β_E) funds as well as balanced (β_B) funds. Therefore, two hypotheses are developed from the above and both will be tested in order to determine whether a linear relationship exists between unit trust fund size and the performance of general equity and balanced funds. H_0 and H_A can therefore be rewritten as:

$H1_0$: $\beta_E = 0$

$H1_A$: $\beta_E \neq 0$

$H2_0$: $\beta_B = 0$

$H2_A$: $\beta_B \neq 0$

3.2.2. Testing for a difference in performance between small and large funds

To meet the second objective of the study, unit trust funds will be grouped into four size categories, or quartiles, with quartile one representing the smallest 25% of funds, as measured by AUM, and quartile 4 representing the largest 25% of funds as measured by AUM. A one-factor analysis of variance (ANOVA) test will be conducted to determine whether the mean (μ) returns varied across the unit trust fund size categories. To achieve this, the following hypothesis will be tested:

H_0:   The mean returns are equal across all fund size categories

H_A: At least one fund size category has a different mean return

This can be stated differently as:

H_0: $\mu_1 = \mu_2 = \mu_3 = \mu_4$

H_A: At least one μ_i differs (i = 1, 2, 3, 4)

Again, the hypothesis above will be tested for the mean returns of South African general equity funds (μ_E) as well as balanced funds (μ_B). As such, two hypotheses will be tested to determine whether there is a difference in mean performance between small and large equity and balanced funds, respectively. H_0 and H_A above can therefore be rewritten as:

$H3_0$: $\mu_{E1} = \mu_{E2} = \mu_{E3} = \mu_{E4}$

$H3_A$:   At least one μ_{Ei} differs (i = 1, 2, 3, 4)

$H4_0$: $\mu_{B1} = \mu_{B2} = \mu_{B3} = \mu_{B4}$

$H4_A$:   At least one μ_{Bi} differs (i = 1, 2, 3, 4)

3.3. Conclusion

To meet the objectives of the study, four hypotheses were developed. These hypotheses are summarised in Table 3 on page 30. Chapter 4 will introduce and discuss the methodology to be used in testing these four hypotheses.

Table 3: Summary of hypotheses

Hypothesis	Description
$H1_0$:	$\beta_E = 0$
$H1_A$:	$\beta_E \neq 0$
$H2_0$:	$\beta_B = 0$
$H2_A$:	$\beta_B \neq 0$
$H3_0$:	$\mu_{E1} = \mu_{E2} = \mu_{E3} = \mu_{E4}$
$H3_A$:	At least one μ_{Ei} differs ($i = 1, 2, 3, 4$)
$H4_0$:	$\mu_{B1} = \mu_{B2} = \mu_{B3} = \mu_{B4}$
$H4_A$:	At least one μ_{Bi} differs ($i = 1, 2, 3, 4$)

CHAPTER 4: RESEARCH METHODOLOGY

4.1.   Choice of methodology

A deductive research approach was adopted to achieve the objectives of the study. As stated in the previous chapter, the primary objectives of the study were to determine whether a relationship exists between the size and the performance of equity and balanced unit trust funds, and, whether there was a difference in performance achieved by both large equity and balanced funds when compared to their smaller peers. In order to meet these objectives, four hypotheses were developed, as outlined in the previous chapter.

Previous studies that have attempted to test for a relationship between unit trust fund size and performance, have relied extensively on linear regression analysis to not only determine the direction of such a relationship, but also to quantify the relationship between fund size and performance (Hibbert, 2003). To preserve consistency with prior studies, simple linear regression analyses were utilised to determine whether a relationship exists between fund size, the independent variable, and performance, the dependant variable. Performance, or total return, were defined as the actual monthly total return per unit trust fund with dividends reinvested, net of fees and expenses. Fund size were defined as total AUM in millions of rand for each unit trust fund at month-end.

To determine whether a statistically significant difference existed between the mean performance of small and large unit trust funds, unit trust funds were grouped into four size categories, or quartiles, with quartile one representing the smallest 25% of funds, as measured by AUM, and quartile four representing the largest 25% of funds as measured by AUM. Monthly total returns for each fund in each respective size quartile was recorded. A one-factor analysis of variance (ANOVA) test was conducted to determine whether the mean monthly returns varied across the unit trust fund size categories.

Due to the quantitative nature of the study an explanatory research approach, with a positivist philosophy, was adopted to achieve the objectives of the study (Saunders and Lewis, 2018). In addition, cross-sectional time series unit trust data was used to test the hypotheses that were developed and presented in the previous chapter.

4.2.   Unit of analysis

South African unit trust funds over the ten-year period between the start of April (Q2) 2009 and end March 2019 were analysed. More specifically, monthly cross-sectional time series fund size and performance statistics of South African general equity unit trust

funds as well as balanced unit trust funds were analysed. Therefore, the units of analyses comprised monthly unit trust fund size and return statistics for both South African general equity funds and balanced funds over the ten-year study period. This formed a data series of 120 monthly reporting periods for each of the two classifications of unit trust funds on which the study was grounded.

According to Hibbert (2003), cross sectional time series data have been utilised extensively in international studies that have analysed mutual fund performance. Amongst these studies, total return, defined as the actual monthly total return per unit trust fund with dividends reinvested, net of fees and fund expenses, were also widely used to test for a relationship between fund size and performance (Hibbert, 2003). Fund size was defined as monthly AUM in millions of rand, for each unit trust fund analysed.

Furthermore, Droms and Walker (1996), who explored the relationship between mutual fund size and performance of 151 US equity mutual funds over the 1971 to 1990 period, posit that a benefit of using cross sectional, time series data is that the sample statistics are not specific to one fund or group of funds. In addition, the sample statistics, or parameter estimates, are measured over a long period of time, whilst being observable and measurable for all funds in the population over the envisaged time range. Therefore, time series data overcomes the challenge associated with a limited amount of data which is collected over shorter periods of time.

In addition, both Hibbert (2003) and Droms and Walker (1996) posit that a further advantage of time series data is that the various statistical tests are very demanding when accepting or rejecting the existence of a statistically significant relationship between the dependent and independent variables. "To accept the hypothesis that a coefficient is statistically different from zero, the impact of the independent variable must be considerable" (Hibbert, 2003, p. 23). This is due to the fact that the variables are tested over a long time period for a diverse group of funds, whilst using a relatively high (monthly) number of observations (Hibbert, 2003; Droms & Walker, 1996).

The reason for analysing South African unit trust fund data over a ten-year period was threefold. Firstly, the ten-year period accurately captured the growth experienced in the South African unit trust industry over the preceding decade. Secondly, ten years is typically considered long-term, or meaningful, in the investment industry and more accurately reflects the impact of various market and business cycles on the performance generated by the respective unit trust funds (Thune, 2019). A ten-year analysis period therefore more accurately reflects the true skill of unit trust managers to deliver investment returns over meaningful investment periods and should limit the impact of

luck experienced over shorter investment horizons, which could distort the shorter-term performance numbers, and which could lead to incorrect conclusions being made regarding the relationship between unit trust fund size and performance. Finally, no recent scholarly articles on the relationship between unit trust fund size and performance have been published in SA which spans the most recent ten-year investment period.

4.3. Population

The focus of the study was South African general equity and South African multi-asset high equity, or balanced, unit trust funds. General equity funds have been widely used as the unit of analysis in both international and South African studies that have attempted to determine the relationship between unit trust find size and performance (Chen et al. 2004; Zhu, 2018; Hibbert, 2003; Pillay et al, 2010; Molelekoa, 2013). Instead of focussing exclusively on general equity funds, the study was extended to include South African balanced unit trust funds. By including balanced funds as part of the study it was believed that the study would be more representative of the South African unit trust industry, as opposed to previous studies that have exclusively focused on general equity funds in determining the relationship between fund size and performance.

As defined by ASISA (2018), all unit trust funds comprising the general equity and balanced unit trust fund sectors, respectively, are subject to similar investment mandates, rules and restrictions. This made the total returns generated by the underlying general equity funds comparable, as all general equity funds are exposed to similar investment mandates and restrictions (ASISA, 2018). Similarly, the total returns generated by the underlying balanced funds were also comparable to one another as these funds are also guided by similar investment mandates and restrictions (ASISA, 2018). The only exception would be the presence of Shariah funds in either of the aforementioned unit trust sectors since these funds are managed according to Islamic law (PricewaterhouseCoopers, 2009). The definition of fund size, measured as total AUM in millions of rand, were similar for both general equity and balanced unit trust funds.

The population, therefore, encompassed the entire universe of unit trust funds classified as South African general equity and balanced funds as at the end of Q1 2019. As at the end of Q1 2019, there were a total of 235 South African general equity unit trust funds in existence (ASISA, 2019). Moreover, 246 South African balanced funds were in existence as at end Q1 2019 (ASISA, 2019).

4.4. Sampling method

Purposive sampling was used to select a sample of unit trust funds in South Africa that was best expected to contribute towards achieving the objectives of the study. Prior

studies on the size-performance relationship of unit trusts in South Africa, have limited their sample to general equity unit trust funds (Hibbert, 2003; Pillay et al., 2010; Molelekoa, 2013). In contrast, the sample of unit trust funds that were selected for this study were South African general equity unit trust funds as well as balanced unit trust funds that were in continuous existence during the ten-year study period which spanned the beginning of Q2 2009 to the end of Q1 2019.

Index-tracking funds and fund-of-funds in both the general equity and balanced fund unit trust categories were excluded from the sample. The exclusion of index-tracking funds and fund-of-funds was consistent with the methodology employed by both Ferreira et al. (2013) and Pastor et al. (2015). Index-tracking, or passive funds, purely attempt to mimic the performance of an index. As such, their performance is informed by the performance of the index which they track. As these funds do not make active investment decisions, the impact of fund size on performance is negligible for index-tracking funds. The returns achieved by fund-of-funds are informed by the returns delivered by the underlying unit trust funds in which these funds invest, for which the size-performance relationship would be more pronounced.

In addition, Islamic and/or Shariah compliant funds in both the general equity and balanced fund unit trust categories were excluded from the sample. These unit trust funds cannot freely invest in any security of their choice as they require all investments in the fund to strictly adhere to Islamic law or Shariah requirements (PricewaterhouseCoopers, 2009). Therefore, the performance of these funds will be informed by the securities that are eligible for inclusion in these funds, with the impact of fund size arguably being much less for such funds than for funds that are not bound by such mandate restrictions.

Multiple fund classes of a specific fund were removed to circumvent duplicate counting of fund size and performance (Ferreira et al., 2006; Chen et al., 2004). Different fund classes of the same fund are listed in the Morningstar database. These multiple fund classes of a specific fund are virtually similar to one another as they have the same returns before any fees and expenses, the same fund manager, the same underlying holdings and the same fund size, with the only difference between the different fund classes being the management fees charged by the fund manager (Ferreira et al., 2006). As such, there is a slight difference in net monthly performance between the different fee classes of the same fund. For the purposes of this study it was necessary to remove multiple fund classes of the same fund as it would introduce multiple monthly observations of fund size and performance for the same fund. The fund classes that were

kept and used in the analysis were the ones classified by Morningstar as the retail fund classes (Ferreira et al., 2006). This ensured that the net monthly returns were comparable amongst the different funds.

Finally, the funds included in the sample had to have all the required data points over the entire ten-year analysis period. Therefore, funds that had missing or incomplete data over the study period were also excluded from the sample. Although this was not ideal, the impact of this was thought to be negligible as only one general equity fund, the ABAX Equity Prescient fund, did not have complete data for the ten-year analysis period. There was no missing data for any of the balanced funds that were eligible for inclusion in the sample of balanced funds.

4.5.   Sample size

There were a total of 78 equity funds and 56 balanced funds, respectively, that were in continuous existence over the ten-year study period. Within the general equity fund category, 31 funds were classified as either index-tracking funds, fund-of-funds or Shariah compliant funds. One additional fund, the ABAX Equity Prescient fund, did not have complete data for the ten-year analysis period. Therefore, 32 funds were dropped, and 46 funds formed the sample of general equity unit trust funds.

Within the balanced fund category, 37 funds were classified as either index-tracking funds, fund-of-funds or Shariah compliant funds. No funds reported missing data. Therefore, 37 funds were dropped, and 19 funds formed the balanced fund sample. Although the sample of balanced funds were small, the monthly returns of all balanced funds within the sample were normally distributed over the ten-year study period whilst individual fund sizes covered the entire size spectrum. As such, the relatively small sample of balanced funds was thought to be representative of the balanced fund sector.

4.6.   Survivorship bias

The sample did suffer from survivorship bias as only funds that were in continuous existence during the ten-year study period were included in the sample. Survivorship bias is the phenomenon where failed funds are excluded from performance statistics since they no longer exist (Pawley, 2006). The survivorship bias present in the sample occurred from the fact that some funds either seized to exist or had been merged with other funds during the period of analysis. In the South African context, Pawley (2006) found that survivorship bias resulted in the overstatement of average unit trust performances since poor performing funds over multi-year periods are either liquidated or merged. According to Droms and Walker (1996), survivorship bias is a potential problem for all unit trust time series data sets.

The impact of survivorship bias is more pronounced for smaller funds, with Elton, Gruber and Blake (1996) concluding that "the results are clearly consistent with the fact that a larger percentage of small funds relative to large funds fail to survive, and funds that fail to survive have poorer performance than funds that do survive" (p. 1118). The implication of this is that surviving small funds mostly comprise of good performing funds, whereas larger surviving funds comprise of both good and bad performing funds. For the purposes of this study then, survivorship bias would only be considered a major limitation if a meaningful statistically significant negative relationship was found between fund size and performance, and more specifically, if the mean returns of smaller funds were significantly better than the mean returns of large funds.

From a practical point of view, the existence of survivorship bias introduced the problem of how to treat liquidated and merged funds during the analysis period. Funds that were liquidated during the analysis period were excluded from the sample as they did not have a performance history that spanned the entire study period. Merged funds were treated in such a way that if a fund from either the general equity or balanced fund categories merged into another fund in the same category, the surviving fund data, now consisting of the two merged funds, was used, whilst the pre-merger data of the acquired fund was removed from the sample as the acquired fund seizes to exist in its original form subsequent to the merger. This was consistent with the methodology employed by Droms and Walker (1996) as well as Hibbert (2003) and was required to maintain a constant number of data points, or observations, during the analysis period.

It is worth noting that it would have been possible to reduce the impact of survivorship bias by shortening the time period of the study (Hibbert, 2003). However, for the study to yield optimal results, it was important to conduct the analysis over a sufficiently long time series, as explained under section 4.2.

4.7. Research instrument

No specific research instrument was developed as secondary data was used to meet the objectives of the study. Monthly total return and fund size data was extracted from the Morningstar database for South African general equity as well as balanced unit trust funds. Morningstar is a global financial services company that compiles and analyses unit trust and financial market data.

Morningstar calculates fund total returns by including both capital appreciation and dividends, or income, whilst accounting for fees by deducting portfolio management fees, administrative fees and other fund expenses (Morningstar, 2019). Therefore, all total return performance numbers were quoted on a net of fees basis. Using net returns was

comparable to the performance measure used by authors such as Hibbert (2003), Droms and Walker (1996), Chen et al. (2004) and Phillips et al. (2018), amongst others. Using net returns was also deemed important as it would more accurately reflect the actual investment outcomes achieved by investors.

Fund size was measured as the month-end net assets, or AUM, of the respective unit trust funds (Morningstar, 2019). Monthly performance and fund size data were used since Morningstar report on both measures on a monthly basis. Furthermore, monthly fund size and performance data were used by previous authors such as Chen et al. (2004), Phillips et al. (2018) and Zhu (2018), amongst others. As such, it was envisaged that the research results would be comparable to prior studies that utilised monthly data to determine the relationship between fund size and performance. Lagged fund size was used in the analysis, which was similar to the methodologies employed by Chen et al. (2004) and Pastor et al. (2015). Therefore, fund size equalled the fund AUM at the end of the previous month, whereas the current month's net return was used.

Importantly, the month-end performance and fund size data reported by Morningstar are verified by all fund organisations in SA. Morningstar reports this data to all fund managers in SA and fund management companies report any discrepancies observed in the data. This further enhances the integrity of the data in the Morningstar database.

4.8. Data collection

Monthly total net return and size statistics were collected from the Morningstar database for general equity unit trust funds and balanced unit trust funds, spanning the ten-year analysis period between the start of Q2 2009 and the end of Q1 2019. This formed a data series of 120 monthly reporting periods for each of the two classifications of unit trust funds on which the study was based. The final data samples that were obtained from the Morningstar database and used in this study were the following:

- Total net monthly returns, per fund, for South African general equity funds that were in continuous existence between 1 April 2009 and 31 March 2019

- Total net monthly returns, per fund, for South African balanced funds that were in continuous existence between 1 April 2009 and 31 March 2019

- Monthly fund size, per fund, for South African general equity funds that were in continuous existence between 1 April 2009 and 31 March 2019

- Monthly fund size, per fund, for South African balanced funds that were in continuous existence between 1 April 2009 and 31 March 2019

Data cleaning began by identifying all general equity and balanced funds that existed at some stage during the ten-year analysis period. Funds that were liquidated during the analysis period were identified and removed. Funds that merged with a fund in another fund category were also removed as these funds seized to exist in their original fund categories and therefore it was safe to assume that their investment mandates were altered following the merger (ASISA 2018). If either a general equity fund or balanced fund merged with another fund in the same category that were in existence throughout the entire analysis period, the surviving fund data was used. In such a case, the pre-merger data of the acquired fund was removed as the acquired fund technically failed to exist throughout the ten-year study period. As mentioned, this was necessary to keep a constant number of fund data points throughout the study period.

Next, multiple fund classes of a specific fund was removed (Ferreira et al., 2006; Chen et al., 2004). The next step was to look for any missing performance and/or fund size data for those funds that were in existence throughout the study period. Funds that were included in the sample had to report information on monthly return statistics as well as AUM for each month of the analysis period. One fund, the ABAX Equity Prescient Fund, had incomplete fund size data. This fund was removed from the database.

Furthermore, all funds that were classified as index funds, tracker funds, fund-of-funds and multi-managed funds, were removed from the dataset. This was consistent with the methodologies used by Pastor et al. (2015), Ferreira et al. (2006) and Chen et al. (2004), amongst others. This was done manually after interpreting each funds' fact sheet, which indicates whether funds are passively managed or whether they are fund-of-funds. Finally, funds managed in accordance to Islamic law, or Shariah funds were removed from the dataset.

The final sample therefore consisted of 46 equity funds and 19 balanced funds that were in continuous existence throughout the study period. As such, there were a total of 5520 equity fund observations consisting of both fund size and fund performance and 2280 balanced fund observations consisting of both fund size and performance. The final monthly fund size and performance statistics for general equity funds as well as balanced funds were stored in Microsoft Excel spreadsheets. These monthly observations were used as the primary input into the regression analyses as well as the ANOVA tests.

4.9. Data analysis

Simple linear regression analyses were conducted to test hypotheses one and two. A regression analysis estimates and quantifies the relationship between the dependent and independent variables and can be used to determine the statistical significance

between dependent and independent variables (Wegner, 2016). Unit trust performance denoted the dependent variable and unit trust fund size denoted the independent variable. The linear regression equation is set out as follows:

$$y = \alpha + \beta x + \mathcal{E}$$

where:

y = the dependant variable, or unit trust performance

α = the intercept coefficient, or unit trust performance when fund size is zero, or irrelevant

β = the slope coefficient of the linear regression line

x = the independent variable, or unit trust fund size

$\mathcal{E}$ = the random error term

The regression analyses were conducted by regressing total net monthly returns for the sample of equity and balanced funds against the lagged monthly AUM of the respective samples of equity and balanced funds. The following regression model was produced and interpreted for both equity and balanced funds over the ten-year study period:

$$R_{it} = \alpha + \beta x_{it-1} + \mathcal{E}_{it}$$

where:

R_{it} = net return of fund i in period t

x_{it} = fund size of fund i at the end of period $t-1$

The β coefficients of the regressions were interpreted to establish the extent to which monthly fund returns were influenced by fund size. The β coefficient indicates the impact of the independent variable on the dependent variable (Wegner, 2016). Therefore, should the β coefficient be significantly different from zero, it would point to the existence of a statistically significant relationship between the dependent and independent variable. The error term ($\mathcal{E}$) was interpreted to quantify the margin of error within the regression model(s). The $\mathcal{E}$ variable captures all other factors, or variables, that influence the dependent variable other than those independent variables that have already been included in the model.

Durbin Watson statistics were calculated to test to what extent the data used in the analyses displayed serial correlation. Durbin Watson values closer to 2 would suggest

that low levels of serial correlation were present in the data (Wegner, 2016). In addition, the coefficient of determination (R^2) of each regression was interpreted. The R^2 measures the percentage of variation in the dependent variable, total net return, that is explained by the independent variable, fund size (Wegner, 2016). Therefore, the R^2 measures how strongly the dependent and independent variable are associated. As an example, a R^2 of 0.08 in the context of this study would mean that 8% of the variation in total net return is explained by fund size. All statistical tests referred to above was conducted at a 95% level of significance.

To test hypotheses three and four, unit trust funds were grouped into four size categories, or quartiles, with quartile one representing the smallest 25% of funds, as measured by AUM as at Q1 2019, and quartile 4 representing the largest 25% of funds as measured by AUM as at Q1 2019. This was done for both samples of equity and balanced funds. Monthly total returns throughout the ten-year study period for each fund in each respective size quartile was recorded. A one-factor analysis of variance (ANOVA) test was conducted to determine whether the mean monthly returns varied across the unit trust fund size categories, and thus, whether the mean monthly returns were dependent on the fund size categories in which the unit trusts were classified (Wegner, 2016).

The F-statistic was interpreted to test whether the difference in mean returns for the four groups of fund sizes were significantly different from zero (Wegner, 2016). This was done for both equity and balanced funds. As such, if the mean returns across the size groups were not significantly different, it was concluded that fund size had no influence on performance, implying that size and performance were statistically independent of each other (Wegner, 2016). In contrast, if mean returns across the fund size quartiles were found to be significantly different from zero, it was concluded that a statistically significant relationship existed between fund size and performance (Wegner, 2016). The confidence interval was set at 95%, which was consistent with what was used by previous authors (Hibbert, 2003); Molelekoa, 2013).

4.10. Limitations
The following limitations were worth noting. As is the case with all secondary data, it was assumed that the data collected from the Morningstar database was accurate for the entire measurement period.

Importantly, the sample consisted of general equity funds and multi-asset high equity funds that were in continuous existence between the start of Q2 2009 and the end of Q1 2019. Therefore, survivorship bias was present. Although the impact of survivorship bias could have been mitigated by conducting the study over a shorter time period of, it was

important to conduct the analysis over a sufficiently long time series for the study to yield optimal results (Hibbert, 2003).

Given that the sample only consisted of general equity funds and balanced funds, the sample did not represent the entire population of South African unit trust funds. Furthermore, since the study was only conducted for a select sample of South African unit trust funds, universal conclusions on the size-performance relationship could not be drawn.

This study only attempted to determine the relationship between fund size and performance. Other factors such as past performance, fund family size, country attributes, manager skill, trade execution, portfolio implementation, etc. that could also impact fund return are beyond the scope of this study and were not included in the analysis.

Finally, a drawback of conducting regression analyses whilst making use of time series data, is that the regression results might suffer from serial correlation. To overcome this limitation, the regression results were tested for serial correlation. In the event where the data displayed serial correlation, it was noted that the regression results should be interpreted with caution.

4.11. Conclusion

This chapter provided a detailed overview on the choice of methodology as well as the various factors that were considered in order to best meet the objectives of the study. In addition, the sampling method and data collection process was discussed. Finally, the statistical tests used to test hypotheses one to four were introduced and discussed and various limitations were noted. In the next chapter, the results of these statistical tests are presented.

CHAPTER 5: RESULTS

This chapter documents the descriptive statistics for each sample of general equity funds and balanced funds as well as the results from the four hypothesis tests. Firstly, the sample of 46 general equity funds as well as the sample of 19 balanced funds that formed part of the study, are presented. In addition, the descriptive statistics for the sample of general equity funds and the sample of balanced funds are presented. Next, the results from the regression analyses are presented. Following the regression results, the results from the ANOVA tests are presented. All statistical tests that were conducted to test the various hypotheses were done at a 95% level of significance.

5.1. Description of samples

Table 4 below and on page 43, lists the sample of 46 general equity funds in alphabetical order. Fund sizes are also included for each fund as at the start of the study period and as at the end of the study period. This provides an illustration of how the funds have grown over the ten-year analysis period.

As outlined in chapter four, only funds that were in continuous existence during the ten-year study period were included in the sample of general equity funds. The relevant fund class that was used for each fund is denoted by the letter following the name of each fund. As discussed in chapter four, the fund classes that were used for the purposes of this study were the ones classified by Morningstar as the retail fund classes. Therefore, the letter following each fund name refers to the retail fund class of said fund, as classified and verified by Morningstar.

Table 4: Sample of general equity funds

General Equity Funds	Fund size as at Q1 2009	Fund size as at Q1 2019
ABSA Prime Equity A	R45 750 004	R945 879 447
ABSA Select Equity A	R277 107 649	R2 792 138 260
Afena Equity Prescient A1	R10 491 232	R20 828 150
Allan Gray Equity A	R14 781 958 408	R40 666 369 639
Ashburton Equity A	R202 724 004	R432 042 378
Aylett Equity Prescient A1	R59 329 999	R1 500 183 669
Cadiz Equity A	R44 000 003	R105 588 340
Cannon Equity H4 A	R65 137 680	R20 455 822
Citadel SA Equity H4 B1	R1 919 150 001	R560 659 205
Community Growth Equity	R2 068 786 456	R92 878 287
Coronation Equity A	R1 605 535 289	R7 121 722 810
Coronation Top 20 A	R1 359 130 000	R20 192 501 719
Denker SCI Equity	R819 642 164	R1 776 673 181
Discovery Equity	R97 617 316	R2 786 251 016

Element Earth Equity SCI A	R392 340 005	R225 629 441
First Avenue SCI Focused Quality Eq A	R298 623 909	R343 372 630
FNB Momentum Growth	R121 737 786	R228 802 635
Foord Equity A	R415 259 999	R6 714 836 716
Harvard House BCI Equity A	R22 414 490	R136 880 967
Huysamer Equity Prescient A1	R15 680 002	R8 828 574
Investec Active Quants A	R266 383 583	R1 059 300 012
Investec Equity A	R3 307 658 512	R9 024 388 122
Investec Value A	R4 089 893 614	R4 282 965 970
Kagiso Equity Alpha A	R6 251 845	R296 606 997
Maestro Equity Prescient A	R13 760 000	R31 286 613
Marriott Dividend Growth R	R396 590 005	R4 063 877 201
MI-PLAN IP Beta Equity B2	R329 094 938	R39 956 712
Nedgroup Inv Growth A	R780 782 269	R1 102 871 252
Nedgroup Inv Rainmaker A	R7 457 776 959	R11 464 645 604
Nedgroup Inv Value A	R1 345 093 287	R1 981 477 443
Oasis General Equity A	R386 763 293	R482 508 375
Old Mutual Growth A	R974 620 529	R1 315 155 167
Old Mutual Investors A	R5 911 800 004	R11 748 677 357
Old Mutual Managed Alpha Equity A	R94 668 560	R2 079 388 832
Old Mutual Top Companies A	R665 819 997	R1 060 703 430
Prescient Equity A1	R152 914 999	R76 095 139
Prudential Core Value B	R1 509 970 002	R19 341 231 699
Prudential Dividend Maximiser A	R1 031 230 097	R4 535 718 494
Prudential Equity A	R896 707 714	R3 357 440 733
PSG Equity A	R209 951 252	R4 918 034 528
Sasfin BCI Equity A	R33 316 335	R178 409 783
Select BCI Equity A	R409 289 564	R384 280 640
SIM General Equity A	R751 389 998	R7 362 414 367
SIM Top Choice Equity A1	R195 890 166	R1 538 043 416
STANLIB Equity A	R1 685 380 003	R4 116 025 061
STANLIB SA Equity R	R1 135 369 999	R2 847 289 202

Source: Morningstar, 2019.

Table 5 on page 44, lists the sample of 19 balanced funds in alphabetical order. As before, fund sizes are included for each fund as at the start of the study period and as at the end of the study period. Only balanced funds that were in continuous existence during the ten-year study period were included in the sample of balanced funds. As was the case for the general equity fund sample, the relevant retail fund class that was used for the purpose of this study, is denoted by the letter following the name of each fund. Those fund classes have been classified and verified by Morningstar as the retail fund classes of each fund included in Table 5.

Table 5: Sample of balanced funds

Balanced Funds	Fund size as at Q1 2009	Fund size as at Q1 2019
Allan Gray Balanced A	R23 393 995 459	R155 520 264 987
Autus Prime Balanced A	R73 339 998	R255 457 417
Cadiz Balanced A	R28 390 317	R261 581 891
Coronation Balanced Plus A	R3 171 360 003	R90 475 230 617
Discovery Balanced	R84 377 342	R25 750 687 429
Foord Balanced A	R1 958 100 004	R32 411 975 521
Investec Managed A	R3 771 216 919	R15 144 273 329
Investec Opportunity A	R4 980 651 987	R44 851 240 104
Oasis Balanced D	R1 059 046 505	R1 003 234 114
Old Mutual Balanced A	R1 212 669 999	R11 492 492 778
Personal Trust Managed	R92 477 960	R1 459 685 035
Prescient Absolute Balanced A1	R121 482 062	R148 484 175
Prudential Balanced A	R340 845 998	R22 886 100 299
PSG Balanced A	R130 037 191	R12 166 448 539
Rezco Value Trend A	R110 949 043	R5 228 114 275
Select BCI Balanced A	R37 958 090	R483 165 565
SIM Balanced A	R697 149 503	R18 192 675 038
STANLIB Balanced A	R1 178 710 845	R4 605 684 977
STANLIB Inflation Plus 5% B1	R1 197 988 528	R256 605 593

Source: Morningstar, 2019.

Table 6 below indicates the descriptive statistics for the sample of 46 general equity funds used in the analysis. A total of 5520 monthly observations for both return and fund size was recorded over the ten-year analysis period.

Table 6: Descriptive statistics of the sample of general equity funds

Monthly Return		Fund Size	
Count	5520	Count	5520
Mean	0,01005808	Mean	3 191 031 989
Median	0,010013	Median	1 159 719 563
Standard Deviation	0,032698235	Standard Deviation	6 028 199 830
Kurtosis	0,23457494	Kurtosis	18,174
Skewness	0,259542523	Skewness	3,903
Minimum	-0,119153	Minimum	1 664 342
Maximum	0,189905	Maximum	44 289 973 888

For the sample of equity funds, the average monthly return was just over 1%, whereas the average fund size was just over R3 billion. The highest monthly return was 18,99% and the lowest monthly return was -11,92%. The monthly return statistics were normally

distributed, indicated by the small difference between the mean and median values as well as by the low kurtosis and skewness values.

The variation in general equity fund size was extremely large, with the smallest monthly fund size being recorded at R1,664,342. The largest fund was over R44 billion in size. The disparity amongst fund size was further illustrated by the standard deviation being larger than the mean. The extreme variation amongst fund size points to the existence of outliers in the data sample. The non-normal distribution of fund size was indicated by the large difference between the mean and median fund size values as well as by the high kurtosis and skewness values. However, this was not surprising given the highly concentrated nature of the South African unit trust industry. As mentioned as part of the literature review, the South African unit trust industry is characterised by the existence of several extremely large funds and a long tail of much smaller unit trust funds. Therefore, although the fund sizes in the sample of 46 general equity funds varied widely, the sample was thought to be a fair and accurate representation of the South African unit trust industry, as it included funds across the fund size spectrum.

Table 7 below indicates the descriptive statistics for the sample of balanced funds. The 19 balanced funds in the sample provided a total of 2280 monthly observations for both return and fund size over the ten-year analysis period.

Table 7: Descriptive statistics for the sample of balanced funds

Monthly Return		Fund Size	
Observations	2280	Observations	2 280
Mean	0,008937011	Mean	13 095 213 900
Median	0,0087235	Median	2 293 803 685
Standard Deviation	0,021148352	Standard Deviation	25 459 821 878
Kurtosis	0,391672936	Kurtosis	10,007
Skewness	0,236338785	Skewness	3,053
Minimum	-0,055868	Minimum	27 109 353
Maximum	0,084674	Maximum	157 865 720 660

The average monthly return over the ten-year study period was 0,89%, whereas the average fund size was just over R13 billion. The highest monthly return was 8,47% and the lowest monthly return was -5,59%. The monthly return statistics were normally distributed, indicated by the small difference between the mean and median values as well as by the low kurtosis and skewness statistics.

The variation in fund size was extremely large, with the smallest monthly fund size being recorded at just over R27,1 million. The largest fund was well over R157 billion in size. The disparity amongst fund size was also illustrated by the standard deviation being larger than the mean. Once again, the extreme variation amongst fund size points to the existence of outliers in the data sample. The uneven distribution of the monthly fund size was further indicated by the high kurtosis and skewness statistics. A discussed, this was not surprising given the highly concentrated nature of the South African unit trust industry. Therefore, the limited sample of 19 balanced funds were thought to be a fair and accurate representation of the South African multi-asset high equity unit trust fund sector.

The next section presents the results of the regression analyses that were used to test hypotheses one and two. Simple linear regression analyses were used to determine whether a statistically significant relationship existed between the fund size and performance of South African unit trust funds.

5.2.   Linear regression results

The statistical results presented in this section indicate whether a relationship existed between unit trust fund size and performance at a 95% level of significance. The regression results for the sample of general equity funds are presented first, followed by the regression results for the sample of balanced funds. Table 8 below indicates the results of the regression analysis which was conducted to determine the relationship between unit trust fund size and performance of South African general equity funds.

Table 8: General equity fund regression results

Observations	5520
Intercept (α) Coefficient	0,010595037
Fund Size (β) Coefficient	-1,68271E-13
R Square	0,000962373
Fund Size (β) *P*-value	0,021173555
Durbin Watson Statistic	0,398768361

The intercept was positive which indicated, that on average, general equity funds delivered a monthly return of approximately 1,06% over the period Q2 2009 and Q1 2019 when fund size was extremely small. Because fund size can never be zero, the intercept coefficient has no intrinsic meaning, and therefore, provides no insight into the relationship between fund size and performance.

Importantly, the independent variable, fund size, had a negative impact on returns which implies that as fund size increases, returns were negatively impacted, albeit very slightly. For every R1 increase in fund size, monthly returns were expected to reduce by -1,68271E-13. Stated differently, for every R1 billion rand increase in fund size, average monthly returns were expected to decrease by 0,0168% during the ten-year study period. Therefore, a fund R1 billion in size was expected to deliver a monthly return of 1,06% less 0,0168%, which equates to a monthly return of approximately 1,04%. For each additional R1 billion growth in fund size, monthly returns were expected to decrease by a further 0,0168%. Converting the reduction in monthly returns to annual returns would mean that every R1 billion increase in fund size was expected to reduce net annual fund returns by 0,20%.

Although seemingly small, the negative relationship between fund size and performance was found to be statistically significant, as illustrated by the small p-value. Therefore, hypothesis one (H1) is rejected as the regression results point to the fact that the slope of the null regression line ($H1_0$) is not equal to zero. As such, it was found that a statistically significant negative relationship exists between unit trust fund size and performance for South African general equity funds.

The R^2 was extremely small which meant that only 0,096% of the variation in net monthly returns was explained by fund size. Although the association between returns and fund size was found to be extremely small, the relationship between fund size and performance was still found to be statistically significant. The data did display positive serial correlation as indicated by the Durbin Watson statistic of 0,398768361. However, this should not come as a surprise as time series data often displays serial correlation.

Positive serial correlation is present when the error terms from one time period are positively correlated with the error terms in the next time period. Serial correlation could introduce the problem of rejecting the null hypothesis when it should not be rejected. However, the purpose of the study was to determine the relationship between fund size and performance based on actual unit trust data. Since financial markets do move in cycles, certain market conditions could persist for long periods of time. Therefore, serial correlation is a common phenomenon in time series data sets consisting of economic or financial market data. Given the existence of serial correlation in the data, together with the fact that the negative slope of the regression line was extremely slight, it would be prudent to interpret the results with caution. Although the slope of the regression line was found to be different from zero, it was extremely close to zero.

Figure 5 below provides a graphical depiction of the relationship between fund size and performance. The blue plots illustrate the 5520 monthly returns and lagged monthly fund sizes for all the general equity funds that formed part of the study over the ten-year analysis period. The regression equation from Table 8 is also illustrated on Figure 5. The regression line, or trendline, is indicated by the downward sloping dashed red line. Given that $H1_0$ was rejected in favour of the alternative hypothesis, the downward sloping regression line can be interpreted as being not equal to zero for South African general equity funds. Therefore, the alternative hypothesis ($H1_A$: $\beta_E \neq 0$) was true at the 95% confidence level.
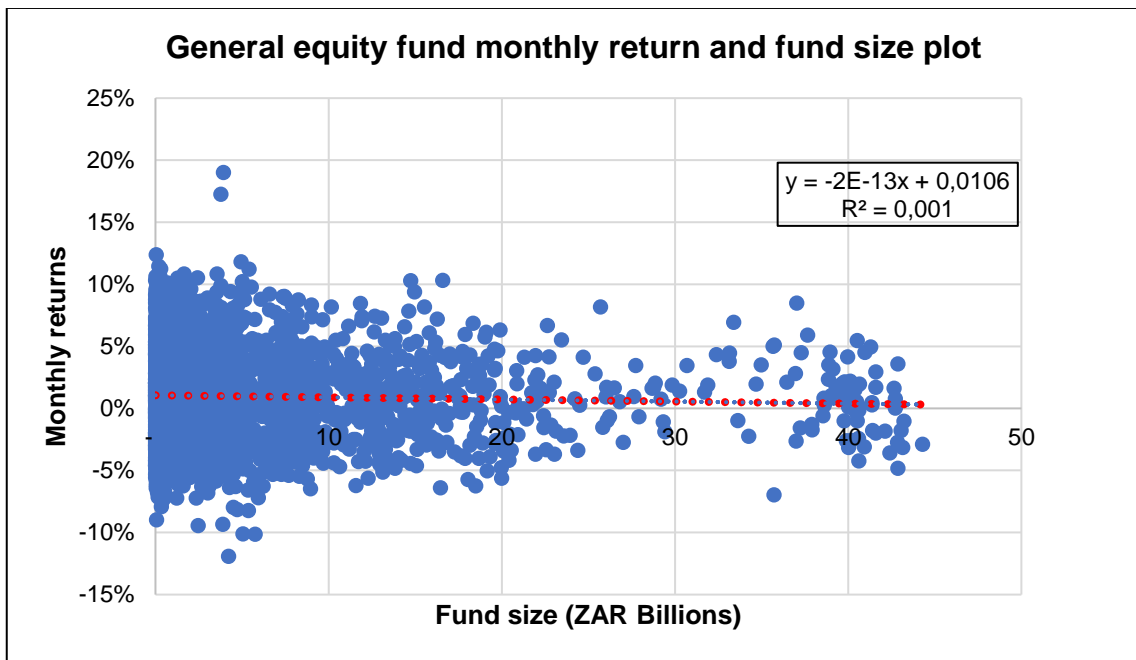

Figure 5: General equity fund monthly return and fund size plot (Morningstar, 2019).

Table 9 on page 49 indicate the results of the regression analysis which was conducted to determine the relationship between unit trust fund size and performance for South African balanced funds. As was the case for general equity funds, the intercept is positive, indicating that on average balanced funds delivered a monthly return of approximately 0,95% over the ten-year study period when fund size was extremely small. Because fund size can never be zero, the intercept coefficient has no intrinsic meaning, and therefore, provides no insight into the relationship between fund size and performance.

As can be seen from Table 9, fund size had a negative impact on returns, which implies that as fund size increased, returns were negatively impacted. The impact of fund size was less pronounced for South African balanced funds as net monthly returns was expected to reduce by -4,13131E-14 for every R1 increase in fund size. Stated

differently, for every R1 billion rand increase in fund size, monthly returns were expected to decrease by 0,0041% during the study period. Therefore, a fund R1 billion in size was expected to deliver a monthly return of 0,95% less 0,0041%, which equates to a monthly return of approximately 0,9459%. For each additional R1 billion growth in fund size, monthly returns were expected to decrease by a further 0,0041%. Converting the reduction in monthly returns to annual returns would mean that every R1 billion increase in fund size was expected to reduce net annual fund returns by 0,049%.

Table 9: Balanced fund regression results

Observations	2280
Intercept (α) Coefficient	0,009478014
Fund Size (β) Coefficient	-4,13131E-14
R Square	0,00247362
Fund Size (β) *P*-value	0,017548699
Durbin Watson Statistic	0,443755379

The negative relationship between fund size and performance for balanced funds was found to be statistically significant, illustrated by the small p-value. Therefore, the null hypothesis from hypothesis two ($H2_0$) is rejected as the regression results point to the fact that the slope of the regression line is not equal to zero. As such, it was found that a statistically negative relationship exists between unit trust fund size and performance for South African balanced funds.

Once again, the R^2 was extremely small as only 0,25% of the variation in net monthly returns was explained by fund size. Although the association between returns and fund size was found to be extremely small, the relationship between fund size and performance was still found to be statistically significant. The data did display positive serial correlation as indicated by the Durbin Watson statistic of 0,443755379. As was the case for general equity funds, it would be prudent to interpret the results with caution given the existence of serial correlation in the data, together with the fact that the negative slope of the regression line was extremely slight. Although the slope of the regression line was found to be different from zero, it was extremely close to zero.

Figure 6 on page 50 provides a graphical depiction of the relationship between fund size and returns as it plots the 2280 monthly returns and lagged monthly fund sizes for all the balanced funds that formed part of the study over the ten-year analysis period. The regression equation from Table 9 is also illustrated on the figure. The regression line, or trendline, is indicated by the downward sloping dashed red line. Given that $H2_0$ was

rejected in favour of the alternative hypothesis (H2$_A$), the downward sloping regression line can be interpreted as being not equal to zero for South African balanced funds. Therefore, the alternative hypothesis (H2$_A$: $\beta_B \neq 0$) was true at the 95% confidence level.

Balanced fund monthly return and fund size plot

$y = -4E-14x + 0{,}0095$
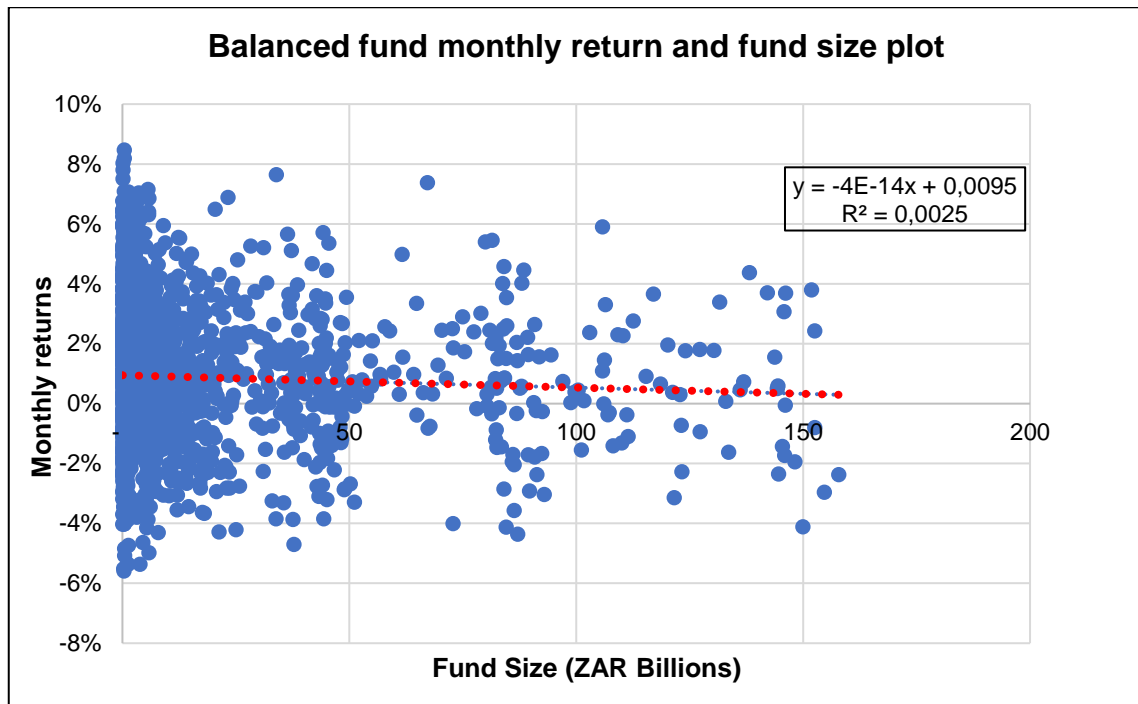$R^2 = 0{,}0025$

Figure 6: Balanced fund monthly return and fund size plot (Morningstar, 2019).

5.3.   Fund size ranking analysis

The second objective of the study was to determine whether a statistically significant difference existed in the mean performance between small and large South African unit trust funds. This section presents the results from the ANOVA tests which was used to test hypotheses three and four. The results for the sample of general equity funds are presented first, followed by the results for the sample of balanced funds.

Table 10 on page 51 presents the ANOVA output which was used to determine whether the mean returns delivered by general equity funds over the ten-year study period varied across the unit trust fund size quartiles. Quartile one represented the smallest 25% of funds, whereas quartile four represented the largest 25% of funds as at Q1 2019. All 5520 monthly return observations from the 46 general equity funds included in the study were allocated between the respective size quartiles. Twelve funds were grouped in each of quartile one and quartile four, respectively, whereas eleven funds were grouped in each of quartiles two and three. This distribution was determined by Microsoft Excel's statistical quartile ranking function, which allocated each fund to its corresponding fund size quartile. Given the number of funds (46) certain fund size quartiles consisted of 12 funds where others consisted of 11 funds.

Interestingly, Table 10 illustrates that the mean returns were lowest for the smallest size quartile of general equity unit trust funds and highest for the largest size quartile. This is illustrated by the column labelled "Average" in the summary output of Table 10. The mean returns achieved between the different unit trust size categories also increases from quartile one to quartile four. This points to the fact that the average returns achieved by the group of large funds were better than the returns achieved by the smaller groups of funds.

Table 10: Single factor ANOVA output for general equity funds

Anova: General Equity Funds (Single Factor)						
SUMMARY						
Groups	*Count*	*Sum*	*Average*	*Variance*		
Quartile 1	1440	1278,38396	0,887766639	10,49781702		
Quartile 2	1320	1291,34274	0,978289955	10,11000216		
Quartile 3	1320	1372,20503	1,039549265	9,394155759		
Quartile 4	1440	1610,1228	1,118140833	12,6021829		
ANOVA						
Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*
Between Groups	40,73784171	3	13,57928057	1,270260633	0,28274696	2,606519019
Within Groups	58966,88418	5516	10,69015304			
Total	59007,62203	5519				

However, the small F-statistic relative to the F-critical value, as well as the large p-value meant that hypothesis three ($H3_0$) could not be rejected. Although the mean returns increased as the fund size categories increased, it was not statistically significant. As such, it was concluded that the mean returns were equal across the fund size categories, that fund size had no influence on performance and that no statistically significant difference existed between the mean returns of the different fund size categories. Therefore, the mean monthly returns delivered by general equity unit trust funds were independent of the size category in which the unit trust funds were allocated. As such, the null hypothesis ($H3_0$: $\mu_{E1} = \mu_{E2} = \mu_{E3} = \mu_{E4}$) was not rejected.

Table 11 on page 52 presents the ANOVA output which was used to determine whether the mean returns delivered by balanced funds varied across the fund size quartiles. Quartile one represented the smallest 25% of balanced funds, whereas quartile four represented the largest 25% of funds as at Q1 2019. All 2280 monthly return observations from the 19 balanced funds that formed part of the study were allocated between the respective size quartiles. Five funds were grouped in each of quartile one to quartile three whereas four funds were grouped in quartile four. As was the case for

general equity funds, this distribution was determined by Microsoft Excel's statistical quartile ranking function. Given the uneven number of funds in the sample (19), it was inevitable that one fund size quartile was going to contain one less fund. This happened to be fund size quartile four.

Table 11 illustrates that the mean returns were lowest for the smallest size quartile of balanced funds. Funds in size quartile two delivered better mean monthly returns than size quartile one, whereas size quartile three delivered better average monthly returns than size quartile two. The average monthly returns achieved by the funds allocated to size quartile three was also the highest. The mean monthly returns generated by funds allocated to size quartile four, the largest size quartile, were slightly below the average monthly returns delivered by size quartile three but was better than the mean monthly returns delivered by both quartile one and quartile two. As before, this is illustrated by the column labelled "Average" in the summary output of Table 11.

Table 11: Single factor ANOVA output for balanced funds

Anova: Balanced Funds (Single Factor)						
SUMMARY						
Groups	*Count*	*Sum*	*Average*	*Variance*		
Quartile 1	600	453,73642	0,756227367	4,404986601		
Quartile 2	600	535,28901	0,89214835	4,359437418		
Quartile 3	600	592,37738	0,987295633	4,596223709		
Quartile 4	480	456,23061	0,950480437	4,533786918		
ANOVA						
Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*
Between Groups	18,14429374	3	6,048097915	1,352910132	0,25547962	2,60881262
Within Groups	10174,71192	2276	4,470435819			
Total	10192,85622	2279				

Once again, the small F-statistic relative to the F-critical value, as well as the large p-value meant that the difference in mean returns between the respective fund size quartiles were not statistically significant. As such, hypothesis four ($H4_0$) could not be rejected and it was concluded that the mean returns were equal across the fund size categories and that fund size had no influence on performance. Therefore, the mean monthly returns delivered by balanced unit trust funds were independent of the size category in which the unit trust funds were allocated. As such, the null hypothesis ($H4_0$: $\mu_{B1} = \mu_{B2} = \mu_{B3} = \mu_{B4}$) was not rejected.

5.4. Conclusion

In this chapter, the results from the statistical tests conducted to determine the relationship between fund size and performance were presented. $H1_0$ and $H2_0$ were rejected in favour of the alternative hypotheses. It can therefore be concluded that the slope of the regression line for both South African general equity funds and balanced funds are not equal to zero and that a statistically significant negative relationship exists between unit trust fund size and performance. This implies that as fund size grows, unit trust funds are expected to deliver decreased returns. However, although the slope of the regression lines for both general equity funds and balanced funds were not equal to zero, they were extremely close to zero. The extremely low R^2 statistics, together with the fact that the data displayed some existence of serial correlation, means that the results from the regression analyses should be interpreted with caution.

In contrast, the ANOVA tests produced results whereby $H3_0$ as well as $H4_0$ were not rejected. Therefore, the mean returns of small and large general equity as well as balanced unit trust funds were not significantly different from each other. It was therefore concluded that the mean returns for both general equity funds and balanced funds were equal across the respective fund size categories and were not influenced by fund size, despite the existence of an actual difference in the mean returns between the fund size categories. These results contradicted the findings of the regression analyses. Table 12 below summarises the results presented in this chapter. In the next chapter, the implications of these results are discussed.

Table 12: Summary of statistical results

Hypothesis	Description	Decision
$H1_0$	$\beta_E = 0$	Reject $H1_0$
$H2_0$	$\beta_B = 0$	Reject $H2_0$
$H3_0$	$\mu_{E1} = \mu_{E2} = \mu_{E3} = \mu_{E4}$	Do not to reject $H3_0$
$H4_0$	$\mu_{B1} = \mu_{B2} = \mu_{B3} = \mu_{B4}$	Do not to reject $H4_0$

CHAPTER 6: DISCUSSION OF RESULTS

The objectives of the study were twofold. Firstly, the study attempted to establish the relationship between unit trust fund size and performance for South African unit trust funds. The second objective of the study was to answer the question of whether a difference existed between the mean performance of small and large South African unit trust funds. Depending on the results achieved, the second objective of the study would also provide insights into whether a possible concave relationship existed between unit trust fund size and performance. To meet these objectives, four hypotheses were developed and tested, as outlined in Chapter Three. The results of the hypothesis tests are discussed below.

6.1.   The relationship between fund size and performance of South African unit trust funds

Both hypotheses one and two were rejected in favour of their alternative hypotheses, which stated that the slope of the linear regression line was not equal to zero. A statistically significant negative relationship between unit trust fund size and performance was found for both South African general equity and balanced unit trust funds. This finding is consistent with the findings of Chen et al. (2004), Chan et al. (2009), Yan (2008), Zhu (2018), Bessler et al. (2016) and Low (2010), amongst others, who found a negative relationship between unit trust fund size and performance in markets outside of South Africa.

In the South African context, the results from the linear regressions were inconsistent with the findings of Hibbert (2003), Molelekoa (2013) and van Andel (2014) who concluded that a statistically significant relationship did not exist between unit trust fund size and performance of South African unit trust funds. In contrast, the results from the linear regressions seem to be more consistent with the findings of Pillay et al. (2010) who found that fund size was a determinant of unit trust returns in SA and that increased fund size had a negative impact on fund returns after a specific fund size was reached. It is worth noting that although the relationship between unit trust fund size and performance was found to be significantly different from zero and negative, the relationship was extremely close to zero.

The literature reviewed in chapter two suggested that liquidity was one of the main reasons why fund size had a negative impact on performance. More specifically, Chen et al. (2004), Yan (2008), Chan et al. (2009) and Blake et al. (2014) found that decreased liquidity and its associated market impact costs was the primary reason why increased fund size erodes performance. These authors posit that smaller funds can trade a larger

part of their portfolio more rapidly without incurring excessive transaction costs, which positively contributes to performance. As such, the increased liquidity, flexibility and nimbleness possessed by smaller funds, which typically translates into lower market impact costs, is often cited in the literature as the primary reason as to why smaller funds achieve superior performance relative to their larger counterparts (Chan et al., 2009; de Resende Baima and da Costa Jr, 2006; Low, 2010).

The literature specifically points to the fact that larger funds are less nimble in their operations and that larger funds typically incur market impact costs that are much larger than those experienced by smaller funds (de Resende Baima and da Costa Jr, 2006; Chan et al., 2009; Low, 2010). More specifically, higher market impact costs may force fund managers to construct and manage their portfolios in such a way as to reduce market impact costs (Chan et al. 2009). As such, large funds might have a bias towards larger and highly liquid stocks, they may be inclined to implement smaller active positions relative to their benchmark, or trade less actively than smaller funds, all of which could negatively impact fund performance (Chan et al., 2009).

Given the large variation in size between South African general equity and balanced funds, it is plausible that liquidity, and its associated market impact costs, could be the primary reason behind the negative relationship between unit trust fund size and performance in SA. However, for South African general equity funds only 0,096% of the variation in net monthly returns was explained by fund size. Therefore, approximately 99,9% of the variation in net monthly returns were due to factors other than fund size. Similarly, for balanced funds, only 0,25% of the variation in net monthly returns was explained by fund size, which implies that 99,75% of the variation in net monthly returns are explained by factors other than fund size.

The low R^2 values discussed above point to the fact that fund size is a weak determinant of fund performance in SA, despite the regression analyses producing statistically significant results. Therefore, although a negative relationship was found between unit trust fund size and performance, the negative relationship was only slightly explained by fund size alone. Other factors apart from fund size could have better explanatory power over unit trust fund performance. Such factors could include past performance, fee methodologies, fund family size, country characteristics, the size of the research team, qualifications and tenure of the fund managers, trade execution and portfolio implementation, amongst others. However, these factors and their impact on fund performance, if any, were beyond the scope of this study and were not included in the analysis. It could be worthwhile to explore whether these factors individually, or

collectively, would provide better explanatory power regarding the performance delivered by unit trusts than fund size alone. This could make for interesting future research.

In addition, and still related to liquidity, both Chen et al. (2004) and Yan (2008) found that the effect of fund size on fund return was more pronounced for funds that focus on small capitalisation stocks. This makes intuitive sense as liquidity is typically lower for small capitalisation shares than for large capitalisation shares. Therefore, the market impact costs experienced by funds that focus on small capitalisation shares are exacerbated when compared to funds that do not limit their investment universe to small capitalisation shares. This study did not distinguish between funds that solely invest in small capitalisation shares and funds that solely invest in large capitalisation shares, and therefore, the finding that the effect of fund size on fund returns are more pronounced for funds that focus on small capitalisation stocks, were not validated in the South African context.

The primary reason for not distinguishing between funds that focused on small capitalisation shares and funds that focused on large capitalisation shares was due to the limited availability of such funds in the South African context. As per Table 1 in Chapter Two, as at Q1 2019 there were only 10 equity funds in the South African unit trust industry classified as designated large capitalisation funds, whereas there were only 27 designated small and medium capitalisation equity funds. The overwhelming majority of these funds did not have a ten-year performance track record, and therefore, would have been ineligible for inclusion in this study. Furthermore, given their mandate, balanced funds are not constrained to invest in either small capitalisation or large capitalisation shares, meaning that a differentiation amongst balanced funds on this basis was impossible.

The very slight negative impact of fund size on performance in the South African context could be explained by the fact that there was no differentiation between funds that invested solely in small capitalisation shares versus funds that invested solely in large capitalisation shares, thereby muting the impact of fund size on performance for South African unit trust funds. As designated "size specific" equity funds become more popular and mature in the South African unit trust industry, it could make for exciting and interesting future research to establish whether the impact of fund size was more pronounced for funds that invested exclusively in small capitalisation shares compared to funds that invested exclusively in large capitalisation shares.

6.2. The variation between the mean performance of small and large South African unit trust funds

Hypotheses three and four attempted to determine whether the mean net monthly returns delivered by unit trust funds of different sizes were significantly different from each other. Interestingly, and somewhat contrary to the findings of hypotheses one and two, the data did not deliver sufficient evidence to reject $H3_0$ and $H4_0$. As such, the failure to reject $H3_0$ and $H4_0$ meant that the mean net monthly returns delivered by South African general equity and balanced unit trust funds were equal across the different fund size categories and therefore not influenced by fund size.

In the case of general equity funds, the largest fund size quartile delivered the highest average net monthly returns, whereas size quartile three delivered the highest average net monthly returns for South African balanced funds. Amongst balanced funds, the largest fund size quartile delivered only slightly lower average returns than the funds grouped in size quartile three but delivered higher average monthly returns than that achieved by the funds grouped in the two smallest size quartiles.

The conflicting results obtained between the regression analyses and fund size ranking analyses could be explained by the findings of Chen et. al. (2004) and Yan (2008) who found that increased AUM for the institution, or family, to which a fund belongs, increases individual fund performance. According to Chen et. al. (2004), this finding can be ascribed to economies of scale that are achieved at the organisation, or firm, level. In addition, fund organisations with higher AUM are in a better position to employ specialised security analysts and provide professional trade execution, which may have a positive effect on individual fund performance (Bessler et al., 2016).

Similar to the findings of Chen et al. (2004) and Yan (2008), Bessler et al. (2016) found that smaller funds outperform their larger peers. This would be consistent with the regression results delivered by this study. However, Bessler et al. (2016) also found that funds belonging to fund organisations with high total AUM generated higher returns than funds belonging to organisations with low total AUM. This finding is also consistent with the findings of Chen et al. (2004), Yan (2008) as well as Ferreira et al. (2013), who found that fund performance is positively correlated to the size of the fund organisation to which the fund belongs. The finding where increased fund family size contributes positively to individual fund performance is somewhat consistent with the results obtained from the ANOVA tests which was used to test hypotheses three and four.

Figure 7 below lists the different South African unit trust companies, or fund families, and ranks them according to total AUM as at Q1 2019. Total AUM in this instance refers to

the collective AUM of all unit trust funds managed by each respective fund organisation and is measured in billions of rand.
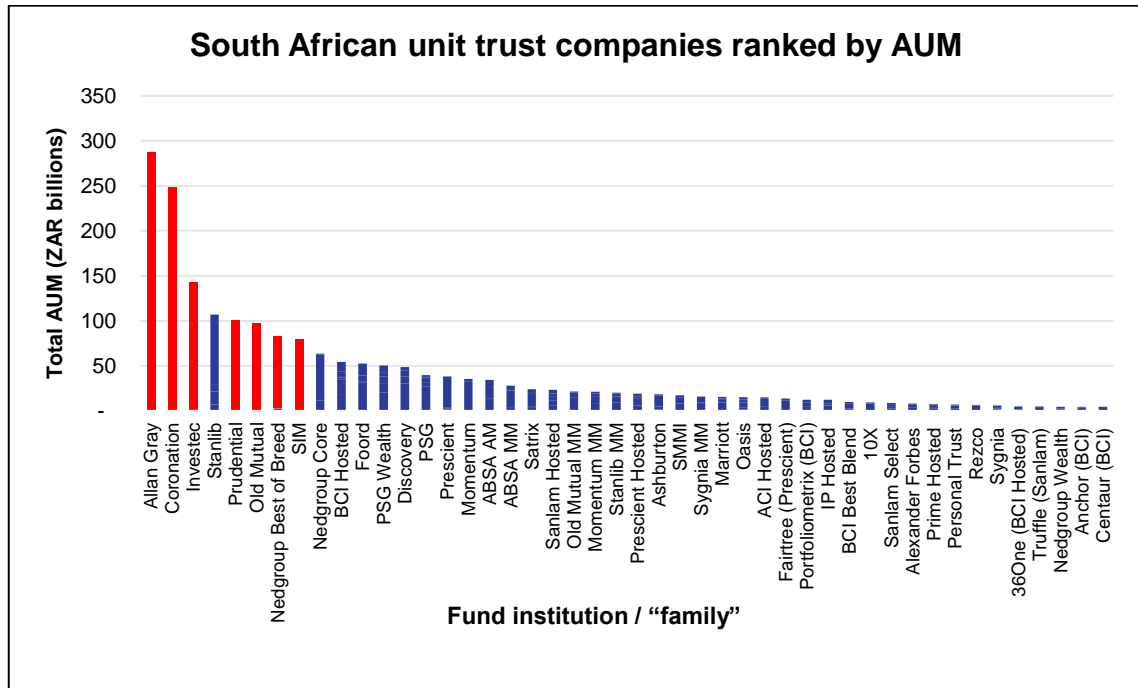

Figure 7: South African unit trust organisations ranked by AUM (ASISA, 2019).

Interestingly, 10 out of the 12 general equity funds that were grouped in size quartile four in Table 10 on page 51, the largest fund size quartile, belonged to seven out of the top eight largest unit trust fund organisations. Those ten funds belonged to the fund organisations which are indicated by the red bars in Figure 7. The only fund organisation amongst the top eight largest fund organisations which did not have a general equity fund in fund size quartile four, was Stanlib.

In the case of balanced funds, and as per Table 11 on page 52, three out of the five balanced funds that were grouped in size quartile three, the best performing fund size quartile based on mean monthly returns, belonged to fund families that were amongst the top eight largest fund families in SA. Three out of the four balanced funds that were grouped in size quartile four, for which the mean monthly returns were only slightly less than for fund size quartile three, each belonged to one of the three largest fund families as per Figure 7.

In summary, when equity funds were ranked according to individual fund size, the largest fund size quartile delivered the best mean monthly return. In the case of balanced funds, the second largest fund size quartile delivered the best mean monthly return, with the largest fund size quartile delivering mean monthly returns that were only slightly less. This was indicated by the average net monthly returns of the respective funds size

quartiles, as per Table 10 and Table 11, respectively. Moreover, in the case of both general equity and balanced funds, the overwhelming majority of the funds belonging to fund size quartiles three and four belonged to the largest fund institutions in SA.

Therefore, the conflicting results obtained between the regression analyses and ANOVA analyses are plausible, given the findings of Chen et al. (2004), Yan (2008), Ferreira et al. (2013) and Bessler et al. (2016), who all found a negative relationship between individual fund size and performance but a positive relationship between individual fund performance and the size of the fund organisation to which the fund belongs. Given that the larger fund quartiles delivered the best mean monthly performance, it might be reasonable to conclude that the positive effect of belonging to a large fund family outweighs the negative effect of individual fund size on unit trust performance in South Africa.

However, definitive conclusions could not be drawn as the difference in mean monthly returns between the respective fund size quartiles were insignificant for both general equity and balanced funds. This was consistent with the findings of Bessler et al. (2016), who also found that funds belonging to fund organisations with high total AUM generated higher returns than funds belonging to organisations with low total AUM, but who also concluded that the difference in performance was insignificant.

Ferreira et al. (2013) also found a statistically significant positive relationship between fund performance and fund family size, citing the fact that large fund organisations benefit much more from lower trading commissions and higher lending fees relative to their smaller counterparts. Fixed research expenses and administrative expenses can also be shared amongst funds and will have a smaller economic impact when those expenses are shared amongst a larger asset base as opposed to a smaller asset base (Ferreira et al., 2013). Therefore, funds that perform better are more likely to form part or a larger organisation with more AUM (Ferreira et al., 2013). As such, Ferreira et al. (2013) posit that increased AUM is not necessarily bad for performance since economies of scale at the organisational level could lead to better fund performance, irrespective of the size of the individual fund. The results from the ranking analysis, which was used to test hypotheses three and four, seem to support this view.

The results discussed above hold positive implications for investors and other allocators of capital. It is fair to assume that the largest funds are the best supported funds amongst investors since these funds have been the main beneficiaries of investor capital. These larger funds have, on average, delivered superior net monthly returns than their smaller counterparts. This illustrates that, on average, investors in SA have allocated the majority

of their capital to superior performing funds. By implication, this means that investors and allocators of capital have done a good job at identifying and selecting outperforming unit trust funds. Therefore, superior fund selection has, on average, contributed positively to the investment outcomes achieved by South African investors in unit trust funds.

Finally, the results from the ranking analysis dismisses the findings of Pillay et al. (2010), who found a concave relationship between unit trust fund size and performance. This contrast in findings was not surprising as this study was based on actual unit trust fund size and performance data and not on simulated, equally weighted unit trust size and performance data as was used by Pillay et al. (2010). Since the difference in mean returns were found to be insignificant across the different fund size categories, an optimal fund size does not seem to exist in the South African unit trust industry. In fact, the results from the ranking analysis seem to suggest that in most instances the better performing funds in SA are large funds that are part of some of the largest fund institutions in SA.

6.3.   Conclusion

A statistically significant negative relationship was found between unit trust find size and performance of South African unit trust funds. Although the relationship between unit trust fund size and performance was found to be significantly different from zero and negative, the relationship was extremely close to zero. In addition, fund size was found to be an exceptionally weak determinant of fund performance in SA, as explained by the low R^2 values obtained in the regression analyses for both general equity funds as well as balanced funds. As such, factors apart from fund size could have better explanatory power over unit trust fund performance. This study did not differentiate between funds that invested exclusively in small capitalisation shares versus funds that invested exclusively in large capitalisation shares. As discussed in this chapter, this could explain the muted impact of fund size on performance for South African unit trust funds.

Although a negative relationship existed between unit trust fund size and performance, there were no evidence to suggest that a statistically significant difference existed between the mean performance of small and large South African unit trust funds. This contradictory finding could be explained by the fact that the largest funds in the South African unit trust industry belong to the largest fund families. As discussed, previous authors have found a positive relationship between fund family size and individual unit trust fund performance. Therefore, it is plausible that in the South African context the negative impact of individual fund size on unit trust performance is outweighed by the positive impact that fund family size has on individual unit trust performance.

In addition, no evidence was found that a concave relationship existed between unit trust fund size and performance in SA. Finally, the results achieved point to the fact that South African investors, on average, have done a good job at fund selection as is evident by the fact that larger funds, and therefore the best supported funds amongst investors, delivered the highest mean monthly returns as per the fund size ranking analysis.

CHAPTER 7: CONCLUSION

7.1.   Summary of principal findings

The South African unit trust industry has experienced significant growth over the past decade, both in terms of total AUM as well as the absolute number of unit trust funds available to South African investors. Despite the proliferation in the competitive landscape, the South African unit trust industry remains highly concentrated, with a very large share of total industry AUM managed by a relatively small number of unit trust funds and fund institutions as at the end of March 2019 (ASISA, 2019). In order to attract assets, grow market share and increase profitability, institutions managing smaller unit trust funds have in recent times increasingly alluded to the perceived performance benefits that smaller unit trust funds enjoy relative to their larger peers (Clayton, 2019). Clayton (2019) points to superior flexibility and nimbleness that smaller funds enjoy over their larger competitors, positing that these benefits should result in smaller funds achieving superior investment performance relative to their larger peers.

The relationship between unit trust find size and performance has been studied extensively in markets outside of SA and is amongst the most studied topics in unit trust fund research (Ferreira et al., 2013). Although Chen et al. (2004) and Zhu (2018), amongst others, found a negative relationship between unit trust fund size and performance for US mutual funds, the claims made by industry participants such as Clayton (2019), have not been verified in the South African context. Apart from the limited scholarly attention that this topic has received in SA, most academic studies that have attempted to determine the relationship between fund size and performance for South African unit trust funds have found no relationship between unit trust fund size and performance. In addition, the literature fails to provide any recent academic studies on this topic in the South African context.

Given the absence of any recent academic studies on the relationship between fund size and performance, the significant growth in the South African unit trust industry over the past decade as well as the claims made by industry participants such as Clayton (2019), this study attempted to establish whether a relationship exists between unit trust fund size and performance of South African unit trust funds. Secondly, the study attempted to establish whether a difference exists between the mean performance of small and large South African unit trust funds. These objectives were achieved by studying unit trust fund size and performance data of both South African general equity and balanced funds over the ten-year period spanning the beginning of Q2 2009 to the end of Q1 2019. Monthly unit trust fund size and performance data was obtained from Morningstar. To the author's

knowledge, this was the first study of this nature to include balanced funds, the largest individual fund sector within the South African unit trust industry (ASISA, 2019).

Although a very slight statistically significant negative relationship was found between individual unit trust fund size and performance for both general equity and balanced unit trust funds, no statistically significant difference existed between the mean performance of small and large South African general equity and balanced unit trust funds. This interesting and somewhat contradictory conclusion is most likely explained by the fact that the slight negative impact of individual fund size on unit trust performance was outweighed by the positive impact of fund family size on unit trust performance in the South African context. This would be consistent with the findings of Chen et al. (2004), Yan (2008), Ferreira et al. (2013) and Bessler et al. (2016), who found that although smaller funds outperformed their larger peers, also found that fund performance was positively correlated to the size of the fund organisation to which the fund belongs.

Furthermore, fund size was found to be an extremely weak determinant of South African unit trust fund performance, with fund size explaining only 0,096% of the variation in net monthly returns for general equity funds and only 0,25% of the variation in net monthly returns for South African balanced funds. As such, other factors apart from fund size were responsible for more than that 99% of the variation in net monthly returns for both South African general equity and balanced unit trust funds. Those factors could include past performance, fee methodologies, fund family size, country attributes, the size of the research team, qualifications and tenure of the fund managers, trade execution and portfolio implementation, amongst others, all which were beyond the scope of this study.

To conclude, the results of this study provides sufficient evidence to suggest that, for both general equity and balanced funds, the better performing funds in the South African unit trust industry over the past decade were large funds that formed part of the largest fund institutions. This was evidenced by the results of the ranking analysis which was used to determine whether a difference existed between the mean returns of small and large unit trust funds. Although a very slight negative relationship existed between unit trust fund size and performance, the results of this study suggests that it is plausible that the negative relationship between unit trust fund size and performance was probably not significant enough to outweigh the positive impact of fund family size on individual unit trust fund performance.

7.2. Implications for stakeholders

The findings of this study hold implications for several stakeholders in the asset management and wealth management industries, which includes, but is not limited to,

fund institutions, investors in unit trust funds, financial advisors, pension fund trustees as well as asset allocators and other buyers of unit trust funds. Firstly, although a negative relationship was found between unit trust fund size and performance, no difference was found between the mean returns delivered by small and large unit trust funds. As such, the results of this study suggest that unit trust fund sizes in South Africa have not yet reached a point where fund size has become a hindrance to performance. There is therefore also no evidence to suggest that an optimal fund size exists in the South African unit trust industry and fund institutions should spend no time in trying to regulate, or calibrate, the sizes of their unit trust funds in an attempt to enhance performance. As there seems to be a positive relationship between fund family size and unit trust performance in the South African context, fund institutions should however attempt to increase their market share and AUM as there seems to be evidence of economies of scale in the South African unit trust industry.

Secondly, fund size was found to be a very weak determinant of unit trust performance. For investors, financial advisors, pension fund trustees and other fund buyers, these findings hold important implications as they suggest that fund size should be given very little, if any, consideration when assessing the future return potential of individual unit trust funds. Other factors such as performance track records, fee methodologies, fund family size, country attributes, the size of the research team, qualifications and tenure of the fund managers, trade execution and portfolio implementation, amongst others, could have better explanatory power over unit trust fund performance and should probably be given more consideration by current and prospective investors in unit trust funds than individual unit trust fund size when assessing the future return potential of different unit trust funds. What is clear however, is that individual fund size cannot be considered in isolation when assessing the future return prospects of different unit trust funds. Fund family size, and its impact on unit trust performance, should at the very least be considered alongside fund size when assessing the future return potential of individual unit trust funds in the South African unit trust industry.

Finally, investors, financial advisors, pension fund trustees, asset allocators and other fund buyers seem to have done a good job at fund selection in SA, as evidenced by the fact that larger funds, of which most belonged to some of the largest fund families in SA, delivered the highest mean returns as per the fund size ranking analyses. These large fund families, which are also home to some of the largest individual unit trust funds in SA, have been widely supported amongst investors, financial advisors, pension fund trustees and other stakeholders, as evidenced by the large number of total AUM allocated to these fund institutions, and in turn, their underlying funds. The results of this

study seem to suggest that it has been the right decision to allocate capital to large funds that are managed by large fund families as this strategy have, on average, yielded the highest average net returns for investors and other stakeholders over the ten-year period spanning the start of Q2 2009 and the end of Q1 2019.

7.3. Research limitations

The study only attempted to determine the relationship between unit trust fund size and performance of South African general equity and balanced funds over the ten-year period between the start of Q2 2009 and the end of Q1 2019. As the sample was not representative of the entire South African unit trust industry, inferences cannot be made on the size-performance relationship of other classifications of unit trust funds in South Africa. Importantly, since the study was only carried out on a sample of South African unit trust funds, universal conclusions on the relationship between unit trust fund size and performance could not be drawn. It is also worth noting that the results presented throughout this document are only valid for the specific ten-year study period over which this study was conducted, and it is acknowledged that the statistical tests carried out in this study could have yielded different results under different analysis periods.

This study only attempted to determine the relationship between fund size and performance and whether there was a difference in the mean performance of small and large South African unit trust funds. Other factors such as past performance, different fee methodologies, fund family size, country characteristics, the size of the research team, qualifications and tenure of the fund managers, trade execution and portfolio implementation, amongst others, that could also impact unit trust performance were beyond the scope of this study and were not included in the analysis.

Both the general equity and balanced fund unit trust samples that were used in this study suffered from survivorship bias. Survivorship bias refers to the phenomenon where failed funds are excluded from performance statistics since they no longer exist and it is therefore a major issue with any unit trust investment performance time series data set (Pawley, 2006). Since survivorship bias is more pronounced for smaller funds, survivorship bias typically results in the returns of smaller unit trust funds being overstated relative to their larger peers (Elton et al., 1996). Despite the existence of survivorship bias in both samples of unit trust funds, the difference in mean returns between small and large unit trust funds were found to be statistically insignificant. Therefore, survivorship bias was not found to be a major limitation of the study, although smaller fund performance would an all likelihood probably be worse, on average, if the full impact of survivorship bias on performance was accounted for.

Finally, the regression results did display the existence of serial correlation in the data sets. Although serial correlation is a common problem in economic and financial market time series data, serial correlation could introduce the problem of rejecting the null hypothesis when it should not be rejected. Since $H1_0$ and $H2_0$ was indeed rejected, and together with the fact that the slopes of the regression lines for both $H1_0$ and $H2_0$ were extremely close to zero, it would be prudent to interpret the results of the regression analyses with caution.

7.4.   Suggestions for future research

This study identified several exciting and interesting areas for future research. As such, this paper concludes with suggestions for future research that could add to the body of knowledge of the South African unit trust industry.

Firstly, the study could be extended to other classifications of unit trust funds in SA as it would be worthwhile to establish whether the results obtained in this study are consistent across all unit trust fund classifications in SA. Secondly, the study could also be conducted over different time periods to establish how dependent the results are on the time period of analysis.

Thirdly, the results achieved in this study, together with the findings of Chen et al. (2004), Yan (2008), Ferreira et al. (2013) and Bessler et al. (2016), who found that individual unit trust fund performance is positively correlated to the size of the fund family to which the fund belongs, warrants future studies on the relationship between fund family size and unit trust performance. It would be worthwhile to determine the exact impact of fund family size on unit trust performance in the South African context. To the author's knowledge, such a study has never been conducted within the South African unit trust industry.

Fourthly, Pastor et al. (2015) in their study of actively managed US mutual funds, found evidence of decreasing returns to scale at the industry level, suggesting that as the size of the active mutual fund industry increases, the performance of any individual fund decreases. To the author's knowledge, there has never been a study done on the relationship between industry level size, or AUM, and the performance of unit trust funds in the South African context. This could make for interesting future research.

Chen et al. (2004) and Yan (2008) found that the effect of fund size on fund returns was more pronounced for funds that focus on small capitalisation stocks. This study did not distinguish between funds that exclusively invest in small capitalisation shares and funds that invest exclusively in large capitalisation shares. Therefore, the findings of Chen et

al. (2004) and those of Yan (2008) referred to above, were not validated by the findings of this study. As designated "size specific" equity funds become more popular and mature in the South African unit trust industry, it could make for an exciting and interesting fifth area of future research to establish whether the impact of fund size is more pronounced for funds that invest exclusively in small capitalisation shares compared to funds that invest exclusively in large capitalisation shares.

Since Ferreira et al. (2013) posit that country attributes may be superior at explaining fund performance than individual fund attributes, a sixth area of suggested future research is to explore the impact of country fundamentals on unit trust fund performance. Factors such as the level of financial market development, the strength of legal institutions and the level of stock market liquidity, amongst others, could all be explanatory variables in predicting unit trust performance (Ferreira et al., 2013). It would be interesting to establish the relationship between country characteristics such as these and the performance of South African unit trusts.

Finally, and to conclude, factors such as past performance track record, different fee methodologies, the size of the research team, qualifications and tenure of the fund managers, trade execution and portfolio implementation, amongst others, could also have explanatory power over the variation in unit trust fund performance. It could be worthwhile to explore the extent, if any, to which these factors individually, or collectively, contribute towards explaining the variation in performance of South African unit trust funds. It would also be worthwhile to establish whether these factors have better explanatory power over the variation in unit trust performance than fund size.

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