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ETHICAL AND FAITH-BASED INVESTMENTS:
AN ASSESSMENT OF PERFORMANCE

A Thesis
Presented to the
Faculty of
California State University,
San Bernardino

In Partial Fulfillment
of the Requirements for the Degree
Master of Business Administration

by
Hisar Joel Munte
December 2009

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December 2009

Approved by:


Dr. Francesca Beer, Chair,
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9/25/2009
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ABSTRACT

This thesis explores the risk and return characteristics of socially responsible investing by comparing three indices, the Domini 400 Social Index (DS400 Index), the KLD Catholic Values 400 Index (CV400 Index), and the Dow Jones Islamic Market Index (DJIMI). The second purpose of the study is to contrast the returns of the three SRI indices to the conventional SP500 Index.

This project will utilize six different performance measures: Sharpe Ratio, Treynor Index, Jensen's Alpha measures, as well as the Sortino ratio, Treynor (SSD), and the Jensen (SSD) ratio. Further, the "one-way analysis of variance" (ANOVA) test is performed to see whether any of the indices mean significantly differ from the others, the test of Jarque-Bera to evaluate the normality of the indices distribution, and cointegration technique to detect long run equilibrium tendencies between CV400, DS400, and DJIMUS.

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CHAPTER ONE

BACKGROUND

Introduction

Neoclassical economics assumes that investments are chosen exclusively on the basis of two characteristics: expectations of return and expectations of risk. In classical financial theory (Markowitz, 1952), the choice of an efficient portfolio of assets, is based on the maximization of the investor's utility function, where each investor is only concerned by maximizing return and minimizing risk and disregards other rewards of a social nature.

However, according to the pioneering work of Sen (1999) there are a number of social, moral or ecological motives that modify market economics, adding weight to ethical decision-making in business. Ethical investment (or alternative finance) has objectives in socially responsible, ethical investment, in which the social return is of relevance alongside the financial return. Therefore, social return must therefore be added to these models.

In a bid to meet investor demands, mutual fund managers have developed un-conventional portfolios that

factor in ethics, sustainability, social, religious and environmental factors that affect returns. The socially responsible investing and conventional portfolios are subjected to maximization of returns and minimization of risks.

The first purpose of this study is to explore the risk and return characteristics of socially responsible investing by comparing three indices, the Domini 400 Social Index (DS400 Index), the KLD Catholic Values 400 Index (CV400 Index), and the Dow Jones Islamic Market Index (DJIMI). The second objective of the thesis is to contrast the three Socially Responsible Investment (SRI) indices with the Standard and Poor's 500 Index (SP500).

Universe of Mutual Funds

Mutual funds over the past two decades have become the preferred investment option for small-scale investors. This is reflected by the number of mutual funds far exceeding the listed securities in the New York Stock Exchange (NYSE) (Rouwenhorst, 2004). Table-1 shows that since 1986 the number of mutual funds available in the market has surpassed the number of securities listed in the NYSE,

which means that investor has put greater attention into this method of investment.

Table 1. Mutual Funds Compared with the New York Stock Exchange Listed Securities

Year	Mutual Funds (US)	Listed Companies (NYSE)
1980	564	1,570
1981	665	1,565
1982	857	1,526
1983	1,026	1,550
1984	1,243	1,543
1985	1,528	1,541
1986	1,835	1,575
1987	2,312	1,647
1988	2,737	1,681
1989	2,935	1,720
1990	3,079	1,774
1991	3,403	1,885
1992	3,824	2,089
1993	4,534	2,361
1994	5,325	2,570
1995	5,725	2,675
1996	6,248	2,907
1997	6,684	3,047
1998	7,314	3,114
1999	7,791	3,025
2000	8,155	2,862
2001	8,305	2,798
2002	8,244	2,783
2003	8,126	2,591
2004	8,041	2,642
2005	7,975	2,707
2006	8,118	2,764
2007	8,029	2,805

Source: 2008 Investment Company Fact Book (www.icifactbook.org) and NYSE (www.nyse.com).

Mutual funds high returns have been associated with diversification of investments. This entails investing in unrelated industries for the purpose of mitigating risk. These mutual funds invest in an array of securities in different industries thus reducing the risk exposure to their portfolios.

Mutual funds are the common name for open-end investment companies (Bodie, Kane, and Marcus, 2009). These companies issue shares when they receive money from investors and redeem the shares as the investors sell their shares (BusinessWeek, 1999). Mutual funds shares are valued by Net Asset Value (NAV), which is total assets less total liabilities per shares outstanding, calculated at the end of every trading day. Unlike any other form of investments, in mutual funds, with mutual fund, investors have the privilege to liquidate their investment any time at less or no cost. The changes (increase or decrease) in NAV and the addition of dividend or distribution of capital gains represent the return the investor obtain by investing in mutual funds.

In general, investors obtain plenty of privileges by investing in mutual funds. In addition to diversification and relative low cost of investment, mutual funds also

offer professional management, simplicity, and affordability that can explain their popularity.

Origin

Mutual funds have been around for a long time and date back to the second half of the 18th century (Huij, 2007). Rouwenhorst (2004) explained that mutual funds emerged as the outcome of a gradual process, in which merchants and brokers learned how to expand the range of investment opportunities to the general public during the 18th century. Yuksel (2007) stated that the idea of mutual funds has always been the same; pooling resources to allow small investors an opportunity to diversify, spreading risk across various countries and investments. "The growth of capital markets and the development of new investment opportunities allowed room for more mutual funds to emerge" (Yuksel, 2007).

Mutual funds started out as closed-end funds and have presently evolved into open-end funds. "Open-end funds allows the continuous issue and redemption of shares by the investment company at a price that is proportional to the value of the underlying portfolio." (Rouwenhorst, 2004).

Advantages and Limitations of Funds

As mentioned above, mutual funds provides substantial benefit to investors. Unfortunately mutual funds also have some drawbacks. First Federal Deposit Insurance Corporation (FDIC) does not insure mutual funds losses. Second, mutual funds are not free from fees. Most funds usually charges management and operating fees, ranging from 1.0% to 1.5% per year. In addition, some mutual funds charge high sales commissions, 12b-1 fees¹, and redemption fees. (<http://www.investorguide.com>).

Lastly, open-end mutual fund cannot be liquidated before the end of the trading period. A mutual funds value is estimated using their Net Asset Value (NAV). NAV is calculated once at the end of each trading day based on the closing market prices of the portfolio's securities (<http://www.investopedia.com>).

Different Type of Funds

At the fundamental level, there are three varieties of mutual funds²:

¹ An extra fee charged by some mutual funds to cover promotion, distributions, marketing expenses, and sometimes commissions to brokers. A genuine no-load fund does not have 12b-1 fees, although some funds calling themselves "no-load" do have 12b-1 fees (as do some load funds). 12b-1 fee information is disclosed in a fund's prospectus, is included in the stated expense ratio, and is usually less than 1%.

² <http://www.investopedia.com>/and <http://www.socialinvest.org>, retrieved February 9, 2009

1. Equity funds (stocks)

Funds that invest in stocks represent the largest category of mutual funds. The objective of this class of funds is long-term capital growth with some income. "There are, however, many different types of equity funds because there are many different types of equities." (www.investopedia.com).

2. Fixed-income funds (bonds)

Income funds are named appropriately: their purpose is to provide current income on a steady basis. "When referring to mutual funds, the terms "fixed-income," "bond," and "income" are synonymous. These terms denote funds that invest primarily in government and corporate debt. While fund holdings may appreciate in value, the primary objective of these funds is to provide a steady cash flow to investors." (www.investopedia.com).

3. Money market funds

The money market consists of short-term debt instruments, mostly Treasury bills. This is a safe place to invest the money. By investing in these types of funds an investor is assured of retaining his principal, though obtaining less returns. A typical

return is twice the amount you would earn in a regular checking/savings account and a little less than the average certificate of deposit (CD).

All mutual funds are variations of these three categories of asset classes. Based on investors preferences for risk and their desire for return, mutual funds can be further categorize into growth funds, balanced funds, specialty funds and so on. Specialty funds are mutual funds that mainly invest in specific criteria such as market, region, industry, or assets. Socially Responsible Funds (SRF) known as sustainable investment can be classified in this category. These funds select companies that meet specific criteria on beliefs. For instance, most SRF avoid companies involved with alcohol, tobacco, gambling, weapon, and pornography.

Sustainable Investment / Faith-based Investment

Jones, Van Der Laan, Frost, and Loftus (2008)

indicated that there are no distinct criteria that can be applied to a fund to be called sustainable investment. SRI is an extensive field for which no specific definition has been arrived at. However, it has generally been agreed upon by scholars that SRI encompass assets invested based on a

financial and non-financial criteria (Van Liedekerke, De Moor, and Vanwalleghem, 2007).

Renneboog, Horst, and Zhang (2008) mentioned that today's ethical investments belong to the fourth generation of SRI screens. "Negative and positive screens are often referred to as the first and second generation of SRI screens, respectively. The third generation of screens refers to an integrated approach of selecting companies based on the economic, environmental and social criteria comprised by both negative and positive screens. This approach is often called sustainability. The fourth generation of ethical funds combines the sustainable investing approach (third generation) with shareholder activism. In this case, portfolio managers or the companies specialized in granting ethical labels attempt to influence the company's actions through direct dialogue with the management or by the use of voting rights at Annual General Meetings." (Renneboog, Horst, and Zhang, 2008).

According to the Social Investment Forum / SIF (2005), SRI examine the social and environment consequences of investments while subjecting the firms to extensive financial information analysis. "In general, socially responsible investors favor corporate practices which are

environmentally responsible, support workplace diversity, and increase product safety and quality." (Social Investment Forum, 2005).

While the terms SRI and ethical investment are often used interchangeably, in some contexts, for some purposes, it may be worth making a distinction between the two - although in practice the distinctions made are not always the same. The argument is that "ethical investment" could accurately describe the process whereby value-based organizations applied "internal ethical principles" to an investment strategy. Others might apply the term ethical investment to the specialist or dedicated retail funds, but view SRI as a broader umbrella term which covers various related activities.

The "internal ethical principles" can be translated into "faith-based" investment term, which is a form of investing that considers religious faith teachings to guide or influence investment decisions. It goes to the core of religious belief and asks not only what we do but also why we do it.

Globally, there are many organizations that construct SRI indices. In U.S. alone there are many indices that provide similar SRI characteristics established and

provided by more than 10 different suppliers. Includes are SRI Index families provided by KLD Research and Analytics, Inc., Dow Jones Sustainability indices, FTSE4Good, Humanix, and Ethical. Below is a complete description of the three indices that are used in this thesis: The Domini 400 SocialSM Index, The KLD Catholic Values 400SM Index, and The Dow Jones Islamic Market Index.

The KLD Domini 400 SocialSM Index

KLD Research and Analytics³, Inc (KLD) established the Domini 400 SocialSM Index (DS400) in May 1990 as the world's first ethical social index that concern with environmental, social and governance factors (ESG).

KLD uses a two-step screening process for selecting companies for the DS400 (www.kld.com). Exclusion from involvement in alcohol, tobacco, firearms, gambling, nuclear power and military-weapons beyond specified revenue thresholds is a must for the first step process. In the next step selection, KLD required companies that have positive ESG records based on environmental stewardship, community relations, diversity, employee relations, human rights, product quality and safety, and corporate

³ KLD stands for Kinder, Lydenberg, Domini, and company.

governance issues. Regularly, KLD screens major companies from Standard and Poor's 500 companies and the largest 3000 U.S. equities that exhibit positive ESG.

(<http://www.kld.com/indexes/ds400index/index.html>).

The KLD Catholic Values 400SM Index

In May 1998, KLD turns its attention to Catholic investors by introducing The KLD Catholic Values 400 Index (CV400). "It was designed to represent the large-cap U.S. equity market available to Catholic investors who seek equity ownership in alignment with the moral and social teachings of the Church." (<http://www.kld.com>).

The CV400 also excludes companies involved with alcohol, tobacco, gambling, as well as weapons and nuclear power. Companies with an interest in abortion procedures or abortion - inducing drugs are also removed from the index. Interestingly, the index does not eliminate firms producing contraception, and/or firms that are involved with stem cell research.

The Dow Jones Islamic Market Index

The last index used in this thesis is the Dow Jones Islamic Market Index (hereafter the DJIM). DJIM is currently used as main indicator in evaluating the performance of Islamic funds of the appropriate category.

Launched in January 1997, DJIM provides a wide variety benchmarks tracking Sharia⁴-compliant securities including indices for specific countries, regions, industries and market capitalization ranges. It screened companies in 34 countries whose activities are consistent with Islamic principle (Hussein, 2005).

Companies, which are objectionable in Islamic funds, include the majority of financial institutions. The DJIM also exclude companies which are involved in the production, distribution, and/or profiting from alcohol, pornography, tobacco, gambling, weapons, music, entertainment, processing pork meat or non-halal meat, hotels and airlines which serve alcohol on their premises.

Typical Islamic fund holdings are technology, telecommunications, steel, engineering, transportation, health care, utilities, construction, as well as real estate.

⁴ "Muslim or Islamic law, both civil and criminal justice as well as regulating individual conduct both personal and moral. The custom-based body of law based on the Koran and the religion of Islam. Because, by definition, Muslim states are theocracies, religious texts are law, the latter distinguished by Islam and Muslims in their application, as Sharia or Sharia Law."
(<http://www.duhaime.org/LegalDictionary/S/ShariaLaw.aspx>, retrieved February 9, 2009)

CHAPTER TWO

LITERATURE REVIEW

"A literature review is an account of what has been published on a topic by accredited scholars and researchers" (www.utoronto.ca/writing/litrev.html). "It is also a critical, analytical summary and synthesis of the current knowledge of a topic"

(www.wesleyan.edu/libr/tut/litrev.html). "The purpose of a literature review is to convey to the reader what knowledge and ideas have been established on a topic and what are the strengths and weaknesses of what has been published. It also will allow the reader to be brought up to date regarding the state of research in the field and familiarizes the reader with any contrasting perspectives and viewpoints on the topic"

(www.library.ncat.edu/ref/guides.htm).

The literature review presented in this chapter was conducted using library resources, academic publications and the Internet. This chapter will be divided into 3 parts: Mutual Funds, Socially Responsible Investment, and Faith-based Investment. Part one is devoted to mutual funds. It presents studies related to mutual funds

persistence, predictability, and the measurement of performance. Part two focuses on socially responsible investment. This part will tackle the screening of the funds, costs, maturity, as well as the performance measure. Lastly, part three investigates faith-based investment by presenting studies that mainly discuss the current terminology of the funds.

Mutual Fund

Kenourgios and Petropoulos (2005) mentioned that mutual funds accomplished diversification by collecting funds from a wide group of investors and investing them in many securities all over the world. Mutual funds implement two basic types of investment strategies: active strategies invest in a variety of financial products, and passive strategies invest in a market index (Elton, Gruber, and Blake, 1996; Sharpe, Alexander, and Bailey, 1998). These strategies manage to reduce the level of unsystematic risk and increase the return. Elton, Gruber, and Goetzmann (2006) mentioned that the highest degree of diversification an investor can reach is obtained by holding a portfolio that includes a share of all tradable assets.

Financial organizations such as investment bankers, who sell mutual funds hire professional managers and security analysts who have specific skills in selecting stocks, hedging risk and forecasting the capital and money market. Along with the forecasting capacity, a successful portfolio that becomes attractive to investors and thus grows over time, also consider the past performance. For every investor, decision of considering past performance before investing is very important. Thus, historical performance is always the important part of mutual funds.

Mutual Funds Persistence and Predictability

Hendricks, Patel, and Zeckhauser (1993), Goetzman and Ibbotson (1994), Elton et al. (1996), and Gruber (1996) reported persistence in the returns of the top performing U.S. equity mutual funds. Carhart (1997) also demonstrated that most of the persistence is explained by differences in exposures to common risk factors. Furthermore, the author stated that funds' expenses are better predictors of future performance than past performance (for example, the higher a fund's expenses, the lower its expected return). These findings indicate that there is only little evidence to believe that fund managers are able to systematically increase returns through active stock selection and timing

strategies, and that investors are better off by purchasing shares of passively managed index funds.

Performance Measurement in Mutual Funds

Pedersen and Rudholm-Alfvin (2003) showed that the performance measures must satisfy the following criteria:

1. Appropriateness: The measure captures essential features of the asset return distribution, at a minimum risk and return,
2. Foundation: The measure should have a solid foundation either in finance theory or be a universally applied "market standard", and
3. Clarity: The measure must be easy to explain to a non-technical individual.

Bodie et al. (2009) revealed that a performance measure adequate for an investor who invests in one fund might not be appropriate for an investor who exclusively divides his/her wealth among various funds. For the investor who invest in just one fund, Eling and Schuhmacher (2007) showed that performance measure that look the relationship between the risk premium and the standard deviation of the returns generated by the fund are appropriate. While for the investor who looks to diversify its investment, the performance measure that also considers

the market index along with the risk premium and standard deviation will be relevant.

Classic performance measurements such as Sharpe (1966), Treynor (1966), and Jensen (1968) are commonly used to assess performance. The development of portfolio performance measurement itself has been proved to generate a helpful tool for investor to predict mutual fund performance and invest accordingly (Gruber, 1996, Zheng, 1999). Table-2 below summarizes the major studies:

Table 2. Performance Measures of Mutual Funds

Author(s)	Title	Findings
Darryll Hendricks, Jayendu Patel, and Richard J. Zeckhauser. (2008)	Hot Hands in Mutual Funds: The Persistence of Performance, 1974-87	"The net returns of no-load mutual growth funds exhibit a hot-hands phenomenon during 1974-87. When performance is measured by Jensen's alpha, mutual funds that perform well in a one-year evaluation period continue to generate superior performance in the following year. Underperformers also display short-run persistence. Hot hands persist in 1988 and 1989."

Dirk Nitzsche, Keith Cuthbertson, and Niall O'Sullivan. (2006)	Mutual Fund Performance.	"Key drivers of relative performance are, load fees, expenses and turnover. There is little evidence of successful market timing."
Dimitris F. Kenourgios, and Ioannis Petropoulos. (2005)	The Persistence of Mutual Fund Performance: Evidence From the U.K. Stock Market	"Persistence is weak. We do not find strong evidence that past returns provide information about future returns."
Christian S. Pedersen and Ted Rudholm-Alfvin. (2003)	Selecting a Risk-Adjusted Shareholder Performance Measure	"Present a survey of classic and modern performance measures and assess them against objective criteria. Depending upon the market, industry or group of assets studied and the preferences of investors, different measures gain favor and we propose key questions to address when selecting an appropriate performance measure. Our arguments are demonstrated empirically for the global financial services sector, for which we document strong evidence in support of using Sharpe Ratio-based measures."
S.P. Kothari, and Jerold B. Warner. (1997)	Evaluating Mutual Fund Performance.	"Regardless of the performance measure, there are indications of abnormal fund performance, including market-timing ability,

		when non-exists."
Edwin J. Elton, Martin J. Gruber, and Christopher R. Blake. (1996)	The Persistence of Risk-adjusted Mutual Fund Performance.	"Past performance is predictive of future risk-adjusted performance."
Zhiwu Chen and Peter J. Knez. (1996)	Portfolio Performance Measurement: Theory and Applications.	"This study investigates whether a fund manager helps enlarge the investment opportunity set faced by the investing public and, if so, to what extent the manager enlargers it."
F.A. Sortino and L.N. Price (1994)	Performance measurement in a downside risk framework	"Uses downside volatility (sometimes referred to as semi- volatility) as the denominator instead of standard deviation."
Mark Grinblatt and Sheridan Titman. (1994)	A Study of Monthly Mutual Fund Returns and Performance Evaluation Techniques	"The study finds that the measures generally yield similar inferences when using the same benchmark and that inferences can vary, even from the same measure, when using different benchmarks."
Roy D. Henriksson and Robert C. Merton (1981)	On Market Timing and Investment Performance. II. Statistical Procedures for Evaluating Forecasting Skills	"If the manager's forecasts are not observable, then the parametric test can be used under the assumption of either a capital asset pricing model or a multifactor return structure."
M.C. Jensen (1969)	Risk the Pricing of capital Assets, and the Evaluation of the Investment	"The observed historical patterns of systematic risk and return for the mutual

	Portfolio.	funds in the sample are consistent with the joint hypothesis that the capital asset pricing model is valid and that the mutual fund managers on average are unable to forecast future security prices."
J.L. Treynor (1966)	How to Rate Management Investment Fund	"In order to plot a fund, one needs both an expected rate of return and an appropriate measure of risk. A measure of risk is provided by the slope of the characteristic line (SML) "
William F. Sharpe (1966)	Mutual Fund Performance	"Compared the excess returns and risk as a basis of performance measurement using the Capital Market Line (CML) ."

Socially Responsible Investment

The field of ethical investment has been characterized by debates (Bruyn, 1987; Hylton, 1992) or lack of consensus about definitions (Cooper and Schlegelmilch, 1993; Frankel, 1984). According to the study conducted by Chieffe and Lahey (2009) SRI are defined in a variety of ways, depending on the viewpoint of the author. Henningsen (2002) for instance defined SRI as investing based on "(1)

choosing companies that reflect investors' values, (2) bringing pressure on firms that they invest in by engaging in shareholder activism, and (3) investing in projects that target community development initiatives." For Hill, Stephens, and Smith (2003), socially responsible investors are those who select firms they think use their beliefs and values in operating their business. Gay and Klaassen (2005) stated that as time evolved, screening criteria is now being used by fund managers to measure the conformity of those companies (workplace conditions, sustainable business operations, and other important aspects of the company) with their beliefs and values.

Cowton (1994) defined ethical investing as "the use of ethical and social criteria to select and manage investment portfolios". Ethical investment considers characteristics of particular investment opportunities along with expected risk and return. Perhaps some people are uncomfortable about identifying the grounds for ethics or think that it carries religious or moralizing overtones. Others object to the use of the word "ethical" because it seems to imply that mainstream approaches to investment are "unethical" (Purcell, 1980) - though following that line of reasoning, the usually preferred term of "socially responsible

investment" would seem to imply that normal investing is socially irresponsible, which might be no more appreciated than an implicit accusation of "unethical".

While the terms SRI and ethical investment are often used interchangeably, it may be worth making a distinction between the two - although in practice the distinctions made are not always the same. For example, Sparkes (2001) proposed a heuristic distinction, suggesting that the older term could usefully be restricted to non-profit making bodies such as churches, charities, and environmental groups. The argument was that "ethical investment" could accurately describe the process whereby value-based organizations applied "internal ethical principles" to an investment strategy. Others might apply the term ethical investment to the specialist or dedicated retail funds too, but view SRI as a broader umbrella term which covers various related activities.

In this thesis the SRI term used are defined as ethical investment. As far as SRI are concerned, previous studies focus varies. Some research investigates the screening process while others focuses on the cost associated with the investment. The studies discussed in this thesis have been divided into four categories:

1. Screening,
2. Cost,
3. Maturity, and
4. Performance.

Screening

Screening as mentioned in Social Investment Forum (2007) report, is the practice of evaluating investment portfolios or mutual funds based on social and/or environmental criteria. By screening potential investments, socially responsible investors ensure that the investments they select are consistent with their personal values, while also raising awareness to firms that are not responsive to social concerns. Screening includes strong Corporate Social Responsibility (CSR) performers, and profitable companies that make positive contributions to society. This include, for example, good employer-employee relations, strong environmental practices, products that are safe and useful, and operations that respect human rights around the world.

(<http://www.socialinvest.org/resources/sriguide/srifacts.cfm>).

As Table-3 shows, Sauer (1997) mentioned that the screening has change over time. From basically avoidance

from companies that involved in production of alcohol, tobacco, and gambling in the early 1900's, the screening continues to avoidance of country that involved in war (human rights issue) by the period of 1970's until 1980's. At the present time, ethical investors have a growing concern about the social issues such as environment, minorities, women, employees, and communities.

Table 3. Socially Responsible Investment Screening

Author	Title	Findings
D.A. Sauer (1997)	The Impact of Social-Responsibility Screens on Investment Performance: Evidence from the Domini 400 Social Index and Domini Equity Mutual Fund	"In the early 1900's, socially responsible investors avoided companies that were involved in the production of alcohol, tobacco, and gambling. During the early 1970's, socially responsible investors excluded firms associated with the Vietnam War and in the late 1970's and early 1980's, their attention shifted towards avoiding firms with business ties to South Africa. As time goes, social concerns have expanded to include the area of corporate citizenship where socially responsible investors evaluate corporate responsiveness to the

		needs of the environment, customers, employees, minorities, women, suppliers, and the community."
Michael L. Barnett, and Robert M. Salomon. (2006)	Beyond Dichotomy: The Curvilinear Relationship between Social Responsibility and Financial Performance.	"The results show that as the number of social screens used by an SRI fund increases, financial returns decline at first, but then rebound as the number of screens reaches a maximum. Furthermore, we find that financial performance varies with the types of social screens used."
Diltz, J. David (1995)	Does Social Screening Affect Portfolio Performance?	"Finds that environmental and military screens had a significant ($p < 0.05$) positive impact on portfolio performance."
Christopher C. Geczy, Robert F. Stambaugh, and David Levin. (2005)	Investing in Socially Responsible Mutual Funds.	"Finds important differences between the screened and unscreened funds: - Screened funds had an average expense ratio of 1.3% vs. 1.1% for unscreened ones. - Screened funds had lower turnover, 81.5% average vs. 175.4%. - Screened funds tended to be smaller, \$150 mm average assets vs. \$260 mm."

In relation to the screening process, the Social Investment Forum Foundation (2005) conducted a survey, and found that tobacco, alcohol, gambling, was consistently included in the screening process. The report showed that in 2005 there were 201 socially screened mutual funds in the United States (see Table-4). From those funds, there were five major applied social screenings: Tobacco was utilized by 162 funds (\$159 Billion in total net assets), Alcohol was utilized by 121 funds (more than \$134 Billion), Gambling by 116 funds with \$41 Billion in total net assets, Weapons was utilized by 100 funds (\$34 Billion), and Community Impact such as low-income individuals, childcare, healthcare, and affordable housing, by 95 funds with more than \$32 Billion in assets (see Figure-1).

Table 4. Socially Screened Mutual Funds, 1995 - 2005

	1995	1997	1999	2001	2003	2005
Number of Funds	55	144	168	181	200	201
Total Net Assets (In Billions)	\$12	\$96	\$154	\$136	\$151	\$179

(Source: Social Investment Forum Foundation)

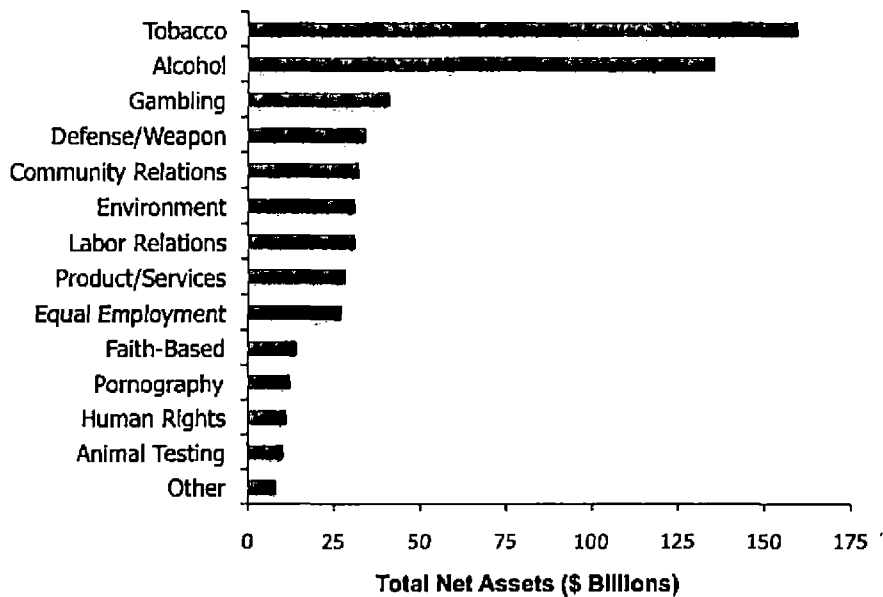


Figure 1. Mutual Fund Assets by Screen Types, 2005
 (Source: Social Investment Forum Foundation)

Study also showed that the increasing number of screen used eventually impacted the performance of the funds (Barnett and Salomon, 2006). Screening such as environmental and military screening proved to had a positive impact on portfolio performance (Diltz, 1995). Nevertheless, further study by Geczy, Stambaugh, and Levin (2005) found a correlation between screened funds and unscreened funds. Screened funds, seems have a higher expense compared with the unscreened funds, thus tend to be smaller in total assets, and lower turnover rate.

Socially Responsible Investment Costs

Ethical and faith-based investment may involve high costs in its screening activities. Hussein and Omran (2005) mentioned that costs correspond with implementing ethical screens may affect the performance. Funds that do not screen their holding could perform better than the screened funds because of its lower cost.

As illustrated in Table-3, Geczy, Stambaugh, and Levin (2005) showed that it is expensive to screen investment. They attempt to address these following questions, "Do investors who allocate their wealth to socially responsible equity mutual funds pay a price for their willingness to "do good deeds" via their investments? Research showed that the answer depends on "what fraction of their portfolios they restrict to SRI funds as well as their prior beliefs about pricing models and manager skill." Kurtz (1997) responded by showing that SRI stocks do not appear to underperform the market and there are always costs to diversification and information effects.

Stone, Guerard, Gultekin, and Adams (2001), corroborating the findings of Waddock and Grave (1977), mentioned that "No cost in risk-adjusted return means that an organization can affirm its social values without

foregoing return. However, if socially responsible investing provides better risk-adjusted returns, then socially responsible investing is not just a question of costlessly affirming organizational values but also rather a question of prudent investment management. If socially responsible investing can consistently provide superior risk-adjusted returns, then it pays to be socially responsible even if there is no issue of affirming social values."

Maturity of Socially Responsible Investment

Reviewing the development of socially responsible investment (SRI) in recent years, Sparkes and Cowton (2004) reported that the industry has grown significantly and matured, in the sense that it has become more complex and begun to enter the mainstream of investment practice. This maturation of SRI has important implications. SRI has changed from an activity carried out by a small number of specialist retail investment funds (in the form of unit trusts and mutual funds), probably of negligible or minor economic importance, into an investment philosophy adopted by a growing proportion of large investment institutions, i.e. large pension funds and insurance companies. Table-5 summarizes the studies conducted about SRI maturity.

Table 5. Socially Responsible Investment Maturity

Author	Title	Findings
Christopher C. Geczy, Robert F. Stambaugh, and David Levin. (2005)	"Investing in Socially Responsible Mutual Funds"	"The SRI constraint imposes large costs on investors whose beliefs allow a substantial amount of fund-manager skill, i.e., investors who rely heavily on individual funds' track records to predict future performance."
Russell Sparkes and Christopher J. Cowton. (2004)	The Maturing of Socially Responsible Investment: A Review of the Developing Link with Corporate Social Responsibility	"The paper argues that not only has SRI grown significantly, it has also matured. In particular, it has become an investment philosophy adopted by a growing proportion of large investment institutions."
Stephen Dillenburg, Timothy Greene and O. Homer Erikson. (2003)	Approaching Socially Responsible Investment with a Comprehensive Ratings Scheme: Total Social Impact	"This paper describes the evolution of SRI ratings and the role that total social impact hopes to play in affecting business behavior by promoting principled business leadership."

Socially Responsible Investment Performance Measure

Measuring and valuing SRI-performance is still in its infancy and the results reported so far are sobering. The performance of current SRI investment strategies and mutual funds do not seem to stand out among other mainstream investment strategies. Researchers also question the relationship between social responsibility and the profitability of companies as well as the relationship between SRI and investment returns. Many studies on the relationship between various elements of environmental, social, and governance (ESG) issues and profitability are inconclusive and have not brought research much further (Margolis and Walsh, 2001).

Table 6. Socially Responsible Investment Performance

Author	Title	Findings
Luc Renneboog, Jenke Ter Horst, and Chendi Zhang. (2008)	Socially Responsible Investments: Institutional Aspects, Performance, and Investor Behavior.	"Conclude that the existing studies hint but do not unequivocally demonstrate that SRI investors are willing to accept suboptimal financial performance to pursue social or ethical objectives."
Chris Goodmacher. (2006)	The Effects of Ethical Screens on Socially	"Finds that "the mean raw [excess] returns for the

	Responsible Fund Performance.	group of SRI funds are actually superior to those of the group of non-SRI funds," although this difference was not statistically significant."
Karen L. Benson, Timothy J. Brailsford and Jacquelyn E. Humphrey. (2006)	Do Socially Responsible Fund Managers Really Invest Differently?	"Prior findings generally suggest that, on a risk-adjusted basis, there is no difference in performance between SRI and "conventional funds.""
James Chong, Monica Her, and G. Michael Phillips. (2005)	When It's 'Good', It's Good; When It's 'Bad', It's Better.	Over this time period both the Domini and Vice Fund outperformed the market after fees, but the magnitude of the Vice Fund's outperformance was greater."
N. Kreander, R.H. Gray, D.M. Power, C.D. Sinclair. (2005)	Evaluating the Performance of Ethical and Non-ethical Funds: A Matched Pair Analysis.	"There is no difference between ethical and non-ethical funds according to the performance measures employed." (Based on 60 European funds from four countries.)
Rob Bauer, Kees Koedijk and Rogér Otten. (2005)	International Evidence on Ethical Mutual Fund Performance and Investment Style.	"No evidence of significant differences in risk-adjusted returns between ethical and conventional funds for the 1990-2001 periods." (Using an international

		database containing 103 German, UK and US).
Nicolas P. Bollen and Mark A. Cohen. (2004)	Mutual Fund Attributes and Investor Behavior.	"The alphas of the social funds were higher than those of the conventional funds. "Results suggest that SR investors are just as concerned about the performance of their investment as investors in conventional funds, if not more so. Nonetheless, mutual funds companies, which continually compete to offer new funds in an effort to attract investor capital, can expect SR investors to be more loyal than investors in ordinary funds."
Emily Hall (2004)	Evaluating Socially Responsible Funds.	"Perform about as well as funds that pay no attention to ethical considerations when building their portfolios."
Michael Schröder (2003)	"Socially Responsible Investments in Germany, Switzerland and the United States - An Analysis of Investment Funds and Indices"	"Most of the SRI assets have a similar performance than their benchmarks."
Michael L. Barnett, and Robert M. Salomon. (2003)	Porous, Pious, and Prosperous: The Curvilinear Relationship Between Social	"There are several interesting findings: 1) The screened funds

	Responsibility and Financial Performance.	Underperformed the SP500 on a nominal basis, but outperformed on a risk-adjusted basis. 2) The best performers were those with the strongest and weakest social screens - funds with moderately stringent screens lagged."
Christoph Butz. (2003)	Decomposing SRI Performance - Extracting Value Through Factor Analysis.	"They find that social factors had a notably greater positive impact on returns than environmental factors, which they note, "sharply contradicts the findings of other studies.""

As Table-6 shows, there are many studies of SRI performance that was conducted from different points of view. Studies such as Hamilton, Jo, and Statman (1993) could not reject the hypothesis of a statistically significant difference between the risk-adjusted returns of SRI and other fund. Statman (2000, 2005), as well as Sauer (1997), compares the performance of the DS400 Index and the SP500 index. Utilizing Jensen's alpha and Sharpe's ratio as measures of performance, they found that the DS400 raw

return and risk-adjusted returns are higher than the SP500 index.

Faith-Based Investment

The internal ethical principles can be translated into faith-based investment term, which means a form of investing that considers religious faith teaching to guide or influence investment decisions. It goes to the core of religious belief and asks not only what we do but also why we do it. The Social Investment Forum report (2005) mentioned that faith-based investing history was long stretches over centuries.

Culture and religion has played an important role in the investment decision. Investors from Christian, Islam, and Jewish background carefully considered their investment choices and have consistently chosen investments that align to their beliefs. In United States, Christians from different denominations as early as 1928 have shied away companies that might have benefited from the slave trade or were involved in tobacco, alcohol, and gambling.

(<http://www.corostranberg.com>). In U.K., as reported by Kreander, McPhail, and Molyneaux (2004), faith-based institutional investors from Methodist Church and Church of

England has remain significant until nowadays. Today, SRI has matured beyond church-based activism with single-issue concerns, into a broad agenda for socially and environmentally responsible financing (Richardson, 2007).

Additionally, Girard and Hassan (2005) described that Islam has also screened companies based on *riba* or interest which is spurn in the religion. "Muslims deem that profit should come as a result of efforts; this is not the case in interest-dominated investments. Further, there is a desire to have investment portfolios which are morally purified. Thus investments in companies that are not in compliance with Muslims moral orientations are not permitted and are eliminated from the portfolio."

Summary

To summarize, the studies explained in this chapter lead to the conclusion that ethical investment and faith-based investment might have higher returns than the conventional investment. However, there is another reward that yields from such investments. Socially and ethically conscious investors seek to invest in assets that will yield profit and at the same time give them peace of mind. The motivation behind investing in socially and ethically

investment based on their principles is not solely profit but also the peace of mind. Therefore, investing in these kinds of investments will have high moral values for the society.

CHAPTER THREE

DATA AND METHODOLOGY

Data

As mentioned in Chapter One, a sample of SRI Funds was collected from various index databases. The data was obtained from KLD Research and Analytics, Inc. for DS400 and CV400 indexes, and Dow Jones Indexes Databases for DJIMUS⁵. These data include 360 monthly observations over the period July 1998 to June 2008. A list of the SRI monthly returns is provided in Appendixes C through E. The major benchmark for these indices is SP500 and the data was taken from CRSP, The University of Chicago.⁶

Table 7. Types of Index and Number of Data Used

Index	Data			
	Inception Date	Data Start	Data End	Number of observations
DS400	May 1990	July 1998	June 2008	120
DJIMUS	January 1997	July 1998	June 2008	120
CV400	May 1998	July 1998	June 2008	120
			Total	360

(Source: various).

⁵ For the consistency with other two U.S. based market index (DS400 and CV400) and S&P500 Index as comparison, Dow Jones Islamic U.S. Market Index (IMUS) is used. IMUS is part of Dow Jones Islamic Market Index (DJIM).

⁶ CRSP (*Center of Research in Security Prices*) Daily NYSE/AMEX/NASDAQ Stock File, The University of Chicago.

As shown in the Table-7, DS400 was established in May 1990, DJIMUS in January 1997, and CV400 in May 1998. To insure adequate comparability, analysis in this thesis focuses on the period of July 1998 to June 2008, which is 120 months of observations per indices studied.

Methodology

There are six different performance measures used in this thesis: the Sharpe's, Treynor's, Jensen's Alpha measures, as well as the Sortino ratio, Treynor (SSD), and the Jensen (SSD) ratio. Using these measures, we analyze the ethical and faith based funds describe in this chapter to determine if there is a difference between the returns of the three ethical and faith based indices. If a difference exists, which index provides the highest return. The ethical and faith based indices to the conventional SP500 index are also compared to determine whether they outperformed the market. Each performance measure is presented below. Further, we rely on the "one-way analysis of variance" (ANOVA) test to see whether any of the indices means significantly differ from the others. Because ANOVA requires that the indices are independent and identically normally distributed, we also used the test of Jarque-Bera

to evaluate the normality of the indices distribution. Finally cointegration technique is used. Cointegration analysis detects long run equilibrium tendencies between CV400, DS400, and DJIMUS.

Risk-Adjusted Performance

As commonly done in the financial literatures, all index series returns are calculated using the continuously compounded formula (Hussein and Omran, 2005):

$$R_t = \ln\left(\frac{P_t}{P_{t-1}}\right) \quad (1)$$

where P_t and P_{t-1} represent the closing price of an index at time t and $t-1$ respectively and \ln is natural logarithm.

Performance Measures

All mainstream quantitative performance measures attempt to accurately capturing risk and returns. In 1952 Harry Markowitz (1952) introduces modern portfolio theory. Markowitz assumed that the investors have "mean-variance" preference, i.e. they select securities based on their risk and return characteristics. Subsequently, based on Markowitz study, and the assumption of standard market

condition, Sharpe (1964), Litner (1965) and Mossin (1969), established the CAPM (Capital Asset Pricing Model):

$$r_p - r_f = \alpha_p + \beta_p \times (r_m - r_f) + \varepsilon_p \quad (2)$$

where r_p is the portfolio returns, r_m is the return on the market portfolio, r_f is the risk-free returns, β is the systematic risk as defined in terms of the covariance between the portfolio and market returns, and ε_p denotes unsystematic risk, i.e. the risk of price change due to the unique circumstances of a specific portfolio, as opposed to the overall market (Pedersen and Rudholm-Alfvén, 2003).

Based on the fundamental financial theory, Sharpe (1966) ratio is calculated by subtracting the return on a benchmark asset, such as the risk free rate of return from the rate of return for a portfolio studied and dividing the result by the standard deviation of the portfolio returns:

$$\text{Sharpe Ratio} = \frac{r_i - r_f}{\sigma} \quad (3)$$

where r_i represents return on index, r_B with B is the benchmark, and σ is standard deviation of the index. The benchmark could be the TBILL, Treasury Notes, Treasury Bonds, or even the SP500 depending of the goal of the study. In this thesis, our goal is to compare the performance of SRI and faith-based investment with market portfolio, i.e. the SP500. Generally, higher Sharpe ratio indicates higher or superior performance, while lower Sharpe indicates poor performance.

Second, Treynor (1966) measure (Treynor Index-TI) developed by Jack Treynor is computed using the formula below. TI calculates the returns earned in excess of that which could have been earned on a riskless investment per unit of market risk.

$$\text{Treynor Index} = \frac{r_i - r_f}{\beta_i} \quad (4)$$

where r_i and r_B are as defined previously, and β_i is beta of the security. The higher the value of Treynor index, the more return gained per unit of risk and vice versa. The difference between TI and SR is that the former deals with the standard deviation for the indices while the latter use

the systematic risk or beta as a measure of risk.

Third, the adjusted Jensen's (1968) alpha index performance (Jensen Alpha) is a risk-adjusted performance measure that represents the average return on a portfolio over and above that predicted by the Capital Asset Pricing Model (CAPM), given the portfolio's beta and the average market return. It is calculated as:

$$\alpha = r_i - [r_f + \beta(r_m - r_f)] \quad (5)$$

Where r_i , r_f , β_i , are as defined above and r_B is the SP500 Composite Index which is the benchmark in this thesis.

Alpha evaluates returns that the fund has generated against the returns actually expected out of the fund given the level of its systematic risk, a positive Jensen Alpha indicates the index return more than expected.

"The Sharpe Ratio and the Treynor Index have the convenient property of being completely captured by a risk-return frontier, as illustrated in Figure-2, from which one can interpret them as the slope of the efficient line, or return per unit risk." (Pedersen and Rudholm-Alfvin, 2003).

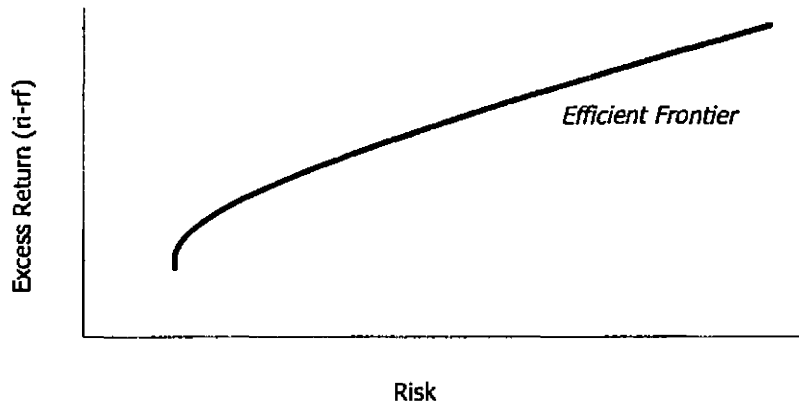


Figure 2. Illustrative Risk/Return Diagram

Regardless of how well the return and variance fit in the quantitative performance measures, return and variance preferences does not always give a fair description of the financial markets (Pedersen and Rudholm-Alfvin, 2003). Here are the conditions:

- Condition 1: Portfolio returns can be characterized completely by the mean and variance of the return distribution.
- Condition 2: Investors care only about the mean and variance of the return distribution.⁷

⁷ In this thesis, the focus not only in mean and variance but also in another factors, such as social, moral or ecological motives (best known as alternative investment: ethical investment).

A consequence of Condition 1 is that the performance measures of Sharpe, Treynor, and Jensen Alpha are appropriate when returns are normally distributed. Unfortunately, reality is complex and returns are rarely normally distributed. Capital markets include illiquid assets and are regulated. Returns distribution is often characterized by "fat tails" and "skewness".

Further, the hypothesis that investor's preferences can adequately be apprehended by a quadratic utility function is intuitive. A quadratic utility function implies that as people become wealthier their risk aversion increase.

Finally, evidence from Fishburn and Kochenberger (1979), Luce (1980), Sarin (1987), Fishburn (1980, 1981), Kahnemann and Tversky (1979), and Thaler (1993) showed that investors are concerned with earning less than expected not more, for instance they try to avoid "downside" volatility only. Notice that, private investors are not the only class of investors exhibiting such behavior. Recent studies by Sortino and Price (1994), Balzer (1994), and Damant and Satchell (1996) showed that institutional investors exhibit similar loss aversion. These investors are rewarded when they exceed a target and "punish" when they do not exceed.

Alternative Performance Measures

When the underlying assumptions are violated, alternative measure can be used. One of the best known measure is the Lower Partial Moments or LPM (t,k), captures asymmetries in both investor preferences and asset returns, it is defined by:

$$LPM_p(t,k) = \left[E(t - r_p)^k | t > r_p \right]^{\frac{1}{k}} \quad (6)$$

In Equation-6, t is the benchmark which performance is measured. It can be risk-free rate (i.e. $t = r_f$), mean returns (i.e. $t = \mu_p$) or a specific external benchmark against which performance is measured; k, is the variables that explains the sensitivity to extreme losses; the higher the value of k, the more extreme losses contribute to risk in relative terms (Pedersen and Rudholm-Alfvén, 2003).

LPM uses only the returns that are less than a predetermined benchmark, for example the risk free rate. As can be seen in Equation-6, when the variable k increases, extreme losses increase the value of LPM.

Several sub-cases of LPM (t, k) can also be used, i.e.: absolute shortfall (AS), the probability of shortfall (PS), and semi-standard deviation (SSD):

$$AS = LPM_p(t, 1) = [E(t - r_p) | t > r_p], \quad (7)$$

$$PS = LPM_p(t, 0) = \text{Prob}(r_p < t), \quad (8)$$

$$SSD = LPM_p(r_f, 2) = [E(r_f - r_p)^k | t > r_p]^{\frac{1}{k}} \quad (9)$$

Hogan and Warren (1972), Bawa and Lindenberg (1977), Harlow and Rao (1989), and Satchell (1996) introduced a SSD derived CAPM. In the model, "the risk measure, β^{SSD} , is defined in terms of the "semi-covariance" with the market." Pedersen and Satchell (2002) proved that the risk/return frontier, when risk is defined by SSD equation, exhibits the same desirable convexity properties of the traditional mean-variance frontier, thus rendering it amenable for portfolio analytics. The SSD has lead to the use by Henriksson and Merton (1981), Henriksson (1984), Pedersen and Satchell (2000) of a SSD Treynor Index and a SSD Alpha.

$$\text{Treynor (SSD)} = \frac{r_i - r_f}{\beta_i^{\text{SSD}}} \quad (10)$$

$$\text{Jensen Alpha (SSD)} = \alpha^{\text{SSD}} \quad (11)$$

In addition to the Treynor (SSD) and the Jensen Alpha (SSD), a last ratio has been added in our analysis, the Sortino Ratio introduced by Sortino and Price (1994). The Sortino ratio can be expressed as:

$$\text{Sortino} = \frac{r_i - r_f}{\text{SSD}} \quad (12)$$

To conclude, six measures are used in this thesis, the Sharpe's Ratio, Treynor's Index, Jensen's Alpha measures, as well as the Sortino ratio, Treynor (SSD), and the Jensen (SSD) ratio. The performance measures, as Pedersen and Rudholm-Alfvén (2003) said, is more convenient to work with if its satisfied at a minimum the following criteria:

1. Appropriateness: The measure captures essential features of the asset return distribution, at a minimum risk and return.
2. Foundation: The measure should have a solid foundation either in finance theory or be a universally applied

market standard.

3. Clarity: The measure must be easy to explain to a non-technical individual.

For the six measures described before fulfilled all these criteria mentioned above.

ANOVA and Cointegration

As mentioned, this thesis also tests the indices mean equality (ANOVA) and level of cointegration. These tests are described next. Further, because the ANOVA procedure relies on the assumption of normality for the indices returns, the normality test is presented first.

Normality Test

A normality test is a statistical process used to determine if a sample or any group of data fits a standard normal distribution (<http://www.isixsigma.com>). There are two well-known ways of testing normality: graphical methods and numerical methods (see Park, 2008). Graphical methods visualize the distributions of random variables or differences between an empirical distribution and a theoretical distribution (e.g., the standard normal distribution). Numerical methods, presents summary statistics such as skewness and kurtosis, or conduct

statistical tests of normality using Q-Q plot Shapiro-Wilk, Shapiro-Francia test, Kolmogorov-Smirnov test, Lilliefors test, Anderson-Darling/Cramer-von Mises tests, Jarque-Bera test, and Skewness-Kurtosis test. In this thesis, Jarque-Bera statistic test will be used for testing whether the series is normally distributed. This test statistic measures the difference of the skewness and kurtosis of the series with those from the normal distribution. The Jarque-Bera test has been selected because in most paper reviewed and presented in the literature review chapter, it is the test the most widely used. Additionally the test is more easily interpretable than some of the other tests. The test statistic is expressed as:

$$\text{Jarque-Bera} = \frac{N}{6} \left(S^2 + \frac{(K-3)^2}{4} \right) \quad (13)$$

where S is the Skewness and K is the Kurtosis (Jarque and Bera, 1980).

Mean-Equality Test

This test is based on a single-factor, between-subjects, analysis of variance (ANOVA). The basic idea is that if the subgroups have the same mean, then the

variability between the sample means (between groups) should be the same as the variability within any subgroups (within group)⁸. The between and within sums of squares are defined as:

$$SS_B = \sum_{g=1}^G n_g (\bar{x}_g - \bar{x})^2 \quad (14)$$

$$SS_W = \sum_{g=1}^G \sum_{i=1}^{n_g} (\bar{x}_{ig} - \bar{x}_g)^2 \quad (15)$$

where \bar{x}_g is the sample mean within group, g and \bar{x} are the overall sample means. The F-statistic for the equality of means under the assumption that the subgroup means are identical is computed as:

$$F = \frac{SS_B / (G - 1)}{SS_W / (N - G)} \quad (16)$$

where N is the total number of observations. The F-statistic has an F-distribution with $G-1$ numerator degrees of freedom and $(N-G)$ denominator degrees of freedom under the null hypothesis of independent and identical normal

⁸ EViews 6 Users Guide. Quantitative Micro Software, LLC.

distribution, with equal means and variances in each subgroup. This test is conducted using the monthly returns data of the CV400, DS400, DJIMUS index, and SP500.

Cointegration Test

The purpose of the cointegration test is to determine whether a group of variables are cointegrated or not.

"Cointegration is a statistical property possessed by some time series data that is defined by the concepts of stationarity and the order of integration of the series. A stationary series is one with a mean value which will not vary with the sampling period. For instance, the mean of a subset of a series does not differ significantly from the mean of any other subset of the same series. Further, the series will constantly return to its mean value as fluctuations occur. In contrast, a non-stationary series will exhibit a time varying mean." (Khayum, Cordo, and Rhim, 2005).

"If there is a linear relationship between two sets of non-stationary variables (in this case a SRI fund and its peer) which renders them stationary, then the variables are said to be cointegrated. This suggests that even though a SRI or its peer group may tend to trend up or down in a non-stationary fashion, they may have a long-run

equilibrium relationship. This implies that social screens do not cause a SRI's temporal behavior to diverge from its peer." (Reyes and Grieb, 1998).

For the purpose of knowing the cointegration relationship, Johansen (1991,1995) cointegration tests are conducted. However, prior to conducting cointegration test, Kwiatkowski-Phillips-Schmidt-Shin unit root statistic test is performed to indicate whether the variables are stationary or not.

CHAPTER FOUR

FINDINGS

This chapter provides data-analysis and provides the results. The chapter is organized as follows. Firstly, the monthly return distributions of CV400, DS400, DJIMUS, and SP500 are analyzed. Secondly, the performance of each index (CV400, DS400, and DJIMUS) is evaluated using the six performance measurements discussed in previous chapters. Thirdly, empirical tests will be performed on the data to evaluate the hypothesis that there is a significant difference between the returns of the indices studied. The tests include normality test, mean-equality test, and cointegration test.

Basic Statistics

Figures-3 presents the monthly returns of DS400, CV400, DJIMUS. The graph shows a high level of correlation between the indices studied, and it also indicates that the Dow Jones Islamic Market U.S. Index (DJIMUS) fluctuate more than the other two indices (Figures-4 and 6). When the market goes up, it generated higher returns than Catholic Index (CV400) and Domini Social Index (DS400); and when the

market down, DJIMUS seems to have higher loss than its counterparts. It is apparent from the graph that all indices moved together in all the period from 1998 to 2008, except few periods in the year of 2003 and 2006 for DJIMUS (that shows positive and negative returns respectively due to the component changes in the index as a result of the regular quarterly review. Some companies were being removed due to their failure to meet financial screening requirements).

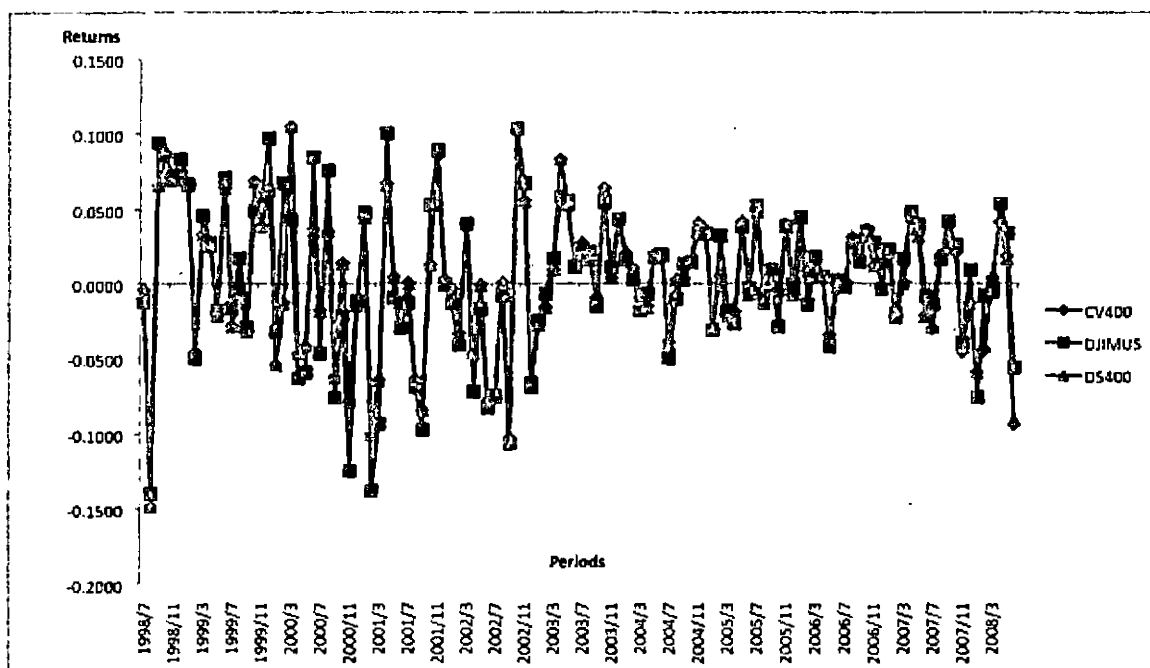


Figure 3. The Monthly Return of CV400, DS400, and DJIMUS.

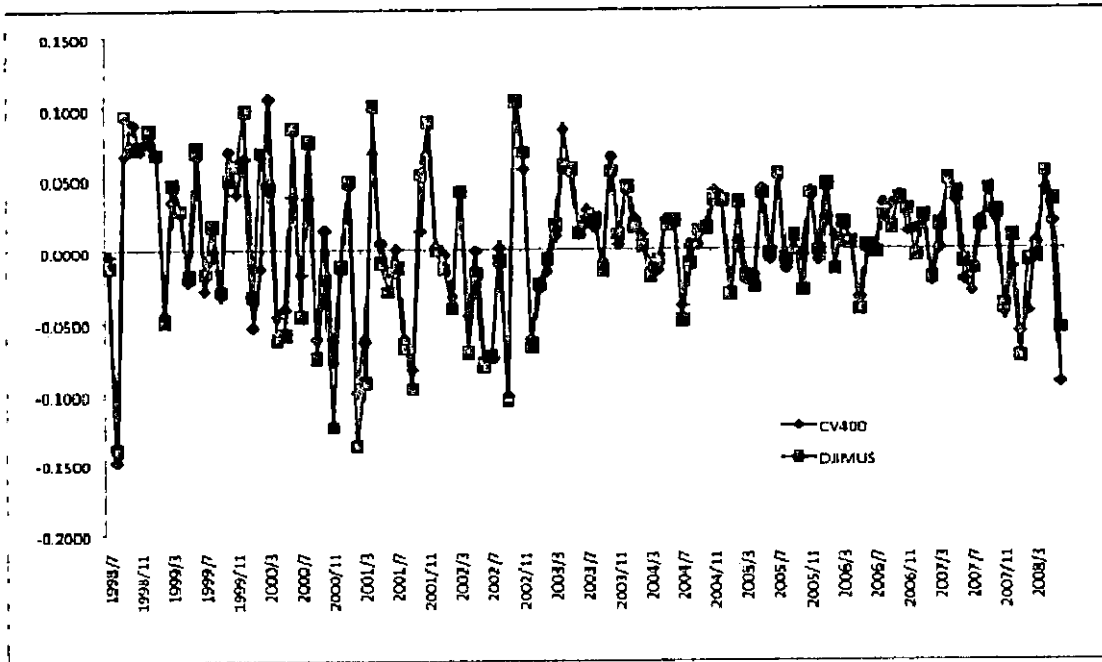


Figure 4. The Monthly Return of CV400 and DJIMUS.

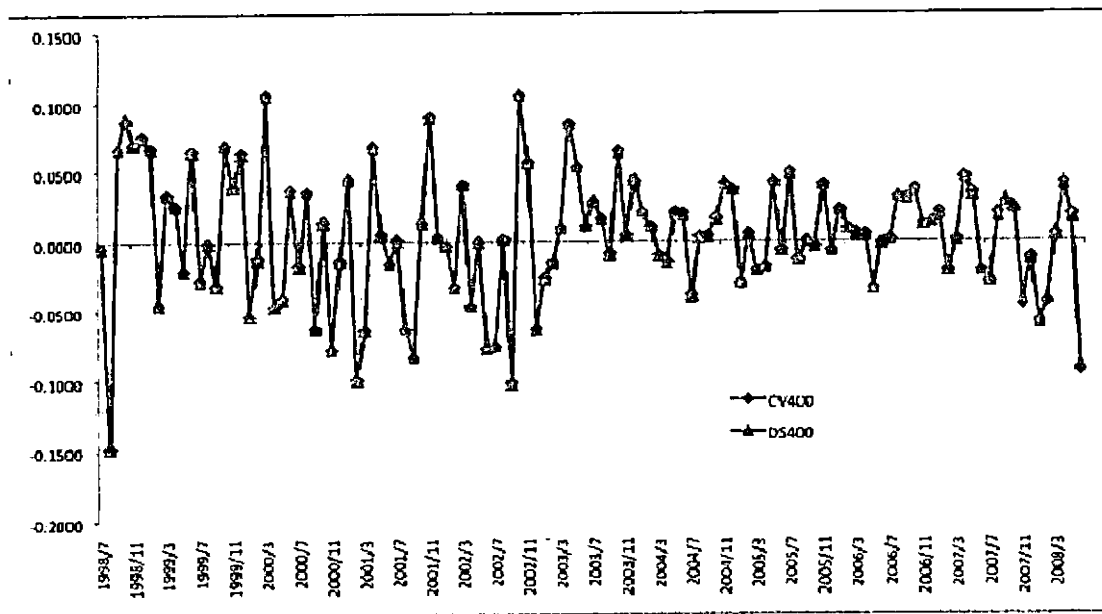


Figure 5. The Monthly Return of CV400 and DS400.

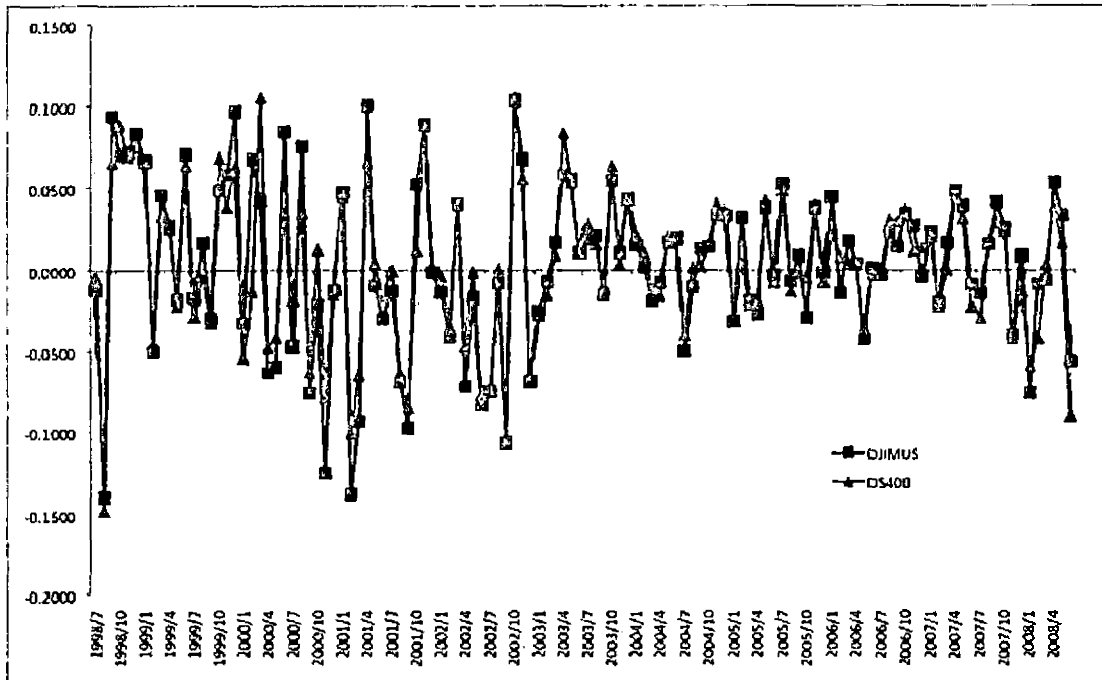


Figure 6. The Monthly Return of DJIMUS and DS400.

In Figures-7 through 10, the monthly return of CV400, DS400, and DJIMUS indices are compared with the monthly return of SP500. The figure shows that investors who invest in socially responsible kind of investment and faith-based investment are enjoying higher returns compared with conventional index such as Standard and Poor's 500 (SP500). Thus these graphs support the finding of Chong, Her and Phillips (2005) and Goodmacher (2006) in Chapter 2, that ethical investment and faith-based investment might have higher returns compared with the conventional investment.

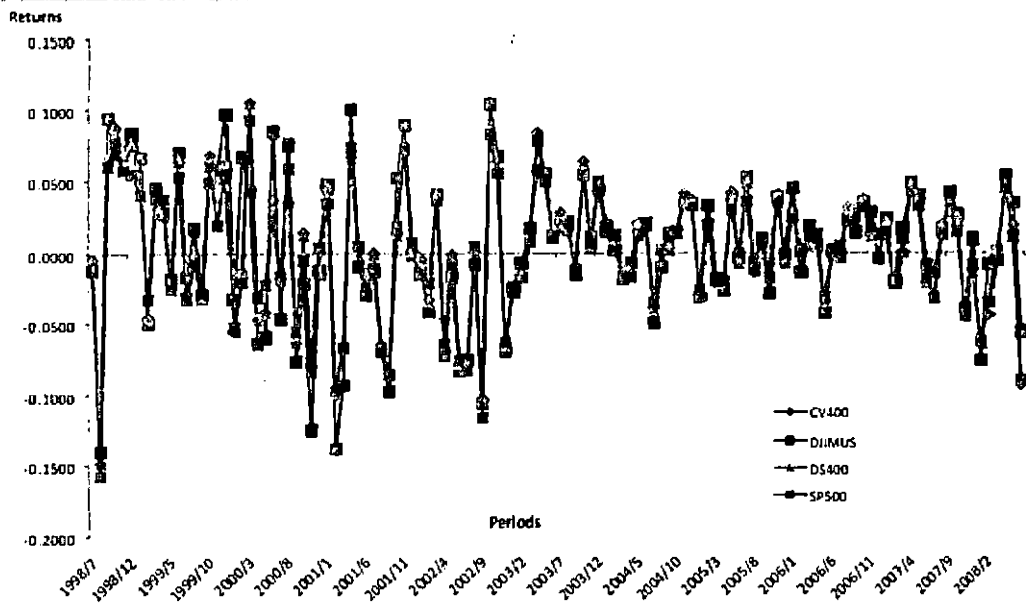


Figure 7. The Monthly Return of CV400, DS400, DJIMUS, and SP500 index.

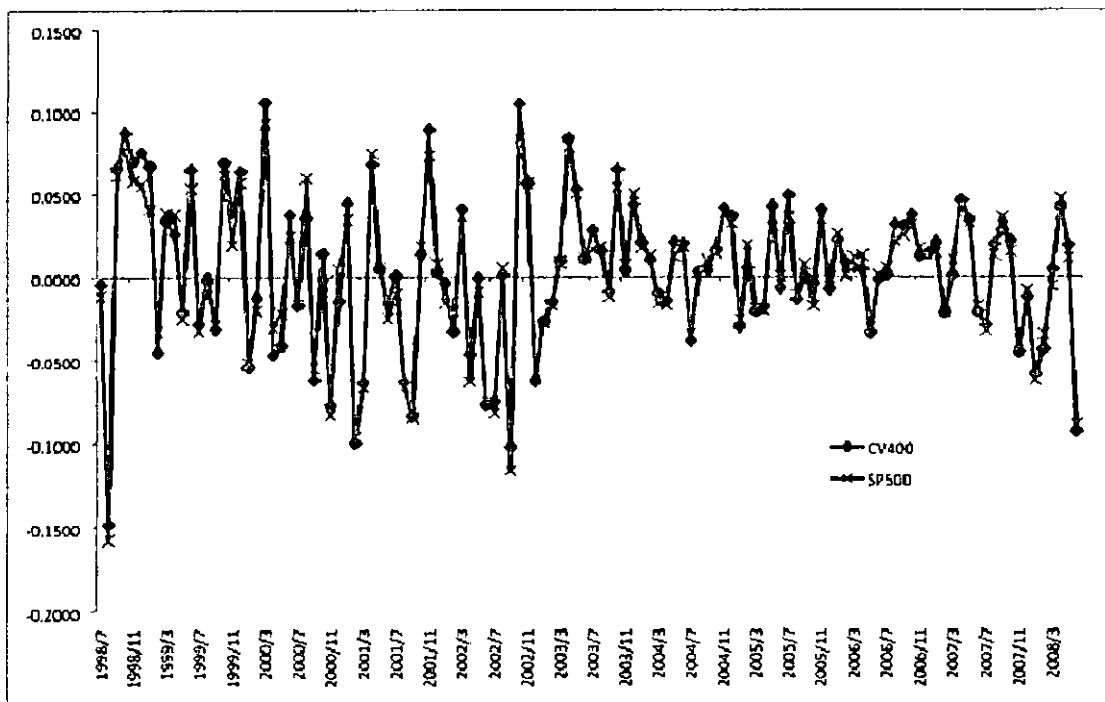


Figure 8. The Monthly Return of CV400 and SP500.

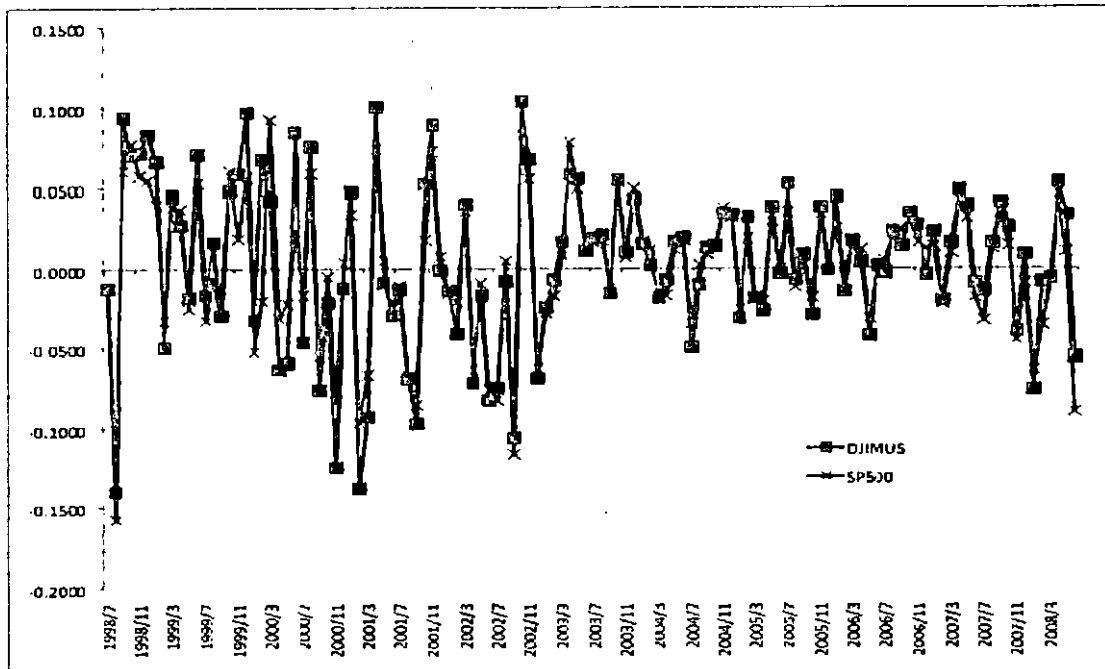


Figure 9. The Monthly Return of DJIMUS and SP500

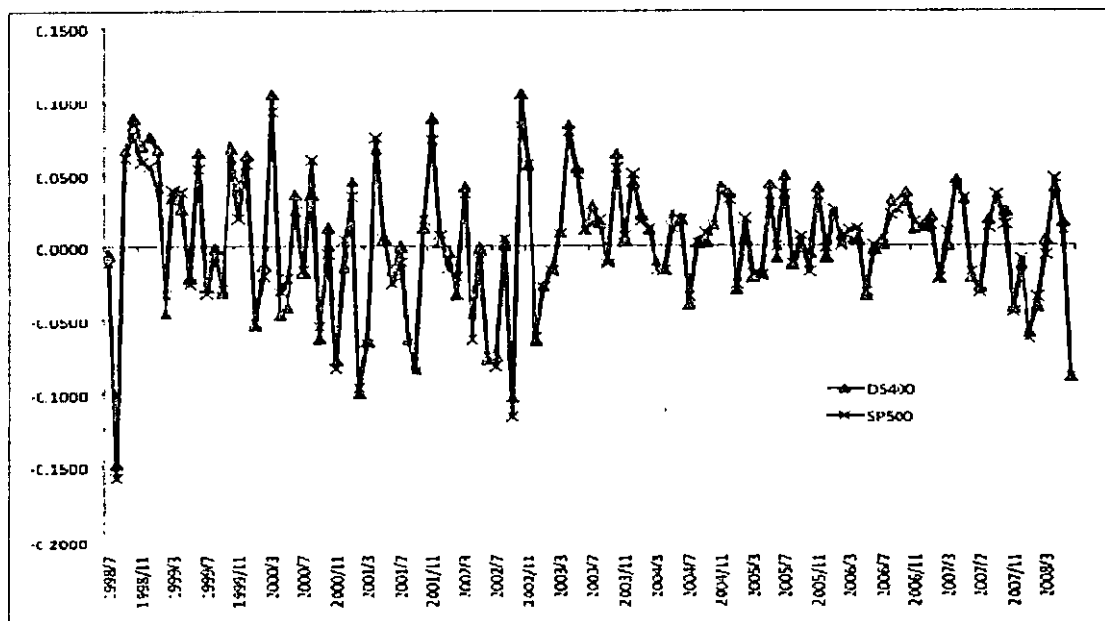


Figure 10. The Monthly Return of DS400 and SP500

Table-8 presents the descriptive statistic for monthly returns of the three indices: CV400, DS400, and DJIMUS. It shows that the mean return of the DJIMUS is higher than the other two indices. This is also true for the standard deviation, which is the conventional measurement of risk, showing that DJIMUS is riskier than the CV400 and DS400. The table also includes statistics for the SP500 index return. It shows that for the period 1998 - 2008, SP500 returns are lower than the three ethical investment indices. Standard deviation of this conventional index is also lower compared to the other three indices' standard deviation. Therefore, means and standard deviation of these indices are in line with what Figure-3 through Figure-10 are showing.

Table 8. Basic Statistics

	CV400	DS400	DJIMUS	SP500
Mean	0.0029	0.0030	0.0037	0.0010
Median	0.0037	0.0039	0.0066	0.0070
Maximum	0.1052	0.1052	0.1037	0.0923
Minimum	-0.1484	-0.1481	-0.1398	-0.1576
Std. Dev.	0.0456	0.0455	0.0507	0.0436
Correlation				
	CV400	DS400	DJIMUS	SP500
CV400	1	0.9998	0.9308	0.9819
DS400		1	0.9314	0.9819
DJIMUS			1	0.9316
SP500				1
Observations	120	120	120	120

Table-8 also displays the correlation coefficients between indices. The correlation coefficient between CV400 and DS400 is 99% showing that there is a "strong" positive relationship between the indices. This might be because the CV400 is similar to the KLD's Domini 400 Social™ index with additional layer of screens covering abortion, contraceptive products and embryonic/fetal stem cells⁹. The high correlation coefficient can also be explained by the fact that all indices are produced by KLD Research and Analytics. The indices are composed of approximately 250 SP500 companies, 100 large and mid cap companies chosen for sector diversification, and 50 smaller companies with exemplary social and environmental records.

The correlation coefficients between DJIMUS and CV400, and also DJIMUS and DS400 are 93.08% and 93.13% respectively, showing again a high positive relationship between the indices. As mentioned above the correlations are high because the indices are build by the same company which uses similar screening criteria (screening that exclude tobacco, alcoholic beverages, gambling, arms, and

⁹ DS400 screenings includes alcohol, tobacco, firearms, gambling, nuclear power and military weapons. The selected companies should have positive social and environmental records based on the following issues: community relations, diversity, employee relations, human rights, and product quality and safety, environment and corporate governance.

pornography). The DJIMUS is, however, more restrictive than the CV400 and DS400. The DJIMUS excludes companies involved with pork products, hotel and leisure industries, and conventional financial services (banking, insurance, etc).

Performance Measures Results

Table-9 depicts the results from the performance measure introduced in Chapter Three. As shown in the table, with the exception of the Jensen Alpha SSD, all ratios indicate that the indices studied outperformed the SP500. Table-9 also indicates that among the indices studied, it is the DJIMUS that outperformed the other indices, and that the CV400 performs less favorably than its ethical and faith-based investment counterparts. As far as the Jensen Alpha SSD is concerned, the measure indicates that it is the DS400 that should be the best choice for investor. Recall that the Jensen Alpha SSD shows the difference between a series' realized (or expected rate of return) and its expected position on the security market line given its risk level¹⁰ (Equation-11).

¹⁰ SSD derived CAPM, "which is the semi-covariance with the market" (Pedersen and Satchel, 2002)

Table 9. Risk-adjusted Performance Measures

INDEX	SHARPE	TREYNOR	JENSEN ALPHA	SORTINO	TREYNOR (SSD)	JENSEN (SSD)
CV400	0.04216	0.00187	0.00197	0.10174	0.00192	0.88893
DS400	0.04391	0.00195	0.00204	0.10578	0.00200	0.88958
DJIMUS	0.05318	0.00249	0.00283	0.12402	0.00269	0.88037

The Beta (β) presented in the Equation-4 shows the index's relative volatility. As shown in Table-10, ethical-based and faith-based investment betas are slightly higher than one, showing volatility slightly higher than the SP500. The highest beta found is for the DJIMUS index. When calculating β^{SSD} , betas for all funds are even closer to the SP500 beta.

Table 10. Beta and Beta-SSD

INDEX	BETA	BETA SSD
CV400	1.02679	1.00050
DS400	1.02454	1.00046
DJIMUS	1.08193	1.00171
S&P500	1	1

ANOVA

Normality Test

To measure the data adequacy with a normal distribution, the Jarque-Bera (JB) test statistic is used.

The test is used to calculate the variance between the skewness and kurtosis of the series with those from the normal distribution. "Skewness is a measure of symmetry, or more precisely, the lack of symmetry. A distribution, or data set, is symmetric if it looks the same to the left and right of the center point." (<http://www.itl.nist.gov>). The skewness for a normal distribution is zero, and any symmetric data should have skewness near zero. Kurtosis is a measure of whether the data are peaked or flat relative to a normal distribution. The kurtosis of the normal distribution is 3. If the kurtosis exceeds 3, the distribution is peaked (leptokurtic) relative to the normal; if the kurtosis is less than 3, the distribution is flat (platykurtic) relative to the normal (EViews 6 Users Guide).

Table 11. Jarque-Bera Statistic

	CV400	DS400	DJIMUS	SP500	TBILL
Skewness	-0.3593	-0.3522	-0.4671	-0.6447	-0.0929
Kurtosis	3.4129	3.4201	3.1852	3.8963	1.5638
Jarque-Bera	3.4339	3.3636	4.5351	12.3306	10.4859
Probability	0.1796	0.1860	0.1036	0.0021	0.0053
Observations	120	120	120	120	120

Under the null hypothesis of a normal distribution, the JB statistic is distributed with two degrees of freedom. The probability depicted in Table 11, is the probability that a JB statistic exceeds the observed value under the null hypothesis. "A small probability value leads to the rejection of the null hypothesis of a normal distribution." (www.fao.org). In the Table-11, the skewness and kurtosis lead to the normal distribution conclusion. The p-value given at the bottom of the Jarque-Bera statistic table indicated that we could not reject the hypothesis that the returns of CV400, DS400, and DJIMUS are normally distributed.

Mean-Equality Test

Recall from Table-8 that DJIMUS generate higher return compared with the socially responsible investment and SP500. The second highest is the DS400 followed by CV400. To test whether there is a difference in the mean between the indices, we use ANOVA (Analysis of Variance). The results found in Table-12, shows that there is no significant difference among mean between the indices, that is between the ethical investment indices (CV400, DS400, and DJIMUS), or between ethical investment indices (CV400, DS400, and DJIMUS) and conventional index (SP500). Results

of the standard F-Value and their probabilities suggest that the null should be rejected (i.e. that there are a difference in the mean between the indices).

Table 12. Mean Equality Test (ANOVA)

Mean Difference	F-Value	P-value for F-test
CV400, DS400, DJIMUS	0.009683	0.9904
CV400, DS400, DJIMUS, and SP500	0.074389	0.9737

Cointegration Test

The results of Kwiatkowski-Phillips-Schmidt-Shin test of stationary in Table-13 indicates that the indices are stationary, meaning that their pattern is similar to other ethical indices.

Table 13. The Kwiatkowski-Phillips-Schmidt-Shin Test

Kwiatkowski-Phillips-Schmidt-Shin test statistic	
Null Hypothesis: D(CV400) is stationary	
Exogenous: Constant, Linear Trend	
Index	LM-Stat
C400*	0.128452
DS400*	0.127759
DJIMUS*	0.5
*Kwiatkowski-Phillips-Schmidt-Shin (1992, Table 1) denotes rejection of the hypothesis at the 0.1 level	

The results for Johansen cointegration test in Table-14 shows the rejection of the null hypothesis of no cointegrating vectors under both the trace and maximum eigen value forms of the test. In the case of the trace test, the null of no cointegrating vectors is rejected since the value of the test statistic is 86.68, i.e. it is greater than the 5% critical value of 47.86. Moving on to test the null of at most 1 cointegrating vector the trace statistic is 55.99, while the 5% critical value is 29.79, so the null is again rejected at 5%. Similar results are observed for the 2nd and 3rd cointegrating vectors.

In the case of the maximum eigen test, the null of no cointegrating vectors is rejected since the test statistic of 30.68 is greater than the 5% critical value of 27.58. Moving on to test, the null of at most 1 cointegrating vector the trace statistic is 30.38, while the 5% critical value is 21.13, so the null is rejected at 5%. Similar results are observed for the 2nd and 3rd cointegrating vectors.

Table 14. The Johansen Cointegration Test

Trace Test			
Number of cointegrating vector	Trace Statistic	5% critical value	P-value*
None *(H0: no cointegration) Between ethical indexes (CV400, DS400, and DJIMUS) and conventional index (SP500)	86.6818	47.8561	0
At most 1 *	55.9991	29.7971	0
At most 2 *	26.616	15.4947	0.0011
At most 3 *	10.8298	3.8415	0.001
Max-Eigen Test			
Number of cointegrating vector	Max-Eigen Statistic	5% critical value	P-value*
None *(H0: no cointegration) Between ethical indexes (CV400, DS400, and DJIMUS) and conventional index (SP500)	30.6827	27.5843	0.0194
At most 1 *	30.3831	21.1316	0.0019
At most 2 *	14.7862	14.2646	0.0413
At most 3 *	10.8298	3.8415	0.001

* Denotes rejection of the hypothesis at the 0.05 level

The cointegration tests presented above show that there is a cointegration between the ethical and faith-based indices studied; which points to the parallel between the screens used by KLD and the resemblance of the indices to the SP500.

Summary

Better results in performance showed by the ethical-based and faith-based investment (DS400, CV400, and DJIMUS) compared with the conventional index (SP500) in the risk-

adjusted performance measures, are not enough to help investors to choose the most suitable ethical and faith-based investment for them. Normality test, mean-equality test, and cointegration test will also help the investor to better comprehend the inherent characteristics of the funds.

In addition to the risk/return characteristics reported in this chapter, the fees associated with selecting these funds must also be considered. Unfortunately, the three ethical and faith-based investment indices studied in this thesis, we did not have any information regarding fees and transaction costs. Additional studies are needed to address this shortcoming. Adding these fees might corroborate the findings of Johnson and Neave (1996). The authors report that Islamic Funds are inefficient since additional screening is conducted, and Sauer (1997) also mentioned that costs related to the screening does not always warranty higher risk and lower return.

CHAPTER FIVE

CONCLUSIONS

As mentioned in the first chapter of this thesis, the first purpose of this thesis is to explore the risk and return characteristics of socially responsible investment and faith-based investment by comparing three indices, the KLD Domini 400 SocialSM Index (DS400), the KLD Catholic Values 400SM Index (CV400), and the Dow Jones Islamic Market U.S. Index (DJ-IMUS).

The second objective of the thesis is to compare the three Socially Responsible Investment (SRI) indices with the Standard and Poor's 500 Index. This comparison was conducted using several risk-adjusted measures: Sharpe ratio, Treynor index, Jensen Alpha, Sortino, Treynor (SSD), and Jensen Alpha (SSD). Findings are as follows:

1. The descriptive statistics indicate that the risk and returns measured by mean and standard deviation shows that DJ-IMUS is over performing the CV400 and DS400.
2. The results also show that there is a high level of correlation between the indices studied, mainly between CV400 and DS400, because of the similar

screening methods and holding companies in the index (mainly from large scale companies in SP500).

3. When compared with the performance of SP500, the returns of the ethical and faith-based kind of investment that mirrored indices such as KLD CV400, KLD DS400, and DJ-IMUS provide a higher return.
4. The six performance measures indicate that the ethical investment has higher volatility and generate higher returns than the SP500.
5. From the three ethical and faith-based investments studied, The Dow Jones Islamic U.S. Market Index (DJIMUS) appears to be the best choice for investors per unit of risk, followed by DS400 and CV400.
6. Empirical tests conducted show that the returns of ethical investments are normally distributed. Ethical investment and faith-based investment are also found to be cointegrated.
7. The results also show that there is no significant difference between the indices means, all indices generate similar average returns during the observation period. This result summarizes a statement that diversification between ethical investments is not recommended.

8. Other research is suggested since the field of socially responsible investment is still at its infancy and not yet all cultivated.

APPENDIX A
MONTHLY RETURN OF STANDARD AND POOR'S 500
COMPOSITE INDEX

Standard and Poor's 500 Composite Index - Monthly Return

Jun-08	-8.99%	Dec-05	-0.09%	Jun-03	1.13%	Dec-00	0.40%
May-08	1.06%	Nov-05	3.46%	May-03	4.96%	Nov-00	-8.35%
Apr-08	4.64%	Oct-05	-1.79%	Apr-03	7.79%	Oct-00	-0.50%
Mar-08	-0.60%	Sep-05	0.69%	Mar-03	0.83%	Sep-00	-5.50%
Feb-08	-3.54%	Aug-05	-1.13%	Feb-03	-1.71%	Aug-00	5.89%
Jan-08	-6.31%	Jul-05	3.53%	Jan-03	-2.78%	Jul-00	-1.65%
Dec-07	-0.87%	Jun-05	-0.01%	Dec-02	-6.22%	Jun-00	2.37%
Nov-07	-4.50%	May-05	2.95%	Nov-02	5.55%	May-00	-2.22%
Oct-07	1.47%	Apr-05	-2.03%	Oct-02	8.29%	Apr-00	-3.13%
Sep-07	3.52%	Mar-05	-1.93%	Sep-02	-11.66%	Mar-00	9.23%
Aug-07	1.28%	Feb-05	1.87%	Aug-02	0.49%	Feb-00	-2.03%
Jul-07	-3.25%	Jan-05	-2.56%	Jul-02	-8.23%	Jan-00	-5.22%
Jun-07	-1.80%	Dec-04	3.19%	Jun-02	-7.52%	Dec-99	5.62%
May-07	3.20%	Nov-04	3.79%	May-02	-0.91%	Nov-99	1.89%
Apr-07	4.24%	Oct-04	1.39%	Apr-02	-6.34%	Oct-99	6.07%
Mar-07	0.99%	Sep-04	0.93%	Mar-02	3.61%	Sep-99	-2.90%
Feb-07	-2.21%	Aug-04	0.23%	Feb-02	-2.10%	Aug-99	-0.63%
Jan-07	1.40%	Jul-04	-3.49%	Jan-02	-1.57%	Jul-99	-3.26%
Dec-06	1.25%	Jun-04	1.78%	Dec-01	0.75%	Jun-99	5.30%
Nov-06	1.63%	May-04	1.20%	Nov-01	7.25%	May-99	-2.53%
Oct-06	3.10%	Apr-04	-1.69%	Oct-01	1.79%	Apr-99	3.72%
Sep-06	2.43%	Mar-04	-1.65%	Sep-01	-8.53%	Mar-99	3.81%
Aug-06	2.10%	Feb-04	1.21%	Aug-01	-6.63%	Feb-99	-3.28%
Jul-06	0.51%	Jan-04	1.71%	Jul-01	-1.08%	Jan-99	4.02%
Jun-06	0.01%	Dec-03	4.95%	Jun-01	-2.54%	Dec-98	5.48%
May-06	-3.14%	Nov-03	0.71%	May-01	0.51%	Nov-98	5.74%
Apr-06	1.21%	Oct-03	5.35%	Apr-01	7.40%	Oct-98	7.72%
Mar-06	1.10%	Sep-03	-1.20%	Mar-01	-6.64%	Sep-98	6.05%
Feb-06	0.05%	Aug-03	1.77%	Feb-01	-9.68%	Aug-98	-15.76%
Jan-06	2.51%	Jul-03	1.61%	Jan-01	3.41%	Jul-98	-1.17%

TABLE-A: Monthly Return of SP500 Composite Index

APPENDIX B
MONTHLY RETURN OF 91-DAY TREASURY BILL

91-Day Treasury Bills Monthly Return

Jun-08	0.15%	Dec-05	0.32%	Jun-03	0.08%	Dec-00	0.47%
May-08	0.14%	Nov-05	0.32%	May-03	0.09%	Nov-00	0.50%
Apr-08	0.11%	Oct-05	0.30%	Apr-03	0.09%	Oct-00	0.50%
Mar-08	0.10%	Sep-05	0.28%	Mar-03	0.09%	Sep-00	0.49%
Feb-08	0.17%	Aug-05	0.28%	Feb-03	0.10%	Aug-00	0.49%
Jan-08	0.23%	Jul-05	0.26%	Jan-03	0.10%	Jul-00	0.48%
Dec-07	0.25%	Jun-05	0.24%	Dec-02	0.10%	Jun-00	0.46%
Nov-07	0.27%	May-05	0.23%	Nov-02	0.10%	May-00	0.47%
Oct-07	0.32%	Apr-05	0.23%	Oct-02	0.13%	Apr-00	0.46%
Sep-07	0.32%	Mar-05	0.23%	Sep-02	0.13%	Mar-00	0.46%
Aug-07	0.34%	Feb-05	0.21%	Aug-02	0.13%	Feb-00	0.45%
Jul-07	0.39%	Jan-05	0.19%	Jul-02	0.14%	Jan-00	0.43%
Jun-07	0.38%	Dec-04	0.18%	Jun-02	0.14%	Dec-99	0.42%
May-07	0.39%	Nov-04	0.17%	May-02	0.14%	Nov-99	0.41%
Apr-07	0.40%	Oct-04	0.15%	Apr-02	0.14%	Oct-99	0.40%
Mar-07	0.40%	Sep-04	0.14%	Mar-02	0.15%	Sep-99	0.38%
Feb-07	0.41%	Aug-04	0.12%	Feb-02	0.14%	Aug-99	0.39%
Jan-07	0.41%	Jul-04	0.11%	Jan-02	0.14%	Jul-99	0.37%
Dec-06	0.40%	Jun-04	0.11%	Dec-01	0.14%	Jun-99	0.37%
Nov-06	0.40%	May-04	0.08%	Nov-01	0.15%	May-99	0.37%
Oct-06	0.40%	Apr-04	0.08%	Oct-01	0.18%	Apr-99	0.35%
Sep-06	0.39%	Mar-04	0.08%	Sep-01	0.22%	Mar-99	0.36%
Aug-06	0.40%	Feb-04	0.08%	Aug-01	0.28%	Feb-99	0.36%
Jul-06	0.40%	Jan-04	0.07%	Jul-01	0.29%	Jan-99	0.35%
Jun-06	0.39%	Dec-03	0.07%	Jun-01	0.29%	Dec-98	0.36%
May-06	0.39%	Nov-03	0.08%	May-01	0.30%	Nov-98	0.36%
Apr-06	0.38%	Oct-03	0.08%	Apr-01	0.32%	Oct-98	0.32%
Mar-06	0.37%	Sep-03	0.08%	Mar-01	0.36%	Sep-98	0.38%
Feb-06	0.36%	Aug-03	0.08%	Feb-01	0.40%	Aug-98	0.40%
Jan-06	0.35%	Jul-03	0.07%	Jan-01	0.42%	Jul-98	0.40%

TABLE-B: Monthly Return of 91-Day Treasury Bills

APPENDIX C

MONTHLY RETURN OF KLD DOMINI 400 SOCIALSM INDEX

KLD Domini 400 Social™ Index - Monthly Return

Jun-08	-8.99%	Dec-05	-0.72%	Jun-03	1.08%	Dec-00	-1.45%
May-08	1.64%	Nov-05	4.01%	May-03	5.34%	Nov-00	-7.80%
Apr-08	3.96%	Oct-05	-0.44%	Apr-03	8.35%	Oct-00	1.30%
Mar-08	0.45%	Sep-05	-0.09%	Mar-03	0.93%	Sep-00	-6.25%
Feb-08	-4.17%	Aug-05	-1.30%	Feb-03	-1.56%	Aug-00	3.56%
Jan-08	-5.89%	Jul-05	4.84%	Jan-03	-2.74%	Jul-00	-1.80%
Dec-07	-1.32%	Jun-05	-0.71%	Dec-02	-6.37%	Jun-00	3.56%
Nov-07	-4.20%	May-05	4.25%	Nov-02	5.57%	May-00	-4.13%
Oct-07	2.36%	Apr-05	-1.87%	Oct-02	10.52%	Apr-00	-4.69%
Sep-07	2.91%	Mar-05	-2.11%	Sep-02	-10.35%	Mar-00	10.51%
Aug-07	1.78%	Feb-05	0.46%	Aug-02	0.11%	Feb-00	-1.29%
Jul-07	-2.89%	Jan-05	-2.99%	Jul-02	-7.51%	Jan-00	-5.40%
Jun-07	-2.16%	Dec-04	3.63%	Jun-02	-7.72%	Dec-99	6.26%
May-07	3.20%	Nov-04	4.05%	May-02	-0.10%	Nov-99	3.88%
Apr-07	4.56%	Oct-04	1.54%	Apr-02	-4.61%	Oct-99	6.86%
Mar-07	0.05%	Sep-04	0.28%	Mar-02	4.05%	Sep-99	-3.18%
Feb-07	-2.21%	Aug-04	0.20%	Feb-02	-3.35%	Aug-99	-0.14%
Jan-07	2.04%	Jul-04	-3.98%	Jan-02	-0.36%	Jul-99	-2.82%
Dec-06	1.35%	Jun-04	1.88%	Dec-01	0.27%	Jun-99	6.42%
Nov-06	1.16%	May-04	2.02%	Nov-01	8.82%	May-99	-2.13%
Oct-06	3.67%	Apr-04	-1.58%	Oct-01	1.27%	Apr-99	2.53%
Sep-06	3.02%	Mar-04	-1.04%	Sep-01	-8.40%	Mar-99	3.35%
Aug-06	3.14%	Feb-04	1.04%	Aug-01	-6.29%	Feb-99	-4.53%
Jul-06	0.12%	Jan-04	2.09%	Jul-01	-0.02%	Jan-99	6.62%
Jun-06	-0.21%	Dec-03	4.34%	Jun-01	-1.62%	Dec-98	7.50%
May-06	-3.43%	Nov-03	0.40%	May-01	0.48%	Nov-98	6.93%
Apr-06	0.38%	Oct-03	6.35%	Apr-01	6.62%	Oct-98	8.87%
Mar-06	0.49%	Sep-03	-0.98%	Mar-01	-6.42%	Sep-98	6.61%
Feb-06	0.82%	Aug-03	1.58%	Feb-01	-10.02%	Aug-98	-14.81%
Jan-06	2.19%	Jul-03	2.83%	Jan-01	4.47%	Jul-98	-0.46%

TABLE-C: Monthly Return of KLD Domini 400 Social™ Index

(DS400)

APPENDIX D

MONTHLY RETURN OF KLD CATHOLIC VALUES 400TM INDEX (CV400)

KLD Catholic Values 400™ Index - Monthly Return

Jun-08	-9.36%	Dec-05	-0.76%	Jun-03	1.05%	Dec-00	-1.48%
May-08	1.82%	Nov-05	4.02%	May-03	5.25%	Nov-00	-7.80%
Apr-08	4.11%	Oct-05	-0.45%	Apr-03	8.34%	Oct-00	1.36%
Mar-08	0.37%	Sep-05	-0.03%	Mar-03	0.90%	Sep-00	-6.24%
Feb-08	-4.41%	Aug-05	-1.38%	Feb-03	-1.55%	Aug-00	3.50%
Jan-08	-5.86%	Jul-05	4.85%	Jan-03	-2.69%	Jul-00	-1.75%
Dec-07	-1.28%	Jun-05	-0.71%	Dec-02	-6.28%	Jun-00	3.67%
Nov-07	-4.56%	May-05	4.21%	Nov-02	5.59%	May-00	-4.16%
Oct-07	2.10%	Apr-05	-1.85%	Oct-02	10.43%	Apr-00	-4.69%
Sep-07	2.72%	Mar-05	-2.10%	Sep-02	-10.25%	Mar-00	10.52%
Aug-07	1.90%	Feb-05	0.49%	Aug-02	0.09%	Feb-00	-1.27%
Jul-07	-2.97%	Jan-05	-3.06%	Jul-02	-7.60%	Jan-00	-5.41%
Jun-07	-2.15%	Dec-04	3.62%	Jun-02	-7.73%	Dec-99	6.30%
May-07	3.35%	Nov-04	4.09%	May-02	-0.10%	Nov-99	3.87%
Apr-07	4.54%	Oct-04	1.57%	Apr-02	-4.67%	Oct-99	6.86%
Mar-07	0.05%	Sep-04	0.32%	Mar-02	4.05%	Sep-99	-3.18%
Feb-07	-2.19%	Aug-04	0.26%	Feb-02	-3.31%	Aug-99	-0.14%
Jan-07	2.01%	Jul-04	-3.90%	Jan-02	-0.40%	Jul-99	-2.82%
Dec-06	1.36%	Jun-04	1.93%	Dec-01	0.24%	Jun-99	6.43%
Nov-06	1.18%	May-04	2.02%	Nov-01	8.88%	May-99	-2.13%
Oct-06	3.68%	Apr-04	-1.48%	Oct-01	1.28%	Apr-99	2.53%
Sep-06	3.02%	Mar-04	-1.04%	Sep-01	-8.42%	Mar-99	3.33%
Aug-06	3.10%	Feb-04	0.99%	Aug-01	-6.34%	Feb-99	-4.54%
Jul-06	0.09%	Jan-04	2.03%	Jul-01	0.03%	Jan-99	6.65%
Jun-06	-0.18%	Dec-03	4.33%	Jun-01	-1.60%	Dec-98	7.50%
May-06	-3.42%	Nov-03	0.36%	May-01	0.43%	Nov-98	6.95%
Apr-06	0.40%	Oct-03	6.41%	Apr-01	6.72%	Oct-98	8.72%
Mar-06	0.51%	Sep-03	-0.93%	Mar-01	-6.41%	Sep-98	6.58%
Feb-06	0.82%	Aug-03	1.54%	Feb-01	-10.01%	Aug-98	-14.84%
Jan-06	2.14%	Jul-03	2.75%	Jan-01	4.40%	Jul-98	-0.45%

TABLE-D: Monthly Return of KLD Catholic Values 400™ Index

(CV400)

APPENDIX E
MONTHLY RETURN OF DOW JONES ISLAMIC MARKET
U.S. INDEX (DJIMUS)

Dow Jones Islamic Market U.S. Index - Monthly Return

Jun-08	-5.57%	Dec-05	-0.10%	Jun-03	1.14%	Dec-00	-1.20%
May-08	3.39%	Nov-05	3.83%	May-03	5.55%	Nov-00	-12.47%
Apr-08	5.35%	Oct-05	-2.87%	Apr-03	5.82%	Oct-00	-2.12%
Mar-08	-0.57%	Sep-05	0.92%	Mar-03	1.69%	Sep-00	-7.56%
Feb-08	-0.81%	Aug-05	-0.67%	Feb-03	-0.68%	Aug-00	7.55%
Jan-08	-7.56%	Jul-05	5.23%	Jan-03	-2.44%	Jul-00	-4.63%
Dec-07	0.89%	Jun-05	-0.30%	Dec-02	-6.84%	Jun-00	8.46%
Nov-07	-3.95%	May-05	3.85%	Nov-02	6.75%	May-00	-5.90%
Oct-07	2.61%	Apr-05	-2.66%	Oct-02	10.37%	Apr-00	-6.27%
Sep-07	4.17%	Mar-05	-1.83%	Sep-02	-10.61%	Mar-00	4.27%
Aug-07	1.61%	Feb-05	3.25%	Aug-02	-0.78%	Feb-00	6.76%
Jul-07	-1.40%	Jan-05	-3.09%	Jul-02	-7.44%	Jan-00	-3.22%
Jun-07	-0.87%	Dec-04	3.37%	Jun-02	-8.23%	Dec-99	9.67%
May-07	3.96%	Nov-04	3.43%	May-02	-1.67%	Nov-99	5.85%
Apr-07	4.84%	Oct-04	1.43%	Apr-02	-7.16%	Oct-99	4.88%
Mar-07	1.65%	Sep-04	1.32%	Mar-02	4.02%	Sep-99	-2.92%
Feb-07	-1.97%	Aug-04	-1.00%	Feb-02	-4.11%	Aug-99	1.67%
Jan-07	2.32%	Jul-04	-4.96%	Jan-02	-1.35%	Jul-99	-1.63%
Dec-06	-0.39%	Jun-04	1.99%	Dec-01	-0.09%	Jun-99	7.08%
Nov-06	2.73%	May-04	1.72%	Nov-01	8.91%	May-99	-1.78%
Oct-06	3.49%	Apr-04	-0.72%	Oct-01	5.25%	Apr-99	2.75%
Sep-06	1.44%	Mar-04	-1.81%	Sep-01	-9.72%	Mar-99	4.54%
Aug-06	2.33%	Feb-04	0.21%	Aug-01	-6.89%	Feb-99	-4.96%
Jul-06	-0.26%	Jan-04	1.53%	Jul-01	-1.28%	Jan-99	6.64%
Jun-06	0.19%	Dec-03	4.32%	Jun-01	-2.93%	Dec-98	8.34%
May-06	-4.22%	Nov-03	1.06%	May-01	-0.92%	Nov-98	7.20%
Apr-06	0.42%	Oct-03	5.46%	Apr-01	10.03%	Oct-98	7.05%
Mar-06	1.77%	Sep-03	-1.51%	Mar-01	-9.31%	Sep-98	9.39%
Feb-06	-1.40%	Aug-03	2.12%	Feb-01	-13.80%	Aug-98	-13.98%
Jan-06	4.47%	Jul-03	1.93%	Jan-01	4.77%	Jul-98	-1.21%

TABLE-E: Monthly Return of Dow Jones Islamic Market

U.S. Index (DJIMUS)

APPENDIX F

AGGREGATE RESULTS of PERFORMANCE MEASURES

Aggregate Results of Performance Measures

INDEX	SHARPE	TREYNOR	JENSEN ALPHA	SORTINO	TREYNOR (SSD)	JENSEN (SSD)
CV400	0.04216	0.00187	0.00197	0.10174	0.00192	0.88893
DS400	0.04391	0.00195	0.00204	0.10578	0.00200	0.88958
DJIMUS	0.05318	0.00249	0.00283	0.12402	0.00269	0.88037

TABLE-F-1: Aggregate Results of Performance Measures of CV400, DS400, DJ-IMUS, and SP500

INDEX	BETA	BETA SSD	SSD
CV400	1.02679	1.00050	0.01890
DS400	1.02454	1.00046	0.01889
DJIMUS	1.08193	1.00171	0.02172
S&P500	1.00000	1.00000	0.01726

TABLE-F-2: Aggregate Results of Performance Measures of CV400, DS400, DJ-IMUS, and SP500

APPENDIX G

DESCRIPTIVE STATISTICS AND MEAN EQUALITY TEST (ANOVA)

Descriptive Statistics

	CV400	DS400	DJIMUS	SP500	TBILL
Mean	0.00293	0.00301	0.00370	0.00101	0.00272
Median	0.00365	0.00388	0.00656	0.00701	0.00292
Maximum	0.10520	0.10517	0.10371	0.09232	0.00500
Minimum	-0.14840	-0.14807	-0.13982	-0.15759	0.00073
Std. Dev.	0.04561	0.04551	0.05065	0.04362	0.00135
Skewness	-0.35927	-0.35222	-0.46710	-0.64474	-0.09286
Kurtosis	3.41289	3.42009	3.18521	3.89630	1.56380
Jarque-Bera	3.43394	3.36357	4.53514	12.33055	10.48587
Probability	0.17961	0.18604	0.10356	0.00210	0.00529
Observations	120	120	120	120	120

TABLE-G: Descriptive Statistics of DS400, CV400, DJ-IMUS,
SP500, and TBILLS.

APPENDIX H
MEAN EQUALITY TEST

Mean Equality Test Results

Test for Equality of Means Between Series

Date: 05/14/09 Time: 03:33

Sample: 1 120

Included observations: 120

Method	df	Value	Probability
Anova F-test	(2, 357)	0.009683	0.9904
Welch F-test*	(2, 237.45)	0.009008	0.991

*Test allows for unequal cell variances

Analysis of Variance

Source of Variation	df	Sum of Sq.	Mean Sq.
Between	2	4.34E-05	2.17E-05
Within	357	0.799231	0.002239
Total	359	0.799274	0.002226

Category Statistics

Variable	Count	Mean	Std. Dev.	Std. Err. of Mean
DS400	120	0.003008	0.045506	0.004154
DJIMUS	120	0.003704	0.050651	0.004624
CV400	120	0.002933	0.045606	0.004163
All	360	0.003215	0.047185	0.002487

TABLE-H-1: Mean Equality Test of DS400, CV400, and DJ-IMUS.

Mean Equality Test Results

Test for Equality of Means Between Series

Date: 05/14/09 Time: 03:21

Sample: 1 120

Included observations: 120

Method	df	Value	Probability
Anova F-test	(3, 476)	0.074389	0.9737
Welch F-test*	(3, 264.118)	0.077052	0.9724

*Test allows for unequal cell variances

Analysis of Variance

Source of Variation	df	Sum of Sq.	Mean Sq.
Between	3	0.000481	0.00016
Within	476	1.025605	0.002155
Total	479	1.026086	0.002142

Category Statistics

Variable	Count	Mean	Std. Dev.	Std. Err. of Mean
SP500	120	0.00101	0.043615	0.003982
DS400	120	0.003008	0.045506	0.004154
DJIMUS	120	0.003704	0.050651	0.004624
CV400	120	0.002933	0.045606	0.004163
All	480	0.002664	0.046283	0.002113

TABLE-H-2: Mean Equality Test of DS400, CV400, DJ-IMUS, and SP500.

APPENDIX I
JOHANSEN COINTEGRATION TEST

Johansen Cointegration Test Results

Sample (adjusted): 6 120
 Included observations: 115 after adjustments
 Trend assumption: Linear deterministic trend
 Series: CV400 DJIMUS DS400 SP500
 Lags interval (in first differences): 1 to 4

Unrestricted Cointegration Rank Test (Trace)

Hypothesized		Trace	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.234178	86.68181	47.85613	0
At most 1 *	0.232181	55.99912	29.79707	0
At most 2 *	0.120653	25.616	15.49471	0.0011
At most 3 *	0.089874	10.82981	3.841466	0.001
Trace test indicates 4 cointegrating eqn(s) at the 0.05 level				

* denotes rejection of the hypothesis at the 0.05 level

**Mackinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized		Max-Eigen	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.234178	30.68269	27.58434	0.0194
At most 1 *	0.232181	30.38312	21.13162	0.0019
At most 2 *	0.120653	14.78619	14.2646	0.0413
At most 3 *	0.089874	10.82981	3.841466	0.001

Max-eigenvalue test indicates 4 cointegrating eqn(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

**Mackinnon-Haug-Michelis (1999) p-values

TABLE-I: Johansen Cointegration of DS400, CV400, DJ-IMUS,
 and SP500

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