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ETHICAL REWARDS

An Examination Of The Effect Of Islamic Ethical Screens On Financial Performance and Of Conditioning Information On Performance measures

BY

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DECLARATION

This assignment is the result of my own work. Material from the published or unpublished work of others, which is referred to in the assignment is credited to the author in question in the text. The assignment is approximately 9000 words in length.

Signed

Dated

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Abstract

The Dow Jones Islamic Index is a specialized ethical fund that screens out stocks prohibited by Islamic Shari ah (Law). The effect of these screens is ambiguous. This study examines the effect of the ethical screening on performance and the impact of incorporating lagged information variables into the evaluation of investment performance. The performance of the Dow Jones Global Islamic Index is measured against an unscreened benchmark using a number of performance evaluation techniques including a time-varying conditional asset-pricing model. The results suggest that the Islamic index outperforms the unconstrained benchmark by all the measures of performance employed. This implies that over the sample period, the screening criteria, far from limiting returns, would have delivered superior returns to Islamic Investors. Interestingly, the conditional asset-pricing model diminished the level of out-performance observed in the traditional measures by up to 35%. This indicates that part of the observed out-performance using unconditional asset pricing models is indicative of time variation in expected returns and confirms the importance of using conditioning information to improve the accuracy of performance measurement.

Contents

Introduction

The study of Islamically constrained equity investments is practically non-existent. Yet it holds importance for potentially a fifth of the world s population. In this study, the performance of the Dow Jones Islamic Market Index (DJIM) is evaluated using the Sharpe (1966) and Treynor (1965) composite measures of performance as well as traditional and conditional versions of the Jensen alpha (1968). The main focus of this analysis is twofold. To try to identify an ethical effect over and above a recognized stock market paradigm and to examine whether conditioning on public information has an impact on performance evaluation.

Cowton (1994) defines ethical investment as, the use of ethical and social criteria in the selection and management of investment portfolios . Thus in addition to risk and returns, ethical investors consider the characteristics of the companies they invest in. The amount of money designated as being ethically invested in the UK currently exceeds £1 billion. In the US, more than 20 times this amount is already invested ethically (Wilson, 1997).

Islamic investors represent a unique ethical investment market. As at 1995, the Islamic banking industry held total assets of approximately $166 billion, which is expanding, rapidly with an estimated annual growth rate of 15-20% (Moore 1997). Islamic investors are concerned with a very different set of ethical criteria from other ethical investors but the issues arising out of screening are similar.

A large portion of the Islamic community has been excluded from stock market investments due to Islamic prohibitions on certain business activities and *riba* (interest). The issue of what to do with surplus funds and how to provide financial security for the

future has plagued those determined to comply with religious injunctions. A major breakthrough occurred with religious rulings on equity investments and the establishment of Islamic ethical funds in the 1970s. However, the performance of these funds has been mixed and investors have lacked a suitable benchmark with which to assess performance.

The Dow Jones Islamic Market index[1] launched in 1999 and marketed by the Dow Jones & Company at last provides the Islamic community with an acceptable universe of stocks to invest in and a benchmark against which performance can be measured. In addition, it offers the opportunity to standardize the ethical screens, which hitherto have been unique to each fund.

Despite the increasing attention of practitioners on ethically screened investments, there is relatively little academic research on such funds and to the author s knowledge, little or none on Islamic investments. Comparing the performance of ethical funds to an unscreened benchmark yields mixed results, depending on which funds are compared and which time period is considered. Therein lies the appeal of the DJIM as a proxy for an Islamic ethical portfolio. Being an index, the DJIM provides a unique opportunity to assess the impact of the constraints on performance free of other considerations such as investment style, fund objectives and timing that have clouded the analysis of the performance of ethical mutual funds.

The traditional Capital Asset Pricing Model (CAPM) has a number of well-known weaknesses one of which is that it assumes the risk, (beta), to be stationary over time. A more accurate assessment of the expected return can be obtained by relaxing this constraint using the conditional asset-pricing model to estimate the Jensen s alpha. The purpose of this study is to examine the performance of DJIM using both unconditional

and conditional models to provide an insight into both the effect of Islamic ethical screens and of using lagged information variables in the analysis of performance.

The main findings of this study are that the DJIM exhibits statistically significant positive performance when measured against an unconstrained benchmark implying that at the very least, there is no penalty for investing according to Islamic law and that potentially, this type of investment can deliver superior returns. In addition, the results show that conditioning the model on publicly available information, to achieve a more accurate performance measure, reduces the observed abnormal return of the DJIM indicated by the unconditional performance measure by between 24-35%.

This study is organized as follows. The following chapter reviews the literature on ethical and Islamic equity investing. Chapter 2 reviews the performance evaluation literature. Chapter 3 describes the data and the methodology used in the performance measures and presents the empirical results.

[1] described by its' promoters as, 'a low debt, non-financial, social-ethical index'

CHAPTER 1

ETHICAL INVESTMENTS

The proliferation of ethical unit trusts is a reflection of the prominence the moral element of financial investment has gained in recent years. The growing importance of this type of investing is highlighted by the formation of the Ethical Investment Research Service (EIRIS)[2] who suggest that ethical investment means choosing investments that reflect your values . The growth of the sector has resulted in a number of studies exploring such issues as the ethical criteria applied by such funds and the disclosure of social and environmental aspects of corporate activity. However, there is only limited research into the specific effect of this conscience investing on the performance of these funds and the evidence on whether one profits from, or pays for, being socially responsible is not unambiguous.

The ethical investment movement has its roots in the attempts of religious institutions to avoid so-called sin industries such as alcohol, tobacco and gambling (Domini, 1992; Murninghan, 1992). Nowhere has this been more evident than in the Islamic community where ethical investment is not just desired but is required by the religion.

One point of view is that growth in such investor sentiment may be expected to produce gains in shares with a positive ethical rating and losses on others. Further, Alexander and Bucholz (1978) suggest that socially aware and concerned management will also

possess the requisite skills to run a superior company in the traditional sense of financial performance, thus, making its firm an attractive investment . On the other hand, it is argued that ethical investment offers inferior performance due perhaps to increased monitoring costs, a smaller investment universe and restricted potential for portfolio diversification.

The ethical sector can typically be broken down into four sub-categories, the environmental, political, widely social and religious. Islamic ethical funds, naturally, fall under the latter but are highly specialized.

This chapter is divided into two sections. Section 1.1 gives an overview of the ethical fund market, its genesis, size, characteristics and performance. Section 1.2 examines a specialty ethical fund, the Islamic ethical fund, its characteristics and expected performance.

[2] EIRIS is a research service launched by various Churches and charities in 1983 with the aims of providing information on issues concerning the application of ethical criteria to investment, and of promoting debate on corporate responsibility.

Section 1.1: Ethical Unit Trusts

As at 1989, ethical unit trusts accounted for less than one percent of the UK unit trust sector (Luther, Matatko & Corner 1992), however, the US experience where socially responsible mutual funds account for some 20% of the total market sector (Wilson 1989), indicates the potential for substantial further growth.

The general approach to ethical investing is to employ screening criteria. These can either be positive or negative criteria but typically, negative criteria are used since avoidance of specified investments is more easily described and monitored. Despite the apparent agreement by many ethical trusts on which types of investment to avoid, the judgement of what constitutes an ethical investment is a subjective matter, which varies according to the criteria, applied. As a result, the ethical fund sector is neither cohesive nor highly specialized making it difficult for any extraordinary performance that ethical funds may exhibit to be directly attributable to a common strand of uniformly defined ethicality.

Investigation of the returns from ethical funds is further clouded by the observation that the funds share noticeable common characteristics other than their ethicality. An analysis of the composition of the investment portfolios of UK ethical unit trusts by Luther et al (1992) has shown that ethical investing is found to be correlated with at least three factors which may have an impact on realized returns. These include a bias towards small market capitalization stocks, international diversification and dividend yield.

It has been estimated that eighty percent of the companies listed in the FTSE 100 are not eligible for ethical investing for one reason or another[3]. Luther, Matatko & Corner (1992) and Luther & Matatko (1994) showed by directly examining the ethical funds portfolio holdings that ethical fund investments in the UK were skewed towards smaller market capitalization companies. This has implications for any observed performance of these funds and makes it difficult to separate out the ethical effects due to the well-documented stock market anomaly known as the small-company effect . For example, Levis (1988) showed that between 1966 and 1982 small firms listed on the London Stock Exchange earned significantly higher returns than large firms. Similar results have been shown for the US (Reinganum 1992). However, over the period 1985 to 1992, small companies under performed the UK market as a whole (Luther & Matatko 1994[4]) and ethical trusts followed suit. Thus, small company investing represents a potentially important systematic determinant of ethical trust returns.

Another important characteristic of ethical trusts is that they differ widely in terms of the degree of international diversification of their holdings. The choice of ethical companies may for example lead to the total exclusion of certain countries (for example South Africa for most ethical funds during Apartheid). Similarly, for Islamic funds this could mean under weighting markets where say the prohibited financial sector makes up a substantial part of the index. The global asset allocation that ensues is therefore not determined by fundamental views of each market per se, rather it is a by-product of the ethical criteria. This evidently imposes currency and other non-ethical influences on realized returns. Moreover, it can be argued that placing restrictions on share selection on ethical grounds results in a smaller universe from which to select potential purchases, which may adversely affect diversification and returns. However, ethical fund managers

[3] see Holden Meehan (at his website bath.ac.uk/centers/ethical/Holden Meehan)
[4] a possible explanation for this apparent violation of a long –run trend is given by Reinganum 1992

argue that in the UK alone, approximately 320 billion pounds representing 40% of the total market is eligible for ethical investment. Thus, all other things being equal, performance is unlikely to be any different from that of unrestricted investments.

Ethical investment usually, though not always attempts to reconcile the aim of social responsibility with a desire for financial profit. The financial performance of socially constrained investment vehicles is therefore of interest to existing and potential investors in that inferior returns may be seen to indicate the cost of socially responsible behaviour. The literature suggests that social responsibility and financial gain are not necessarily mutually exclusive objectives. Mallin, Saadouni & Briston (1995) show that ethical funds tend to have superior performance relative to their matched non-ethical pairs although this effect is a weak one on the basis of the Jensen, Sharpe and Treynor measures. However, comparing the actual performance of ethically screened funds against the S&P 500 or the FT All share Index usually yields mixed results, depending on which funds are compared and which time periods are considered (Cooper and Schlegelmilch 1993).

While not all ethical investment trusts perform well financially, they generally perform as well as comparable unit trusts with no social agenda screen. If it is accepted that there is no financial penalty for investing in ethical funds, certain questions remain to be answered; first why is this the case (is this due to the non-ethical characteristics of these funds or the ethical criteria themselves); and second, are these criteria predictors of superior corporate performance and returns?

Section 1.2: Islamic Ethical Investment

The Islamic investment sector is currently experiencing a massive turnaround. Until the early 1990s stock market investments were taboo for most devout Muslims. Whilst

share ownership is allowed under the religion, the issue of how to separate out the prohibited aspects that such an investment would inevitably involve was a problem. This changed after increasingly innovative scholars of Islamic law (Shari ah) began permitting a growing number of equity investments. As a result the number of Islamic equity funds has soared to more than seventy today from just half a dozen ten years ago amid growing interest from western banks that had previously shunned the potential of the Islamic market. Estimates of the untapped wealth in this market range from 100-300bn US dollars globally and the launch of new benchmarks to track the movements of Islamically acceptable stocks has given further impetus to the market.

The importance of this market should not be underestimated. Private liquidity in the Gulf states alone is estimated at over $300bn[5] and there are vast pools of potential private Islamic funds in Turkey, Malaysia, Indonesia, South Africa, Brunei and in expatriate Muslim communities in North America[6] and Europe. The global investment community has begun to respond to the potential of the Islamic market. In 1999, Dow Jones and its British counterpart, FTSE International, each created stock market indexes comprising companies whose businesses and financial structures comply with Islamic law. Table 1 below highlights just a few of the financial institutions that have this market difficult to resist.

Table 1: Key Players in the Islamic Fund Industry

Major fund managers/advisors	Institutions entering Islamic fund management
Wellington Management Co., USA	Nomura, Japan
Al Baraka Investment Bank, Saudi Arabia	Brown Brothers Harriman & Co., USA
Faisal Finance, Switzerland	Saudi American Bank (SAMBA), Saudi Arabia

[5] Fund fever hits the Market by Mushtak Parker – Islamic Banker May/June 1996

[6] Experts estimate that between 6 and 12 million people in the United States call themselves Muslims and that on average they earn between $38,000 and $44,000per year – Morningstar.com 16-07-2000

The International Investor, Kuwait	Securities House, Kuwait
UBS, Switzerland	Commerz Bank, Germany
Robert Fleming, Luxembourg	Morgan Stanley Dean Witter, USA
Citibank, USA/Bahrain	Pictet & Cie, Switzerland

Source: Failaka International Inc.

Despite these recent advances, the Islamic fund sector is still in its infancy relative to its ethical and mutual fund counterparts. Islam not only has some of the most severe restrictions of any major religion on what its adherents can do with their money, but until recently, there has been a dearth of investment options that comply with those strictures.

The question from the Islamic point of view is whether investments in international equity markets are acceptable under the Shari ah. Many Shari ah scholars have now given *fatwas* (religious rulings) that allow Muslims to invest in equities, as long as the companies so chosen are not involved in certain well-defined types of businesses. However, even if the business type is acceptable, almost all companies are likely to be involved, to some extent, in some non-permissible activity. The main objection against them is typically that in their own capital, internal accounting and financial dealings they lend to and borrow from *riba* (interest) banks and other institutions. Consequently, designing products for Muslim investors has proved challenging but has been achieved by determining those aspects of the company s activities that are prohibited under the Shari ah and then establishing screening criteria that would to a large extent filter out these undesirable components. These aspects can be classified into five major classes which include prohibited activities, leverage, interest income and accounts receivable and are discussed in more detail below.

The first criterion totally excludes companies whose principal activity is not permissible under the Shari ah. These include the usurious financial services, producing or trading in alcoholic beverages, pork, gambling, arms, pornography, and the hotel and leisure industry amongst others. Since most companies are financed in part by debt capital, which is prohibited, the second criterion places a ceiling on indebtedness, excluding companies whose level of indebtedness exceeds approximately thirty percent of total capital. Receiving interest is considered more serious than paying interest therefore the third criterion excludes the shares of companies who receive interest that is more than approximately 5% of the company s net revenue. In addition, any interest income is typically calculated and purged (usually through donations to charity) from the received investment returns in what is known as purification. The fourth criterion excludes the shares of companies whose accounts receivable exceeds approximately 50% of the share s total assets and the fifth and last criterion avoids the shares of companies where assets are pure cash.

In matters of the Shari ah (law), the interpretations of various scholars may differ, but in any particular organization, the ultimate approval of what constitutes an ethical investment comes from the Boards of Religious Advisors, (which consist of established religious scholars) and their decisions are binding on the respective fund managers. The most important difference between ethical unit trusts and Islamic unit trusts is that in additional to the exclusion of certain prohibited sectors, Islamic unit trusts do not deal at all in the fixed income market and in their operation, the receipt and payment of interest in any form is not permitted.

One result of this is that the Islamic unit trust will tend to be more fully invested than their ethical or unethical counterparts since interest income is disallowed. As far as the non-ethical characteristics highlighted in the previous section are concerned, the Islamic

funds are not thought to have similar characteristics due to the key differences in the screening criteria outlined above. The small company effect is unlikely to be significant however, the international diversification effect might hold due, for example, to the exclusion of, say, the financial sector from the investment universe. However, a critical factor, the performance of Islamic unit trusts, has not been looked at in detail partly due to the youth of the sector and the scarcity of data.

In addition to the obvious benefits of indices such as the Dow Jones Islamic Indices, they also provide the rational vehicle with which to examine the performance of ethical funds in general and Islamic ethical funds in particular since they are free from the usual issues that cloud the analysis of managed ethical fund performance such as stock selection (over and above the screens), timing, cash holdings and others.

The discussion in the previous section highlights the view that the restrictions that are imposed by ethical investments may have an impact on their performance. Similarly, Fletcher (1995b) notes that any asset or portfolio which faces binding investment constraints will exhibit non-zero Jensen performance . However, we know from the literature that despite its popularity and wide use, the Jensen performance measure has a number of well-documented weaknesses.

From the foregoing it is clear why the performance of screened vis a vis unscreened investments is one of the most debatable issues in the field of ethical investment. Given the lack of consistency between funds and the observed non-ethical regularities of such funds, isolating the ethical effect is problematic. Added to this is the debate, which surrounds the performance evaluation literature. Two key questions emerge. Firstly, how to examine the ethical effect if any? Secondly, how to measure performance as accurately as possible? The Dow Jones Islamic Index provides the opportunity to

attempt answering the former. The review of the performance evaluation literature in the following chapter provides direction on possible answers to the latter.

CHAPTER 2

PERFORMANCE EVALUATION LITERATURE REVIEW

The objective of portfolio management is to derive rates of return that equal or exceed the returns on a naively selected portfolio with equal risk. Within the context of this study, the essence of performance evaluation is therefore to investigate whether the Islamic ethical criteria have an impact on the investment opportunity set faced by the investing public and if so to what extent.

Naturally, the literature in this field is vast but despite more than three decades of theoretical and empirical work, the problem of accurately measuring the performance of managed portfolios remains unsolved. The objective of this review of the performance evaluation literature is two-fold. Namely, to highlight the key issues in performance evaluation and to determine how fund performance can be measured more accurately.

Since an assessment of performance evaluation is in essence an assessment of the tools of measurement which mainly comprise the asset pricing theory. It is not surprising that the issues in performance measurement arise out of the validity (or lack thereof) and assumptions of the return generating process. The imposition of the semi-strong efficiency assumption using information variables has given rise to conditioned models of performance measurement. A related issue is the consistency of the multitude of potential performance measures.

The latest performance measures have arisen out of developments in asset pricing theory namely, the use of efficient benchmark portfolios (to combat the problem of ambiguity and rank reversal of passive portfolios as a result of inefficient benchmarks), and unlike the traditional approaches to performance measurement which are unconditional, (in the sense that average returns are being used to estimate the expected performance), these measures use conditional information variables to account for time variation in expected returns and risk. Subject to certain limitations of their own, these measures can therefore be considered more accurate and potentially the future of performance measurement.

The most common techniques used to evaluate equity portfolios in terms of both risk and returns (composite measures) are based on the Sharpe (1964) Lintner (1965) Capital Asset Pricing Model (CAPM). The Treynor (1965) measure considers the excess returns earned per unit of systematic risk. The Sharpe (1966) measure indicates the excess return per unit of total risk. Jensen (1968) evaluated performance in terms of the systematic risk involved and in addition showed how to determine whether the difference in risk-adjusted performance is statistically significant. Additional work in equity portfolio evaluation has been concerned with models that indicate what components of the management process contributed to the results. A model by Fama (1972) divided the composite return into measures related to total risk, systematic risk, diversification and selectivity in addition to measuring overall performance. Whilst, attribution analysis seeks to establish whether market timing or security selection skills (or both) are the source of a manager s performance. Despite widespread use, these standard measures of performance are known to suffer from a number of biases.

There has been a great deal of controversy over whether the performance measures proposed by Treynor (1965), Sharpe (1966), and Jensen (1968) can identify investors

with superior information. Jensen s alpha, which measures the deviation of a portfolio from the securities market line, has been the focus of most of the controversy as it is most widely used in academic empirical studies. One criticism of the Jensen measure is that it is based on an upwardly biased estimate of systematic risk for a market-timing investment strategy. Another criticism, advanced by Roll (1977, 1978, 1980, 1981), is that the Jensen measure of a portfolio bears no reliable relation to its true performance because there is no appropriate benchmark portfolio with which to compute the systematic risk (beta). The CAPM related empirical anomalies documented in the past decade lend weight to this criticism as it applies to traditional benchmark portfolios. Linked to this is the assumption of stationarity in expected returns and risk.

Subsequent to the early formal measures of Jensen (1968), Sharpe (1966), and Treynor (1965), and in response to the observed flaws of these measures, numerous new performance measures have been proposed. There are the arbitrage pricing theory (APT)-based measures of Connor and Korajczk (1986) and Lehman and Modest (1987), the period weighting measures of Grinblatt and Titman (1989), the intertemporal marginal rates of substitution-based measures of Glosten and Jagannathan (1994), and the stochastic discount factor (SDF) based measures of Chen and Knez (1996) and Dahlquist and Soderlind (1999). From a performance evaluator s perspective, the very diversity of measures using different models and assumptions in addition to differing views on what constitutes abnormal performance raises new issues and highlights the lack of consistency across measures. Different measures do not necessarily assign a given portfolio return the same sign and/or rank competing funds in the same order. The main issues in performance evaluation can be categorized under the four headings of the benchmark problem, admissible performance measures, non-stationarity in risk factors and the efficient market theory assumption. These issues are discussed in turn below.

There are two choices that must be made in specifying the set of reference assets or benchmark. The first is how many assets to include in the reference set. The second is which assets to include. These are important decisions since typically, evaluation results depend on the set of reference assets used. While in portfolio theory this set should include all assets available to the investing public (the optimal market portfolio), in practice one is limited to a finite sample in the estimation.

In what was arguably the one of the most important events in performance evaluation literature, Roll (1978) showed that inferences about performance can be sensitive to the specification of an inefficient benchmark. Roll s critique can be considered the father of modern performance literature since much of the subsequent work is made up of attempts to solve the issues highlighted by Roll.

In a direct contradiction of Roll s conclusions, Grinblatt and Titman (1989) assert that due to its mathematical properties, the unconditional mean-variance efficient portfolio of assets that are considered tradable by the evaluated investor provides correct inferences about the investor s performance. This implies that the missing-asset problem, which is important in tests of the CAPM, does not apply to the evaluation of managed portfolios that consist of traded stocks or bonds.

A more exciting and in my opinion, more important development is the emergence of stochastic discount factors, which allow performance measurement to be conducted independent of the assumptions of the CAPM and hence its accuracy.

Chen and Knez (1996) attempt to address the issue of the multiplicity of admissible performance measures by proposing four conditions that constitute a minimum set of

requirements for any performance measure. The first condition states that any managed portfolio return that is achievable by an uninformed investor is automatically assigned zero performance. This condition is implicit in most existing performances. For instance, according to the Jensen measure any portfolio on the security market line is assigned zero performance. The second condition states that the performance function is linear which implies that simply rescaling a fund or mixing two funds should not by itself improve one s performance ranking. Any change in performance ranking has to result from additional information. The third condition, which states that the performance function is continuous, ensures that two managers producing indistinguishable returns are ranked the same. Finally, the fourth condition states that the performance function is nontrivial and thus guarantees that if a fund s excess return was proportional to the gross return on some security, this fund would not be assigned zero performance. A performance measure is said to be an admissible performance measure if it satisfies these four criteria.

The market condition necessary for the existence of an admissible performance measure is the law of one price (LOP). This requires each payoff to have only one price regardless of the portfolio composition that generates it (Chen and Knez (1994, 1995)). Since the LOP is a weaker market condition than general equilibrium, most equilibrium-based performance measures such as the Jensen measure, the APT-based performance measures and the intertemporal marginal rates of substitution (IMRS) performance measures of Glosten and Jagannathan (1994) are considered admissible.

As far as performance measurement is concerned, each admissible measure can be used in empirical implementations except that some of these measures will require stronger economic assumptions. For instance, the Jensen measure requires the CAPM assumptions to hold whilst the APT-based measures depend on whether the assumed

factor structure for asset returns is correct. Certain assumptions underlying these and other related performance measures might not be empirically supported. An alternative to these parametric performance measurement methods is to identify admissible performance measures from security price data. Basically, a stochastic discount factor (SDF) that prices all benchmarks (and is in this sense efficient) is constructed and then used in evaluations. In doing so, the only market condition required is the LOP holding. This alternative approach allows performance measurement to be independent of the assumptions that accompany asset-pricing models.

A key question is whether these admissible performance measures, will evaluate the same fund drastically differently. Chen and Knez (1996) find that if a managed return lies in the benchmark return set, all admissible, measures will give the fund a zero performance. However, if a fund s return is not achievable by an uninformed investor, then by suitably choosing an admissible performance measure any performance value can be assigned to the fund. This bears similarities to Roll s (1978) conclusions. However, in this case, the arbitrariness of performance evaluation is due to the multiplicity of admissible performance measures rather than the use of an inefficient benchmark.

To make performance evaluation less dependent on the choice of a particular performance measure, the additional condition of positivity is added. Each measure must be positive in the sense that if a managed excess return (over any reference return) is positive with probability one, then the fund will be assigned a positive performance. Such a performance measure only exists if the securities market offers no-arbitrage (NA) opportunities. When only NA-based measures are used for performance measurement, the results are much more positive. Performance values assigned to a given fund will lie in some interval rather than the entire real line. These

findings highlight the need to evaluate performance using a battery of methods before drawing strong inferences.

One of the necessary conditions for the estimation of the Jensen risk-adjusted performance measure and any statistical inference concerning that measure is that the mutual fund s systematic risk remains constant over time. This assumption is unsatisfactory since one would expect to observe nonstationary risk levels of managed portfolios as a result of timing activities, a changing investment opportunity set, and ex post market movements. The findings of substantial nonstationarity of the systematic risk of mutual fund portfolios has important implications for further research. The problem is to propose an estimation procedure for the parameters of the model where the only information one has access to is the rate of return data on the mutual fund portfolio and market portfolio for the measurement interval. Again, the new generation of performance measures outlined by Chen and Knez (1996), Harvey (1991), and Ferson and Schadt (1996) attempt to address this issue.

Traditional models, have taken the view that any information correlated with future market returns is superior information. In other words, they are unconditional models and the manager is being evaluated only on his ability to find an efficient portfolio. If semi-strong —form market efficiency isassumed, then a managed portfolio strategy that uses only readily available public information does not imply abnormal performance. Ferson and Schadt (1996) explore the effects of incorporating lagged information variables in the analysis of investment performance, an approach they call conditional performance evaluation using both the CAPM and a four factor model. The choice of lagged information variables was driven by public information variables that previous studies have shown are useful for predicting security returns and risks over time.

Generally, the traditional measures of average performance (Jensen s alpha) are negative more often than positive, which has been interpreted as inferior performance. This is attributed to common time-variation in the conditional betas and the expected market return. However, the interpretation is clouded by the existence of transaction costs (which shift the alphas to the left of zero) and survivorship bias (shifting alphas to the right). Both a simple CAPM and a four-factor model reproduce this result in Ferson and Schadt s (1996) sample. However, the simple adjustment to condition on public information removes the inference of the traditional approach that mutual fund alphas tend to be negative. When the common variation is controlled using lagged instruments, (conditional models), the distribution of alphas shifts to the right and is centred near zero. Moving from a simple CAPM to the four-factor model (motivated by previous evidence that the value-weighted index is not an efficient portfolio (Roll (1978)) does not change the result that the unconditional alphas tend to be negative. Overall, introducing the conditioning information seems to have a greater impact on the measures of performance than does moving from the single-factor to the four-factor model. This implies that either the non-stationarity of risk is more important than the benchmark issue or that the four-factor model does not ameliorate the benchmark error problem. These results suggest that there is much more interesting work to be done. Incorporating public information variables into the analysis of investment performance is an important development and is the focus of this study.

To conclude, the work of Dahlquist and Soderlind (1999), provides further evidence on the use of stochastic discount, factors in evaluating portfolio performance. Using the same basic approach for testing fund performance as did Chen and Knez (1996), they first estimate a stochastic discount factor that prices some benchmark portfolios, then use GMM to test if it also prices the funds. The SDF is estimated from asset returns, as in Hansen and Jagannathan (1991).

In addition to the avoidance of issues arising out of possible asset pricing misspecification as in the use of the CAPM, another strength of this approach is that estimation and testing can be done with the generalized method of moment (GMM) of Hansen (1982). This means that specific distributional assumptions of the asset returns are not required and that both conditional heteroskedasticity and serial correlation in pricing errors can be handled. Moreover, it is straightforward to incorporate both conditional information and non-linearities (by positivity constraints on the SDFs) can be dealt with. This appears to address many of the issues raised in this review, suggesting that the future of accurate performance evaluation may lie in this direction

CHAPTER 3

METHODOLOGY, DATA DESCRIPTION & EMPIRICAL RESULTS

Section 3.1: Overview of the Methodology

This study assesses the performance of the DJIM to see if there is any ethical effect. Simultaneously, the study examines the impact of the type of performance measure used on the estimated performance. The following section provides details of the methodology used in this study including a discussion of the rationale for using conditional performance measures, followed by a description of the data in section 2. Section 3 provides the results and interpretation.

The questions of this study are approached as follows. First the performance of the DJIM is assessed using the traditional measures of performance in relation to a risk-adjusted benchmark (Sharpe, Treynor and Jensen measures). Subsequently, the Bekeart & Harvey (1995) approach to conditional asset pricing models is followed to test for differences between the unconditional and conditional approach to measuring performance.

Following his earlier work on the CAPM, Sharpe (1966) conceived of a composite measure of performance dealing with the capital market line CML. The Sharpe measure of portfolio performance (S) indicates the risk premium return per unit of total risk. In terms of capital market theory, this measure uses total risk (sd) (both diversifiable and nondiversifiable) to compare portfolios to the CML.

$$S_i = (R_i - RFR) \div \sigma_i \qquad (1)$$

where

R_i = the average rate of return for the DJIM

RFR = the average rate of return on the risk-free asset (3 month US treasury-bill middle rate)

σ_i = the standard deviation of the rate of return of the DJIM

Higher Sharpe measures are associated with superior performance.

In contrast to the Sharpe performance index, the Treynor (1965) measure (T), only treats nondiversifiable market risk (beta) by examining performance in relation to the security market line (SML) as follows:

$$T_i = (R_i - RFR) \div \sigma_i \qquad (2)$$

where

R_i = the average rate of return for the DJIM

RFR = the average rate of return on the risk-free asset (3 month US treasury-bill middle rate)

$\_i$ = the systematic risk for asset i

Like (S), T is a relative measure and must be compared with the values of the benchmark T_m. By assumption the beta of the market proxy is 1.0. Higher Treynor measures are associated with superior performance.

Like Treynor, Jensen (1968) relied directly on the Sharpe (1964) Lintner (1965) CAPM to develop an estimate of the extra return earned by a fund. The Jensen measure has become the standard measure of performance evaluation and has been applied extensively in evaluating managed performance. Performance is measured by the Jensen s alpha since superior (inferior) performance would have consistently positive (negative) random error terms which would be picked up in the intercept alpha . The empirical specification of the model is as follows:

$$E(R_{it}) = \_iE(R_{mt}) \qquad (3)$$

where

R_{it} is the excess return on asset i in period t net of the risk free rate

R_{mt} = the excess return on the benchmark asset

$\_i$ = the systematic risk for asset i

E = the expectations operator

Assuming rational expectations and efficient markets (3) can be written as

$$R_{it} = \__i R_{mt} + \__{it} \quad (4)$$

where

$\__{it}$ = the forecast error with mean of zero, ($E(\__{it}) = 0$).

Jensen s measure of performance includes a constant (_) in equation (4) such that

$$R_{it} = \_ + \__i R_{mt} + \__{it} \quad (5)$$

where

_ = a constant that measures abnormal performance.

An advantage of Jensen s approach is that it enables one to determine whether the performance indicated by the alpha is statistically significant using t-tests. The null hypothesis of neutral performance (or in this case, no ethical effect) is that alpha is equal to zero. A positive alpha is usually interpreted as a measure of superior performance and a negative alpha as reflecting inferior performance. However, it should be borne in mind that in addition to the conclusion that investor s received unanticipated returns over the sample period, a non-zero estimate of alpha could be indicative of a misspecification of the CAPM as a model of the returns generating process or market inefficiency. Any inference about market efficiency involves a joint hypothesis (Fama 1970). If the model is misspecified, then predictable variation in the misspecification can contaminate the _ + $\__{it}$ component.

In recent times, interest in performance evaluation has been renewed with the emergence of two branches of research. The first development is the use of efficient

benchmark portfolios. The second development is the use of conditional information variables in tests of asset pricing theories. Traditional approaches to performance measurement are unconditional, in the sense that average returns are being used to estimate the expected performance. They assume that fund risk and expected returns are stable over time. If this is not the case, the traditional performance measure will confound time variation with abnormal performance. Time variation in expected returns can come from two sources: variation in the price of risk, or variation in the quantity of risk. Recent work on performance evaluation has started to develop measures that take account of the conditioning information used by investors in setting prices.

Evidence that stock returns are predictable using public information variables[7] may indicate that these variables proxy for a variation in the market risk premium[8]. If investors use these market indicators to update rationally their assessments of expected returns, measures of investment performance should incorporate the time variation by using variables that capture the state of the economy. Ferson & Harvey (1991) consider a multi-risk formulation and find that the risk and risk premium associated with the market return is by far the most important component explaining predictability of returns. Thus Ferson and Schadt (1996) advocate using performance measures that are conditioned on public information variables in order to avoid the bias induced by using historical average returns to estimate expected performance.

Conditional measures allow the asset betas and factor risk premiums to vary through time. Ferson and Schadt (1996) use both the CAPM and APT models to develop linear conditional performance measures. They assume that prices in securities markets reflect publicly available information, in other words, semi-strong form efficiency. In the

[7] For example: default risk spread, Keim & Stambaugh (1986); dividend yield, Fama & French (1988)
[8] Ferson & Harvey (1991), Fama & French (1992), Evans (1994) provide evidence supporting this interpretation.

conditional CAPM, an asset s beta is the ratio of the conditional covariance between the asset and the market returns and the conditional variance of the market return.

In order to capture the potential sources of time-varying expected returns we consider the following empirical specification of the conditional CAPM[9] is considered.

$$R_{it} = \_i + \_mt cov_{t-1}[R_{it}, R_{mt}] + \_it \quad (6)$$

From the equilibrium pricing relation (6) it follows that

$$R_{mt} = \_mt var_{t-1}[R_{mt}] + \_mt \quad (7)$$

$$\_mt = \exp(b\ Z_{t-1}) \quad (8)$$

where

R_{it} is the excess return on asset i in period t net of the risk free rate

R_{mt} = the excess return on the benchmark asset

$\_mt$ = is the market price of risk

$\_i$ = is a constant that measures the abnormal performance

cov_{t-1} and var_{t-1} = are the conditional covariance and variance (rolling estimates)

$b\ Z_{t-1}$ = the fitted values from a regression of asset of instruments on the excess market return (we take the exponent to ensure that the price of risk is positive)

The model restricts the conditionally expected returns of the asset to be linearly related to conditionally expected excess returns on the market-wide portfolio. The excess return on the asset, the covariance of asset returns with the market and $\_mt$ are conditioned on

[9] see Antoniou, Barr and Priestly (1998), Harvey (1991), Evans (1994), Bekeart and Harvey (1995) and Ng (1991) for similar examples.

the information $\_{t-1}$ (proxied by a set of instrumental variables Z_{nt-1} conditioning information assumed to be available at time t-1) available in the market at time t-1. We assume the innovations from the model follow a generalized autoregressive conditional heteroscedasticity (GARCH) (1,1) model (see equations 9-11 below) and estimate the system by maximum likelihood assuming normally distributed error terms. The market price of risk is restricted to be the same in equations (6) and (7). To ensure that this restriction is met we estimate the system recursively, first estimating the time-varying price of risk $\_{mt}$ from the market equation (7), and then imposing this estimate on the equation (6).

$$h_{i,t} = \alpha_{i,1} + \beta^{2}_{i2}\varepsilon^{2}_{i,t-1} + \beta^{2}_{i1}h_{i,t-1} \quad (9)$$

$$h_{m,t} = \alpha_{m,1} + \beta^{2}_{m2}\varepsilon^{2}_{mt-1} + \beta^{2}_{m1}h_{m,t-1} \quad (10)$$

$$h_{im,t} = \alpha_{im,1} + \alpha_{i2}\alpha_{m2}(\varepsilon_{mt-1}\varepsilon_{i,t-1}) + \alpha_{i1}\alpha_{m1}h_{im,t-1} \quad (11)$$

Two approaches to the estimation are taken. First, the conditional covariance matrix of asset returns is assumed to follow a multivariate GARCH process with conditional correlation matrix of asset returns being *constant* over time (as in Bollerslev (1990)); and given the evidence against constant correlations (Ferson, 1989), a second estimation is carried out where the conditional correlation matrix of asset returns is assumed to be *varying* over time (as in Baba Engle, Kraft and Kroner (1989)). Once again, the null hypothesis of no performance ability is that alpha is equal to zero.

Section 3.2: Data Description

This study examines the returns of the global Dow Jones Islamic Market Index (DJIM) against the Datastream Global Index over the period January 1996 to December 1999. The DJIM is a subset of the Dow Jones Global Index[10] (DJGI). Made up of over 600 stocks, it is an Islamic equity benchmark index that excludes stocks from the DJGI whose company s primary business is impermissible based on the *Shari ah* (Islamic Law). The DJIM is a capitalization weighted price index computed on the basis of last prices. It does not include reinvested dividends and is based on December 31, 1995 with the base value set at 1000.

The components of the DJIM are selected by filtering the stocks through two broad screens. First, by primary business activity and, second, by financial ratios. The Dow Jones *Shari ah* Supervisory Board hold that the following industries and their financial instruments are inconsistent with Shari ah precepts and hence not suitable for Islamic investment purposes. These prohibited industries include: Alcohol (distillers and brewers), tobacco, pork related products, financial services (banking, insurance, securities brokers) due to the usury prohibition, defense/weapons and entertainment (hotels, casinos/gambling, cinema, pornography, music). Companies classified under other industry groups may also be excluded if they are deemed to have a material ownership or revenues from any of the above business activities.

After filtering out companies with unacceptable primary business activities, the remaining stocks go through several financial ratio filters based on criteria set up by the Shari ah Supervisory Board in order to remove companies with unacceptable levels of debts or impure interest income. These filters exclude companies if total debt to total assets exceeds 33%, and/or if accounts receivables to total assets exceeds 45% and/or if (non-operating interest income + impure income) to revenue exceeds 5%. Companies passing the above screens and meeting the high market capitalization and liquidity requirements of Dow Jones Indexes are included in the DJIM.

The Datastream Global Total Market Index obtained from Datastream is used as the proxy for the market portfolio. The three-month US treasury bill return obtained from Datastream is used as a proxy for the risk-free rate. This rate is subtracted from the DJIM and benchmark index returns to compute weekly excess returns.

[10] DJGI represents approximately 80% of the global equity market capitalization

The data consists of weekly (wednesday-to-wednesday to limit the day of the week effect) prices obtained from the Dow Jones & Company. The choice of the weekly data interval is largely a practical decision given the short sample period available (as the DJIM is relatively new). The use of monthly data, though common in empirical stock market studies[11] would reduce the number of observations to a level where the robustness of the results would be compromised.

Continuously compounded returns of the DJIM (R_{djim}), are calculated for the index and the benchmark as follows:

$$R_{djim} = \ln P_{djim,t}/P_{djim,t-1} \quad (12)$$

where P_{djim} is the end of week (Wednesday) offer price of the DJIM at week t.

The 3 month US treasury yields, stated in percent per annum are converted to continuous weekly rates of return ($R_{f,t)}$ as follows:

$$R_{f,t} = \ln(1+R_{a,ft})/52 \quad (13)$$

where $R_{a,ft}$ is the annual yield on the 3 month treasury bills at time t.

A number of pre-determined instruments have been shown to be important in predicting stock returns. This study uses five such lagged information variables[12] (Z_{nt-1} (n=1,..5). These are:

Z_1, the lagged excess return on the market, follows the work of Conrad, Gultekin & Kaul (1991) Fama & French (1988b). Z_2, (3 month treasury bill rate), short term interest rates

[11] Jensen 1968, Fama & MacBeth 1973, Fama & French 1992 in the US and Guy 1978 in the UK.
[12] collected from Datastream

are prominent instruments in a number of studies Fama & Schwert (1977). Z_3, the lagged weekly return on a 6-month t-bill less the weekly return on a 3-month t-bill, measures of the slope of the term structure of interest rates and is used to predict stock returns in a number of studies Campbell (1987). Z_4, the lagged weekly dividend yield on the benchmark index has been found to be positively related to the future returns of stocks (Fama & French (1988b, 1989)), Campbell & Shiller (1988) and Poterba & Summers (1988). Z_5, the redemption yield of ECU world corporate bonds rated non-AAA by JP Morgan less the AAA rated corporate bond yield proxies for a default related yield spread which has been used to predict returns by Keim & Stambaugh (1986), Fama & French (1989), and Fama (1990).

Summary statistics of the weekly excess returns of the DJIM (R_{djim}) and the market portfolio (R_m) are presented in Table 2. The mean excess return of the DJIM is 0.0032 compared to 0.0023 for the benchmark. This suggests that the DJIM outperforms but is this higher return simply a reward for higher risk as predicted by portfolio theory? The higher standard deviation of the DJIM relative to the benchmark seems to indicate this.

Table 2:- Summary Statistics Weekly Excess Returns

Series	Mean	Std Error	Min	Max	Skewness	Kurtosis
R_{djim}	0.0032	0.0191	-0.0690	0.0524	-0.5739	0.4832
R_m	0.0023	0.0184	-0.0542	0.0603	-0.4611	0.3752

The skewness and kurtosis for both series suggests that returns are not normally distributed.

Section 3.3: Empirical Results and Interpretation

This section examines the Sharpe, Treynor unconditional and conditional performance of the DJIM relative to the benchmark for the sample period January, 1996 to December, 1999.

The Sharpe and Treynor performance indices for the DJIM as well as the benchmark index are reported in Table 3 below. Both indices indicate that DJIM performed better than the aggregate market. Per unit of _, DJIM provided an average excess weekly return of 0.17 versus 0.12 for the benchmark; whilst per unit of beta, DJIM provided an average excess weekly return of 0.003 compared with 0.002 for the benchmark.

Table 3:- Sharpe and Treynor Performance Indices

Sharpe Performance Index	
R_{djim}	0.1709
R_m	0.1268
Treynor Performance Index	
R_{djim}	0.0033
R_m	0.0023

Given the well-documented random walk time series properties of returns, the data was tested for stationarity by employing the Augmented Dickey Fuller (ADF) unit root test to avoid the problem of spurious correlation. If the computed absolute value of the t-statistic exceeds the Dickey Fuller critical t-value, then we reject the null hypothesis that a unit root is present. The results in Table 4 suggest that we can reject the null hypothesis of a unit root and accept the null hypothesis of no serial correlation. This confirms that the data is stationary so the market model described by equation (5) can be estimated by OLS to determine whether the superior performance of the DJIM indicated by the Sharpe and Treynor measures in Table 3 is repeated and statically significant.

Table 4:- Augmented Dickey Fuller Unit Root Test Results

	Test Statistic	p-value	5% critical value
Serial Correlation CHSQ(1)			
R_{djim}	0.949	0.330	3.84
R_m	2.079	0.149	3.84
ADF t-stat (207 df)			
R_{djim}	-15.21	0.00	3.84
R_m	-14.29	0.000	3.84

After employing the Cochrane-Orcutt procedure to solve for serial correlation and the inclusion of dummy variables to mitigate the effect of outlier values, the diagnostic tests summarized in Table 5 show that the null hypotheses of no serial correlation, normality and homoscedasticity are accepted at the 5% level. However, the null hypothesis (model is not misspecified) of the Ramsey s RESET test of functional form, which is a general test of model misspecification, is rejected. This could be due to omitted

variables as the multifactor-asset pricing literature suggests (Fama & French (1993), Ross (1976) or time-variation of expected returns not captured by the model. The implication of the failure of this test is that OLS is no longer BLUE[13]. The efficiency of the estimators and any inference drawn therefrom is suspect.

Inspection of Table 5 shows that the DJIM has a positive Jensen measure that is significantly different from zero at the 5% level. Using the unconditional Jensen measure, the abnormal performance is 0.15% and the beta coefficient is close to one at 0.97. The coefficient of determination is also high at 0.93 suggesting that much of the returns of DJIM are due to market-wide movements. However, the failure of the model misspecification test means that any conclusions drawn from these results should be treated with caution.

[13] Best linear unbiased estimator

Table 5: Unconditional Jensen s _: Weekly Returns

	coefficient	estimate	t-statistic	p-value
R_{djim}	_	0.0015	4.05	0.000
R_{djim}	_	0.97	48.3	0.000
	R^2 = 0.93			

Diagnostic Tests	Test Statistic	p-value
Serial Correlation[14] CHSQ (1)	0.649	0.42
Functional Form[15] CHSQ (1)	6.779	0.009
Normality[16] CHSQ (2)	1.5617	0.458
Heteroscedasticity[17] CHSQ (1)	0.1416	0.141

In light of the above evidence and the discussion in previous sections of this study, the conditional performance of the DJIM is estimated as described by equations (6) to (11). Table 6 shows the results for the conditional Jensen measure and GARCH model predictions assuming the conditional covariance matrix of asset returns follows a multivariate GARCH process with conditional correlation matrix of asset returns remaining constant over time.

[14] Lagrange multiplier test of residual serial correlation
[15] Ramsey's RESET test using the square of the fitted values
[16] Based on a test of skewness and kurtosis of residuals
[17] Based on the regression of squared residuals on squared fitted values

Table:6 Conditional Jensen s alpha (constant correlation matrix of asset returns)

	coefficient	estimate	t-statistic	p-value
R_{djim}	_	0.000972	2.29	0.021
	_mt	13.1	2.33	0.019

GARCH model predictions	estimate	t-statistic	p-value
_i,1	0.000052	1.45	0.14
_i2	0.08432	1.69	0.09
_i1	0.7748	5.58	0.000
p	0.95	Q-stat	
Ljung-Box Q(20) S.C.		25.8	0.167
Ljung-Box Q(20) Heter.		21.9	0.341

The evidence in Table 6 suggests that once again, the performance of the DJIM was significantly greater than zero. However, using the conditional Jensen measure, the performance of DJIM was 0.0972%. This represents a 35% reduction on the measure of abnormal performance reported using the unconditional Jensen measure and clearly demonstrates the impact of incorporating conditioning information.

Table 7 below reports the results of estimating the conditional Jensen measure and GARCH predictions assuming the conditional correlation matrix of asset returns varies over time. The unconditional measure estimated in this was 0.114% and significant at the 5% level. This also represents a reduction from the unconditional measure though less marked (24%) than the constant correlation matrix estimation.

Table 7: Conditional Jensen s alpha (varying correlation matrix of asset returns)

	coefficient	estimate	t-statistic	p-value
R_{djim}	_	0.00114	2.81	0.004
	_mt	12.09	2.18	0.028

GARCH model predictions	estimate	t-statistic	p-value
_i,1	0.0000624	1.74	0.081
_i2	0.0872	1.70	0.089
_i1	0.7403	5.93	0.000
_i,m	0.0000423	2.04	0.041
Ljung-Box Q(20) S.C.		26.27	0.15
Ljung-Box Q(20) Heter.		22.89	0.294

To check the adequacy of the multivariate GARCH (1,1) specification, some diagnostic tests for serial correlations in the conditional first and second moments of the resulting residuals were conducted. Ljung-Box (1978) portmanteau tests were performed for up to 20^{th} order serial correlation of the standardized residuals $_{it}/\sqrt{h_{i,t}}$ and squared standardized residuals $_^2_{it}/\sqrt{h_{i,t}}$. From the p values in Tables 6 and 7 we see that the test statistics are not significant at the 5% level suggesting that the residuals from the estimated conditional models are well behaved and that the multivariate GARCH (1,1)

model provides an adequate description of the weekly stock returns. In both cases, there are indications of persistence (old news appears to have a greater impact than new news). However, the sum of the news and persistence coefficients is below one suggesting that the residuals are not following an integrated GARCH process. Both the constant correlation and varying correlation matrix of asset returns models rejected the normality null hypothesis with significant p-values at the 5% level of significance. However, Greene (2000) argues that due to the central limit theorem, the absence of normality may not be so critical to the interpretation of the results.

Table 8 reports the results of the estimation of the market price of risk as specified by the following equations.

$$R_{mt} = \lambda_{mt} var_{t-1}[R_{mt}] + \varepsilon_{mt}$$

$$\lambda_{mt} = \exp(b Z_{t-1})$$

$$h_{m,t} = \alpha_{m,1} + \beta^{2}_{m2} \varepsilon^{2}_{mt-1} + \beta^{2}_{m1} h_{m,t-1}$$

Table:8 Time-varying market price of risk

Constant correlation matrix of asset returns				Varying correlation matrix of asset returns			
	estimate	t-statistic	p-value		estimate	t-statistic	p-value
$\alpha_{m,1}$	0.000024	1.86	0.06	$\alpha_{m,1}$	0.000030	2.22	0.02
β_{m2}	0.0796	2.49	0.012	β_{m2}	0.101	2.49	0.012
β_{m1}	0.8451	12.614	0.000	β_{m1}	0.808	11.48	0.000
b1	-0.0069	-0.098	0.922	Wb1	-0.0069	-0.085	0.932
b2	-0.0095	-1.89	0.06	Wb2	-0.0095	-1.33	0.184
b3	0.019	1.33	0.184	Wb3	0.019	1.4	0.138
b4	0.0077	1.08	0.281	Wb4	0.0077	1.03	0.301
b5	-0.0043	-0.978	0.329	Wb5	-0.0043	-0.869	0.386

The coefficients of the information variables b1 to b5 are mostly insignificant. The exception is the lagged risk-free rate variable, b2 is both significant at 10 % and of the correct sign as predicted by the literature. Fama & Schwert (1977) show that future stock returns are negatively related to US treasury bills rates, which they interpret as

evidence that expected returns, are negatively correlated with expected inflation. However, once corrected for the expected heteroscedasticity[18], wb2 is also insignificant.

This study examines the effect of incorporating lagged information variables in the analysis of investment performance using weekly data for the DJIM over the period January 1996 to December 1999. The key result is that the DJIM showed superior performance. Since the conditional alpha implies that superior performance can only be generated if more information than is publicly available is used. This result begs the question of whether the cumulative effect of the Islamic screens is to somehow substitute for some form of private information.

Another interesting result is the estimate of the conditional Jensen s alpha, and its comparison with that obtained from the constant expected return version of the CAPM. Whilst the unconditional Jensen s alpha indicates average superior performance, the conditional Jensen s alpha, while still positive, tends towards neutral performance. This suggests that the abnormal return estimated from the constant expected return version of the CAPM was exaggerated and that a part of the return, was indicative of time variation in expected returns. Similar results are reported by Antoniou, Barr and Priestley (1998).

However, Ferson and Schadt (1996) and Ferson and Warther (1996) find that measured performance improves using conditional measures, indicating negative covariance between betas and expected market returns which is controlled for by the conditioning information. The findings of Ferson and Schadt (1996) are somewhat counter-intuitive as they suggest that fund managers increase (decrease) exposures to the market when a decrease (increase) in returns is predicted by the information variables. They propose

[18] White's Heteroscedasticity adjusted standard errors

two possible arguments to explain this seemingly perverse result. First is that managed funds may experience strong cash inflows when expected market return is high which are not immediately invested, causing beta to decline. Secondly, betas of underlying assets may change inversely with market performance. Given these arguments, it is not surprising that the results of this study indicate the reverse. The performance measured here is not that of a managed fund but an index making no attempt at market timing or selectivity and the issue of net cash inflows equally does not apply. Therefore measured performance declines using conditional measures indicating positive covariance between betas and expected market returns, as one would expect. The margin by which the conditional alpha decreased confirms the important role conditioning information plays in improving the accuracy of performance measurement.

CHAPTER 4

SUMMARY AND CONCLUSIONS

Ethical investment has always faced the prejudice that limiting one s potential investment pool, also limits one s potential for financial growth. Some studies have suggested that the stricter funds (such as Islamic ethical funds) may have even more difficulty performing. However, the results of this study indicate that any assumption that Islamic ethical investment is less financially profitable than other forms of investment is highly questionable.

As expected, the constraints placed on Islamically acceptable equity investments (by way of a variety of screens to filter out unacceptable stocks) appears to have an effect on the performance of such portfolios. The DJIM, when measured by the Sharpe, Treynor and unconditional CAPM appears to have earned superior returns. However, when account is taken of the non-stationarity of risk, using a conditional asset pricing model, this abnormal return is noticeably reduced.

This is an important result. Whilst some of the screens would imply a negative impact on performance others suggest a positive impact. This study indicates that the net effect of the various screens, even when a more rigorous measure of performance (taking account of time-varying expected returns) is used is not negative performance. However, several issues should be considered. First, the sample period considered (1996-1999) coincides with one of the longest bull runs in history and the screening possibly generates a portfolio biased in favour of stocks that do well in a bull market

(small caps, technology, growth stocks). Thus performance may be due to the non-ethical characteristics of the DJIM. It would be interesting to observe the relative performance of the DJIM during a prolonged market downturn. In addition, the prohibition on stocks, which derive a substantial part of their revenue from interest income, suggests that the index could by default be selecting companies that make the most productive use of their surplus cash. A similar argument can be put forward for the low receivables screens and more efficient working capital management. On the other hand, the low average leverage screen might reduce the risk of the index, whilst the sector exclusions (particularly financials), might increase the nonsystematic risk of the index. Finally, the positive results obtained by this study of an international fund may be difficult to replicate in a domestic market where the impact of limiting diversification might be felt to a greater degree. All this suggests that an examination of the possible relationships between the DJIM characteristics and the abnormal performance it exhibits in both the domestic and international context would make a valuable contribution to the literature.

Furthermore, given that ethically managed funds tend to levy higher management fees to compensate for the required monitoring and rebalancing of the fund and that the above measure takes no account of dividend income, it is unlikely, that investors will gain a significant economic advantage, if any, from this type of investment.

There are three main conclusions from this study. The first is that the Islamically constrained DJIM delivers significant abnormal returns over the period examined. Second, the abnormal performance indicated is affected by whether or not the model used to measure performance incorporates lagged information variables. The conditional measure reduces the unconditional measure by between 24-35%. Lastly, we can conclude that there may be no financial penalty to pay for following one s

conscience in financial investments but if these screens provide private information , we can expect this effect to be arbitraged away. As the influx of global investment banks into this field indicates, the ethical fund sub-sector may become increasingly attractive to those who may not share the ethical concerns but desire a share of the ethical rewards.

However, important questions still remain to be addressed which require systematic study. Longer data sets and more indices (including domestic, international and sector sub-indices) need to be measured both to obtain more robust results and to observe returns over changing market cycles. Portfolios could be constructed for each screen and combinations of the screens to ascertain and isolate the filter effects. Performance attribution could be conducted to determine other selection effects. In addition, recent developments in the asset pricing literature could be exploited to improve on the performance evaluation measure. These developments include the use of stochastic discount factors by Chen and Knez (1996) and Dahlquist and Soderlind (1999) which allow performance measurement to be conducted independent of the assumptions of the CAPM and hence its accuracy. With the use of SDFs, the issues of the benchmark error, time-variation of risk and conditional information can be addressed. Therefore, this is potentially a more precise approach to performance evaluation.

Further to the question of accurate measurement, is the question of what is being measured. A major issue remains the discrepancies between alternative measures, which in some cases measure different things and as we have seen, can give varying and in some cases conflicting results for the same portfolio return. One key conclusion that deserves reiteration is the need to use a broad set of measures over an extended period of time before conclusive inferences are drawn about performance.

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APPENDIX

Contents of Diskette

File Name	Program	Description
Instrumental Variables.xls	EXCEL	All Raw data
Thesis.fit	MFIT	Unconditional Jensen data
Variables.fit	MFIT	Information Variables data
Statdj.out	MFIT	ADF test results
Jensen.out	MFIT	Unconditional Jensen results & remedial diagnostics
Info.out	MFIT	Market Price of Risk
Alpha1.dat	WINRATS	Conditional Jensen data
Coninfo.prg	WINRATS	Constant Correlation Estimation program
Coninfores.prg	WINRATS	Constant Correlation Estimation results
Varinfo.prg	WINRATS	Varying Correlation Estimation program
Varinfores.prg	WINRATS	Varying Correlation Estimation results