

Innovations in Financial Markets and Institutions

Seth C. Anderson
Jeffery A. Born
Oliver Schnusenberg

Closed-End Funds, Exchange-Traded Funds, and Hedge Funds

*Origins, Functions, and
Literature*

 Springer

Closed-End Funds, Exchange-Traded Funds, and Hedge Funds

Innovations in Financial Markets and Institutions

Volume 18

Series Editor

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ISBN 978-1-4419-0167-5 e-ISBN 978-1-4419-0168-2
DOI 10.1007/978-1-4419-0168-2
Springer New York Dordrecht Heidelberg London

Library of Congress Control Number: 2009935050

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To our families

Preface

Closed-end funds, exchange-traded funds, and hedge funds are three important vehicles for channeling the savings of U.S. investors into financial assets, both domestically and abroad. This book traces the origins of these companies and examines their operational characteristics. It also provides a synthesis of the academic research to date. Our primary intent is to make the material efficiently accessible to researchers and practitioners who are interested in the objective findings and implications of this line of research. We draw from the most widely cited academic journals, including *Journal of Finance*, *Journal of Financial Economics*, *Journal of Financial Services Research*, and others, as well as from practitioner-oriented outlets, such as *Financial Analysts Journal* and *Journal of Portfolio Management*.

We wish to express appreciation to Professor Mark Flannery of the University of Florida, who supported our proposal to undertake this work. We also want to thank Judith Pforr at Springer for her patience and input. The completion of the book was greatly facilitated by the editorial work of Linda S. Anderson. We are most thankful to our patient families.

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Chapter 1

Introduction

Abstract This chapter provides an introduction to the contents of each of the other five chapters in this volume. Chapter 2 presents an overview of investment company basics. Chapter 3 follows with a short history of the evolution of these firms. Chapters 4, 5, and 6 summarize the issues and findings of the research to date on closed-end funds, exchange-traded funds, and hedge funds.

Keywords Open-end funds (mutual funds) · Closed-end funds (CEFs) · Unit investment trusts (UITs) · Exchange-traded funds (ETFs) · Hedge funds

Investment companies provide investment management and bookkeeping services to investors who do not have the time or expertise to manage their own portfolios. In the United States, these companies have proliferated and evolved over the last century; today there are thousands of investment companies with varying characteristics. They are structured as either open-end funds (mutual funds), closed-end funds (CEFs), or unit investment trusts (UITs).

In the following chapter, we present an overview of the basic characteristics of mutual funds, CEFs, and UITs, as well as exchange-traded funds (ETFs) and hedge funds. Chapter 3 presents a short history of the evolution of investment companies in the United States as well as an overview of more recent developments pertinent to CEFs, ETFs, and hedge funds, which are the foci of this volume.

Chapter 4 addresses CEFs, which originated in Europe more than a century ago. These funds differ from ordinary mutual funds in that they do not continuously issue or redeem ownership shares. Initially, there is a public offering of shares, after which the shares trade in the secondary public market.

Chapter 5 involves ETFs, which are investment companies that are typically registered under the Investment Company Act of 1940 as either open-end funds or UITs. The shares of ETFs trade in the secondary public market.

Chapter 6 addresses hedge funds, which are private limited partnerships that accept investors' money and invest it in a pool of securities. Hedge funds are essentially unregulated, and their shares do not trade in the securities markets.

Appendix A gives selected topic details concerning the Investment Company Act of 1940. Appendix B provides an analysis of the factors which are most commonly held to be determinants of CEF discounts.

Chapter 2

Characteristics of Investment Companies

Abstract Chapter 2 provides a brief overview of five types of investment companies: open-end funds, closed-end funds, unit investment trusts, exchange-traded funds, and hedge funds. The primary topics introduced are how investment companies are formed, how they are operated, and how their shares are bought and sold. The chapter also includes a brief treatment of the legal environment in which they operate.

Keywords Open-end funds (mutual funds) · Closed-end funds (CEFs) · Unit investment trusts (UITs) · Exchange-traded funds (ETFs) · Hedge funds · Initial public offerings (IPOs) · Prospectus · Discounts · Creation units · Limited partnerships

2.1 Introduction

In this chapter we look at the basic structural characteristics of open-end investment companies (mutual funds), closed-end investment companies (referred to as either CEFs or CEICs), unit investment trusts (UITs), exchange-traded funds (ETFs), and hedge funds. Although the primary foci of the book are CEFs, ETFs, and hedge funds, a treatment of open-end funds is included as a source of comparison. UITs are described because that structure is frequently adopted by ETFs.

2.2 Open-End Investment Companies

Open-end investment companies (commonly referred to as *mutual funds*) continuously issue and redeem ownership shares. The shares of an open-end fund do not trade in a secondary market or on any organized exchange; instead, investors purchase shares from the company. Likewise, investors redeem shares by selling them back to the company, where they are retired. Thus, the equity

capital and assets of a mutual fund are increased when shares are sold and are reduced when shares are repurchased.

Open-end fund company shares are marketed in a variety of ways. Investors may purchase shares directly from the fund or through a licensed broker. Security regulations require that a prospectus be made available to the potential investor prior to the actual sale. A prospectus details the investment philosophy of the fund, assesses the risks in an actual investment, and discloses management fee schedules, dividend re-investment policies, share redemption policies, past performance, etc. Any sales or redemption fees (i.e., “loads”) must also be disclosed. Management fees for most mutual funds range from approximately 0.2% for some index funds to more than 2% for some actively managed funds. The prospectus is updated quarterly to provide current information to potential investors. Generally, there are minimum initial investment dollar amounts and minimum subsequent investment amounts; usually the latter is significantly smaller than the former.

2.3 Closed-End Investment Companies

Commonly referred to as *closed-end funds*, CEFs do not continuously issue or redeem ownership shares. Initially, there is a public offering of shares, which is preceded by the issuance of a prospectus as described above. Management expenses for most CEFs are in the 1–2% range annually. Like most other initial public offerings, the shares are generally offered to the public by licensed brokers. At this juncture, however, the similarity ends between closed-end and open-end funds.

After the shares of the new closed-end fund are offered to the public, the fund invests the proceeds from the initial public offering in accordance with the policy statement disclosed in the prospectus. CEFs, however, do not sell new shares to interested shareholders, nor do they stand willing to redeem shares from their investors. To obtain shares after a public offering is completed, an investor must purchase shares from other investors in the secondary market (one of the exchanges or the over-the-counter (OTC) market). There is no legal requirement that there be any formal relationship between the price of the shares and the fund’s assets.

The total market value of the company’s assets less its liabilities (i.e., net assets) divided by the number of shares outstanding is generally referred to as the net asset value (NAV) per share. A common measure of the relationship between the price of the shares and the net asset value of a closed-end fund is

$$D = \frac{\text{NAV} - \text{MV}}{\text{NAV}},$$

where D is the percentage difference between the net asset value per share and the market value or price per share (MV). When NAV exceeds the MV, the D is

called a *discount*. When MV exceeds NAV , the D is called a *premium*. Discounts, which are far more common than premiums, have puzzled the investment community since the 1920s. Why discounts or premiums exist and persist is one topic of interest in Chapter 4.

2.4 Unit Investment Trusts

Commonly referred to as *UITs*, these investment companies offer an unmanaged portfolio of securities. They are not management companies as are both open- and closed-ends and have no board of directors. Also, a UIT is created for a specific length of time and is a fixed portfolio. Thus, the UIT's securities will not be sold or new ones bought, except in certain limited situations such as bankruptcy of a holding. UITs are assembled by a sponsor and are sold through brokers to investors. They generally issue units (shares) as intended for a set period of time before the primary offering period closes.

Stock trusts are generally designed to provide capital appreciation and/or dividend income until their liquidation date. In contrast, bond trusts are designed to pay monthly income. When a bond in the trust is called or matures, the funds from the redemption are distributed to the clients via a return of principal. The trust continues paying the new monthly income amount until another bond is redeemed. This continues until all the bonds have been liquidated.

2.5 Exchange-Traded Funds

ETFs are investment companies registered under the Investment Company Act of 1940 as either open-end funds or *UITs*. Regardless of a fund's organizational structure, all existing *ETFs* issue shares only in large blocks (such as 50,000 *ETF* shares) called "creation units." An investor such as a brokerage house or large institutional investor purchases a creation unit with a "portfolio deposit" equal in value to the NAV of the *ETF* shares in the creation unit. After purchasing a creation unit, the investor can hold the *ETF* shares or sell a portion of the *ETF* shares to investors in the secondary market. Management fees for *ETFs* are generally similar to those of low-cost index mutual funds.

The *ETF* shares purchased in the secondary market are not redeemable from the *ETF* except in creation unit aggregations. Thus, an investor holding fewer *ETF* shares than comprising a creation unit can dispose of those *ETF* shares in the secondary market only. If the secondary market *ETF* shares begin trading at a discount (i.e., a price less than NAV), arbitrageurs can purchase these *ETF* shares and, after accumulating shares amounting to a creation unit, redeem them from the *ETF* at NAV , thereby acquiring the more valuable securities in the redemption basket. If *ETF* shares trade at a premium (i.e., a price exceeding

NAV), then transactions in the opposite direction can generate profits. Because of arbitrage, deviations between daily ETF prices and their NAVs are generally less than 2%.

2.6 Hedge Funds

Hedge funds are private limited partnerships that accept investors' money and invest it in a pool of securities. They employ trading strategies using financial instruments and may or may not use financial leverage.

A general partner and limited partners are the two types of partners in a hedge fund. The general partner is the individual or entity who starts the hedge fund and who also handles the trading activity and day-to-day operations of the fund. The limited partners supply most of the capital but do not participate in the trading or daily activities of the fund.

The general partner generally charges an administrative fee of 1% of the year's average net asset value. For the services provided, the general partner normally receives an incentive fee of 20% of the net profits of the partnership. How an investor redeems shares may vary from fund to fund, and there are no guarantees on the fair pricing of a fund's shares.

Thus, these funds are similar to mutual funds in some respects, but differ significantly from mutual funds because hedge funds are not required to register under the federal securities laws. They are not required to register because they usually accept only financially sophisticated investors and do not offer their securities to the general public. Nonetheless, hedge funds are subject to the antifraud provisions of federal securities laws. Some, but not all, types of hedge funds are limited to no more than 100 investors.

Now that we have looked at the basic characteristics of investment companies, we turn to a brief history of them.

Chapter 3

A Brief History of Investment Companies

Abstract This chapter provides an overview of the historical evolution of investment companies which date to Europe in the late 1700s. Investment trusts became popular as an investment vehicle in Great Britain during the late 1800s. Subsequently, closed-end funds blossomed in the United States during the 1920s, at which time the first open-end fund appeared. The first hedge fund and exchange-traded fund (ETF) were formed in the late 1940s and 1993, respectively.

Keywords Investment trusts · Railroad securities · Closed-end fund · Hedge fund · Exchange-traded fund · Securities Act of 1933 · Registration statement · Prospectus · Other country fund · SPDR · A. W. Jones

3.1 Early Development

According to K. Geert Rouwenhorst in *The Origins of Mutual Funds*, the investment company concept dates to Europe in the late 1700s, when “a Dutch merchant and broker . . . invited subscriptions from investors to form a trust . . . to provide an opportunity to diversify for small investors with limited means.”¹ However, despite their earliest use in Europe, trusts did not become popular as investment vehicles until their evolution in England and Scotland during the period 1863–1890.

In 1863, the London Financial Association loaned proceeds from the sale of their shares to domestic railroad companies. The loans were collateralized by the railroads’ securities, many of which proved illiquid, and the trust failed. Five years afterward, the Foreign and Colonial Government Trust sold shares and invested the proceeds in 18 bond issues of foreign countries. Investors in this

¹ Rouwenhorst cited in *Investment Company Fact Book* (2008). *Appendix A: How mutual funds and investment companies operate*. ICI Investment Company Institute. (Retrieved on 4 August 2008) http://www.icifactbook.org/fb_appa.html.

successful trust received dividends from their shares and the return of their capital.²

For 20 years, new trusts were infrequently formed but were usually along similar lines. Dividends were fixed and the trusts liquidated according to their deeds, typically after 20–30 years. By 1886, only 12 trusts were listed on the London Stock Exchange. However, this period was followed by explosive growth during 1887–1890.

In the late 1880s, the economies of the United States, Argentina, and South Africa boomed, presenting tempting investment opportunities for the British. As the booms continued, trusts invested in mines, plantations, diamond fields, railroads, and real estate. From 1887 to 1890, over 100 trusts were formed. The period as a whole was one of high speculation characterized by rising trust share prices, imaginative accounting practices, interlocking directories, exorbitant management fees, and other excesses that forebode a more sober period.

The years 1890–1894 were painful for the British investment trust industry. South American trust securities collapsed during a revolution in Argentina in 1890. Shortly thereafter, the financial house of Baring failed, creating a panic in every financial center. Security prices contracted, and trusts found themselves holding restricted securities bought at high prices as their major assets. Thus began a period of portfolio write-downs and dividend reductions. Although these securities became quite unpopular with the investing public, the industry ultimately rebounded; today, investment trusts are numerous and extensively traded on the London Stock Exchange.

3.2 The American Experience

Some historians trace the origins of investment companies in the United States to the Massachusetts Hospital Life Insurance Company, which in 1823 first accepted and pooled funds to invest on behalf of contributors. Other historians refer to the New York Stock Trust (1889) or to the Boston Personal Property Trust (1893), which was the first company organized to offer small investors a diversified portfolio as a closed-end company. Still other historians hold that the Alexander Fund, established in Philadelphia in 1907, was the forerunner of the modern American closed-end fund (CEF).

Regardless of the precise origin, the growth of the investment company industry was gradual. From 1889 to 1924, only 18 investment companies were formed in the United States. The companies listed in Table 3.1 had varied purposes, ranging from a near holding company (Railway and Light Securities Company) to an essentially modern CEF (Boston Personal Property Trust).

² Much of the following historical material is adapted from Anderson and Born (1992), pp. 7–14, who draw from Fowler (1928), pp. 165–168, 243–245, Krooss and Blyn (1971) pp. 149–212, Steiner (1929) pp. 17–38, and Wiesenberger (1949) p. 14.

Table 3.1 United states investment companies 1889–1923

Year formed	Investment company	Location
1889*	New York Stock Trust	New York
1893	Boston Personal Property Trust	Boston
1904	Railway and Light Securities Co.	Boston
1907	Alexander Fund	Philadelphia
1914	American Investment Co.	Milwaukee
1916	First Investment Co.	Concord, NH
1917	Commercial Finance Corporation	Boston
1917	Public Utility Investing Corporation	New York
1918	Mutual Finance Corporation	Boston
1919	Pennsylvania Investing Co.	Philadelphia
1920	Overseas Securities Corporation	Concord, NH
1921*	Bank Investors Trust	Boston
1921	International Securities Trust of America	Boston
1922	Eastern Bankers Corporation	New York
1922	Securities Company of New Hampshire	Concord, NH
1923*	Bond Investment Trust	Boston
1923	Securities Fund	Philadelphia
1923	United Bankers Oil Company	New York

*Liquidated by 1924.

According to Steiner (1975), the International Securities Trust of America paved the way for later investment companies in the United States. Organized in 1921, the trust soon floundered but reorganized in 1923 and issued both bonds and stock. The firm was independent of any investment banking house and invested in a highly diversified portfolio. The trust's investments performed well, and in 1926 its managers formed the Second International Securities Corporation of America.

American investment trusts grew in earnest during the economic boom of the 1920s. As wealth increased, the general public became interested in the stock market, and a number of trusts catered to that new market. Most of these investment companies were patterned after British trusts, investing primarily for stable growth, income, and diversification. Some trusts invested in municipal securities and were similar to today's unit investment trusts (UITs). Of more importance to the future of the industry was the emergence in 1924 of the first open-end fund, Massachusetts Investors Trust. The fund allowed shareholders to redeem their shares at net asset value, less \$2 per share.

As the 1920s roared, eager investors regarded many of the earlier trusts as too conservative; newer companies appealed to these more adventurous investors; and the popularity of speculative funds exploded. In 1923, investment companies had capital of only approximately \$15 million; by 1929, the industry's approximately 400 funds had total capital close to \$7 billion. Most of the new funds used some form of leverage in their capital structure. On average, 40% of their capital consisted of bonds and preferred equity. Like most of the

investing public, many of these speculative investment companies ignored safety and income considerations, focusing instead on share price appreciation. When the market crashed, many investors lost vast sums of money in these shares.

3.3 Reaction to the Crash

After the abuses by investment companies during the 1920s and the tremendous losses suffered in the stock market crash of 1929, investors began to seek security in their investments. The redemption policies of open-end investment companies offered more security than closed-end investment companies, and the number of open-end companies soared while closed-end fund formation languished. By 1930, the number of closed-end investment companies was greatly reduced.

Believing that investment and banking businesses had performed inappropriately during the panic, many investors and politicians called for investigations and regulation. The first major piece of legislation, the Securities Act of 1933, set basic requirements for virtually all companies that sell securities. Briefly, the act required that publicly traded companies furnish shareholders with full and accurate financial and corporate information. When new securities are to be issued by a public firm or by a firm that is not yet publicly traded, all important information must be filed with the Securities and Exchange Commission (SEC) in a “registration statement.” If information is omitted or discovered to be false, the SEC will not allow the securities to be sold. Any offer to sell a new security must be accompanied by a prospectus.³

Although the act went a long way toward regulating new security offerings, it did not apply to outstanding securities. The Securities Exchange Act of 1934 formed the Securities and Exchange Commission and gave it broad powers over the industry. The act charged the Commission to investigate not only security trade practices but the crash itself. The SEC was further empowered to impose minimum accounting and financial standards on interstate brokers and dealers and to subject them to periodic inspections. To prevent unlawful manipulation of security prices, the SEC began to supervise national stock exchange activities.

A provision in the 1935 Public Utility Holding Company Act directed the SEC to study investment company practices. Under this provision, investment companies were subject to investigation and regulation. The SEC’s investigations culminated in a call for specific legislation to deal with investment companies.

The Investment Company Act of 1940 was omnibus legislation covering the formation, management, and public offerings of every investment company

³ Under the Securities Act of 1933, companies were required to report to the Federal Trade Commission. Under the Securities Exchange Act of 1934, companies were required to file with the Securities and Exchange Commission.

that has more than 50 security holders or that proposes to offer securities to the public. Parts of the act are summarized in Appendix A. Although amended in 1950, the Act of 1940 ended the unrestrained and often unethical practices by which investment companies were formed, floated, and operated in the United States. Now we turn to later developments pertaining specifically to CEFs, ETFs, and hedge funds.

3.4 Later Developments

In this section we briefly look at how the three investment companies of interest (CEFs, ETFs, and hedge funds) have evolved over the past half century. Temporally, CEFs preceded hedge funds which preceded ETFs, and this is the order in which we present them.

Closed-End Investment Companies

Although mutual funds increased in number during the period following the Investment Company Act of 1940, the closed-end fund sector was relatively dormant. However, in the late 1960s, newly formed dual-purpose CEFs offered two classes of common equity: income shares and capital shares. Income shares are entitled to all of the fund's ordinary income; capital shares, to all of the net assets at the specified maturity date. At the original issue, investors purchase an equal number of income and capital shares. After the original issue, the income and capital shares can separately trade. Investors' interest in dual-purpose funds soon faded.

Thereafter, in response to the historically high interest rates in the first half of the 1970s, investors' interest in bond investments grew. During this period 24 CEFs were formed which invested primarily in bonds. Initial public offerings for these new bond funds raised approximately \$2 billion; but when interest rates rose even higher by the end of the decade, their net asset values (NAVs) declined significantly. That decline, combined with substantial discounts, led to very poor investment performance over the latter half of the decade. Poor performance and large discounts greatly reduced investors' interest in new offerings.

During the latter 1980s, stock prices rose sharply, renewing investors' interest in CEFs that invest primarily in stocks. By 1986, the formation of new CEFs had gained momentum, and at the market peak in 1987, nearly \$6 billion was raised through 34 offerings. The following crash in stock prices during October 1987 severely reduced interest in new offerings. CEFs performed poorly relative to the market because large declines in NAV were accompanied by rising discounts. The sharp break in stock prices in October 1989 led to another round of losses for CEF investors. However, the late 1980s also saw the

formation of a number of CEFs that invested almost exclusively in securities of firms located in a single, foreign country. These “other country” funds proved to be quite popular with investors. In early 2008, there were more than 600 CEFs of various types managing approximately \$300 billion.⁴

Hedge Funds

The late 1940s saw the origin of the hedge fund in a magazine article written by the fund’s founder, A. W. Jones, who proposed the utilization of short-selling to hedge stock positions. He also introduced the use of incentive fees and leverage as part of hedge fund strategies. During the 1950s, some funds began using short-selling, although only to a small degree. In the late 1960s, nearly 140 funds were launched, many of which used substantial leverage. Some of these experienced high losses and bankruptcies during the trying markets of 1969–1970 and 1973–1974. The following years were relatively quiet until the 1987–1993 period, which saw extraordinary returns for some funds and an expansion in the number of funds formed. In the early 1990s, there were approximately 500 hedge funds worldwide with assets of \$38 billion. In early 2008, there were over 6,000 funds with assets in excess of \$1 trillion.

Exchanged-Traded Funds

The concept of the exchange-traded fund was introduced in a 1976 *Financial Analyst Journal* article entitled “The Purchasing Power Fund: A New Type of Financial Intermediary” by Nils Hakansson, which presented the concept of a new financial instrument that provides payoffs only for a predetermined level of market return. Over the next several years, the idea evolved, and institutional rules changed to allow for ETFs to be formed and traded. In 1993, the American Stock Exchange introduced the first ETF, the SPDR (“spider”) Trust, which is a unit investment trust (UIT) that tracks the Standard & Poor’s 500 Composite Stock Price Index by holding weighted positions of all the securities in the index. Three years later, World Equities Benchmark Shares (WEBS), which were organized as open-end investment companies rather than UITs, began trading. Since then, many variations primarily using either the UIT or investment company format have been introduced in the markets. By 2001, investors had committed more than \$64 billion to 92 different ETFs. In early 2008, there were more than 600 ETFs with assets exceeding \$600 billion.

⁴ Data for CEFs, ETFs, and hedge funds are taken from *Investment Company Fact Book* (2008).

Chapter 4

Closed-End Funds Issues and Studies

Abstract This chapter provides brief reviews of the numerous articles that investigate various aspects of closed-end fund (CEF) pricing. Much of the research focuses on the causes of the existence and persistence of fund share price discounts to net asset value. These works span the past half century and have yielded many results including the following: (1) market frictions, such as expenses and capital gains effects, only partially explain the existence of discounts; (2) country funds which target countries having international investment restrictions tend to sell at premiums to net asset value; (3) investors who purchase most fund IPOs usually experience poor initial returns; (4) large discounts tend to be associated with periods of market pessimism, and these discounts narrow during periods of euphoria; and (5) the mean reverting behavior of discounts appears to be responsible for the profitable discount-based trading strategies reported by some authors.

Keywords Closed-end funds (CEFs) · Discounts · Premiums · Perceptions · Market frictions · Capital gains · Fees · Expenses · Country funds · Investment restrictions · Sentiment · Trading strategies · Bond · Expectations · Turnover · Restricted holdings

4.1 Introduction

Most closed-end funds' shares usually exhibit prices lower than their calculated net asset value (NAV). These so-called discounts can be substantial, long-lasting, and variable and are, perhaps, the most interesting aspect of closed-end investment companies. Substantial academic literature is devoted to investigating the magnitude and persistence of CEF discounts. The following paragraphs present the basic issues involving the valuation of CEFs. A more detailed development of some of these issues is given in Appendix B.

There is a wide variety of economically based factors which are frequently argued to impact CEF discounts. One factor is unrealized capital appreciation in the portfolio of a closed-end fund. This raises the possibility that the gain will be realized and the stockholder will have to pay taxes on its distribution. However, the distribution of gains reduces the price and the NAV of the fund, dollar for dollar; whereas the investor retains only $(1-T)$ percent of the distributed gain (T is the marginal tax rate expressed as a decimal). It is argued that investors discount the price of closed-end fund shares to compensate for their tax liability on the gain.

In a different vein, a number of authors contend that transaction costs impact fund discounts. Some argue that small investors can “save” on commissions by purchasing shares of a closed-end fund when compared to the costs incurred in replicating the fund’s portfolio. This should lead to a premium for funds. Conversely, some hold that management fees reduce cash flows to the shareholders of closed-end funds, which should produce a discount. Finally, some authors argue that funds sell at discounts when their managers engage in excessive portfolio turnover. In summary, these transaction cost-like arguments usually translate into a predicted discount for the fund.

Additionally, other factors related to a fund’s portfolio are often thought to impact discounts. The holding of large blocks, restricted shares, or an un-diversified investment portfolio is believed by some to increase fund discounts. Conversely, the relation between foreign asset holdings and discounts is uncertain. The added risks of foreign securities are argued to have a negative influence, while the diversification benefits of foreign assets are thought to have a positive influence.

Yet, a number of other factors that do not rely on an economically based model of value are offered by others to explain the discounts on closed-end funds. These “irrational” factors include: market inefficiency, investor sentiment, level of the market, past performance, illiquid trading, no sales effort (compared to open-end funds) and/or the listing market (NYSE, ASE, or NASDAQ).

In addition to studies investigating the above topics, there are also a number of other investigations into various aspects of CEFs. These include papers researching CEF IPOs, various studies of serial correlation in short-term changes in fund prices, and a multitude of idiosyncratic topics ranging from arbitrage to return persistence.

Now we turn to selected works in the literature, which have been grouped into three major categories: (1) cash-flow, country funds, and management studies, (2) perceptions, expectations, and sentiment studies, and (3) trading strategies, IPO, and idiosyncratic studies. Studies in each sub-category are introduced chronologically. Those papers addressing more than one topic are relegated to what appears to be the most appropriate area.

4.2 Cash Flow, Country Funds, and Management Studies

Cash Flow Studies

Close, James A. “Investment Companies: Closed-End versus Open-End.” *Harvard Business Review* 29 (1952), 79–88.

Close authored the first closed-end fund (CEF) academic article of which we are aware. In this descriptive work, he discusses the differences between closed-end and open-end funds, and he anticipates many later contributions to the fund literature. The author reports that the open-end portion of the industry surpassed the closed-end funds by the end of 1943. Further, open-end funds (all 98 of them) had three times the assets of closed-end funds under management by the end of 1950.

He argues that the great growth in open-end funds is primarily related to the continuous, and well-compensated, sales effort via loads that is undertaken by these funds. In addition, high fixed commission rates on small trades tend to discourage small investments in publicly traded shares, including closed-end funds.

Close notes three aspects of CEFs that should facilitate CEF growth but that do not. First, CEFs offer investors the ability to buy shares at a substantial discount from NAV, providing a boost to the investor’s return if the discount narrows. Second, closed-end funds can make use of leverage, potentially enhancing returns to the common stockholders. Third, closed-end funds do not have to manage inflows/outflows of monies.

Close then analyzes the actual investment performance of a sample of open-end funds (37 of the 98 in existence) and the 11 closed-end funds listed on the NYSE. During the period January 1, 1937 to December 31, 1946 and several sub-periods, the mean NAV returns earned by closed-end fund managers exceeded those earned by the sample of open-end fund managers. Close ends with a caution to potential investors to carefully investigate the expense and management fee arrangements for any fund, open- or closed-end, before committing capital.

Edwards, Robert G. “Are Closed-End Discounts Due to Capital Gains Problems?” *The Commercial and Financial Chronicle* 207 (January 11, 1968), 3, 24, 25.

Edwards first discusses the “built-in potential gain tax” hypothesis that many investors believe is the origin of closed-end investment company (CEIC) share discounts to net asset value (NAV). Investors will not pay a price equal to the NAV of the fund if the fund’s portfolio contains unrealized gains that, upon realization and distribution, will result in a tax liability to the investor.

In a counter argument to the tax liability position, Edwards maintains that the realization and subsequent distribution of gains cause the share price of the fund to decline by the amount of the distribution, thus giving the investor a loss in market value. Hence, the offsetting loss negates the tax liability. Thus, he argues that the built-in potential capital gains tax liability explanation is invalid.

Edwards then presents a theory, based on the time value of money, that partially supports the potential tax liability explanation of discounts. Most investors who buy closed-end funds have an investment horizon longer than the length of time in which the average CEIC realizes and distributes gains. They will pay taxes on those gains earlier than they will realize the loss from the ex-distribution fall in the fund's share price. Thus, investors buying a fund containing unrealized portfolio appreciation are subject to a utility sacrifice. Edwards finds, however, that the utility sacrifice does not entirely explain the discounts. He concludes that the argument that funds should sell at a discount substantially equal to the built-in tax liability is not valid.

Malkiel, Burton G. "The Valuation of Closed-End Investment Company Shares." *Journal of Finance* 32 (June 1977), 847–859.

Malkiel begins by discussing the various explanations offered for discounts on closed-end fund shares: (1) unrealized capital appreciation, (2) distribution policies, (3) investments in restricted stock, (4) holding of foreign stock, (5) past performance, (6) portfolio turnover, and (7) management fees. Using multiple regression analysis, he examines the relative importance of these factors.

With a sample of 24 closed-end funds, Malkiel measures each of these parameters between 1967 and 1974 by regressing the average discount for the funds during the year against these factors. The results from the multiple regression suggest that: (1) discounts are positively related to unrealized capital appreciation, distribution policies, restricted stock, and foreign stock holdings, and (2) turnover rates, management fees, and past performance do not significantly contribute to closed-end fund discounts.

Finally, Malkiel examines the time-series behavior of discounts by regressing average discounts against a measure of net open-end fund redemptions, changes in the level of the Standard & Poor's Stock Composite Index, and a dummy variable equal to one when a major brokerage house terminated the marketing of the closed-end fund shares in 1970 and zero otherwise.

He concludes that net open-end fund redemptions, which proxy for investors' sentiments about investment companies, are related positively to closed-end fund discounts. Likewise, discounts rise when marketing efforts are reduced and the level of the market falls. Malkiel contends that, given the low explanatory power of his model, his findings may indicate that closed-end funds are not priced efficiently.

Mendelson, Morris. "Closed-End Fund Discounts Revisited." *Financial Review* (Spring 1978), 48–72.

In this 1978 article, Mendelson attempts to explain why shares of closed-end funds usually sell at a discount from net asset value. Using yearly, monthly and quarterly data gathered for nine closed-end investment companies, he tests ten model specifications and 15 independent variables for the period 1961–1971. Mendelson employs pooled and fund-specific data to analyze the effect of unrealized gains, management expenses, and past performance on discounts, observing whether the behavior of discounts is related directly to fluctuations in the fund's stock.

Mendelson's results show that discounts can be accounted for partially by market performance. He is able to explain approximately 30–50% of the variation in closed-end fund discounts with fund portfolio turnover, performance, and the most recent amount of capital gains distributions. The regression models also indicate that the magnitude of discount is not explained by unrealized gains or prior performance. Mendelson concludes that the market is not entirely efficient in pricing closed-end funds, and that market imperfections may be exploited profitably by various market trading strategies.

Crawford, Peggy and Charles P. Harper. “An Analysis of the Discounts on Closed-End Mutual Funds.” *Financial Review* 20.3 (August 1985), 30–38.

Crawford and Harper attempt to explain the discounts of closed-end investment companies. They find three variables of significance at the 5% level. Expenses and income are related negatively to discounts, but risk is related positively. Specifically, bond funds have three variables of significance: expenses are related positively to discounts, but income and unrealized appreciation are related negatively. For stock funds, income is related negatively, and risk is related positively to the discounts at the 10% level of significance.

Anderson, Seth C. and Jeffery A. Born. “Market Imperfections and Asset Pricing.” *Review of Business and Economic Research* 23.1 (Winter 1987), 14–25.

Anderson and Born argue that CEICs ought to command a premium rather than a discount to NAV in the market place, *ceteris paribus*. They attribute discounts to the following imperfect market factors: (1) imperfectly diversified portfolio, (2) non-optimal portfolio turnover, (3) excessive management fees, (4) investments in illiquid assets, (5) taxable income recognition at a time which is not optimal for the investor, and (6) heterogeneous investor expectations.

They offer the following hypothesized relationships between the price of a CEIC's share and the NAV:

1. As the degree of diversification in the fund's portfolio falls, the fund's premium should fall.
2. As the foreign asset component of the fund's portfolio rises, the fund's premium should rise.
3. As trading volume in the fund's portfolio deviates from the optimal level, the fund's premium should fall.
4. As the amount of the fund's management fee rises above the value of the fund's services, the fund's premium should fall.
5. As the amount of the fund's portfolio invested in less-than-fully liquid assets rises, the fund's premium should fall.
6. As the expectation of the fund's frequency of recognizing taxable income rises, the fund's premium should fall.
7. As the level of uncertainty about the expected return on the market rises, the fund's premium should fall.

To test these hypotheses, they gather share price, net asset value, income statement, and portfolio composition data for a sample of 17 CEICs from 1970 through 1981. From their findings, Anderson and Born conclude that discounts

are related positively to a fund's lack of diversification, illiquid assets, and expenses generated. They also find support for the hypothesis that discounts are related positively to heterogeneous investor expectations. The tax recognition and turnover variables were not significant. Funds with foreign holdings tend to exhibit smaller discounts.

Anderson, Seth C. and Jeffery A. Born. "The Effects of Market Imperfections on Asset Pricing and Risk: An Empirical Examination." *The Journal of the Midwest Finance Association* 16 (1987), 1–17.

Anderson and Born examine the impact of market imperfections on the price and risk of closed-end investment company shares. They argue that discounts are not inconsistent with efficient markets if they are viewed as the result of the existence of market imperfections. If market imperfections vary over time, then the returns from the shares will not perfectly correlate with the returns of the underlying portfolios.

Using a regression model, Anderson and Born compare weekly returns of 17 CEIC shares and NAVs for the period 1970–1981. They find little support for the hypothesis that the slope coefficient is equal to one, as would be predicted by the perfect market model. Anderson and Born infer from this result that market imperfections significantly influence the price of financial assets.

They also consider the difference between systematic risk estimates for the CEIC shares and systematic risk estimates for their respective asset portfolios. Systematic risk estimators (betas) are obtained with a single-factor (market-model) specification of the return-generating process. They find that six of the funds have NAV betas that are significantly greater than their respective share price betas, and two funds have share price betas that are significantly greater than their respective NAV betas.

Finally, Anderson and Born use data from the firm's annual reports and the Livingston Survey data for the period 1970–1981 to test five hypotheses:

H1: As the variance in expected returns rises, CEIC discounts rise.

H2: As the frequency of recognizing taxable income rises, CEIC discounts rise.

H3: As the percentage of assets invested in illiquid assets rise, CEIC discounts rise.

H4: As the ratio of management fees to assets rises, CEIC discounts rise.

H5: As the degree of asset diversification falls, CEIC discounts rise.

The explanatory power of their model is significantly different from chance at the 1% confidence level. All of the estimators are of the hypothesized sign and are significantly different from zero at the 5% confidence level. The authors conclude that discounts are largely a function of market imperfections.

Brickley, James, Steven Manaster, and James Schallheim. "The Tax-Timing Option and Discounts on Closed-End Investment Companies." *Journal of Business* 64.3 (1991), 287–312.

The authors build on two important papers by Constantinidies (1983, 1984) that argue that taxes have demonstrable influences on asset prices. Constantinidies demonstrates that the value of the tax-timing option is positively related to the price variability of the asset's pre-tax rate of return. Put differently, the greater the potential range of security values, the more valuable the security in a tax-minimization strategy.

Brickly, Manaster, and Schallheim extend this insight into the pricing of closed-end funds. When individuals purchase shares in a fund, as opposed to replicating the underlying portfolio of the fund, they forfeit the tax-timing options on the underlying assets to the fund's management, but they gain a tax-timing option on the fund's shares. Whether the individual suffers a net gain or loss from this swap is argued to be a function of the fund's share price variability versus the fund's NAV price variability.

The authors explain that to exploit the value of tax-timing, individuals must engage in transactions and thus bear transaction costs. They argue that the net benefit of a tax-timing option declines as the variability of the individual asset declines. Using data from 1969 through 1978 for funds that had limited investments in restricted securities (<3% of total portfolio), the authors find a positive relation between discounts and the variability of NAV returns as predicted by the extended model of Constantinidies. The authors admit that their findings are also consistent with the investor sentiment hypothesis if investors are "over-optimistic" during expansions and "over-pessimistic" during contractions. However, the investor sentiment hypothesis cannot explain the "rational" degree of correlation between unrecognized portfolio gains/losses and close-end fund discounts.

Kumar, Raman, and Gregory M. Noronha. "A Re-Examination of the Relationship between Closed-End Fund Discounts and Expenses." *Journal of Financial Research* 15.2 (Summer 1992), 139–147.

Kumar and Noronha update the Malkiel (1977) study, employing a different measure of management fees and adding a variable to control for the percentage of NAV invested in foreign securities. The authors argue that management fees are generally determined by a fixed schedule as a percentage of total assets. Thus, as the fund's size increases, management fees rise, but at a slower rate than the growth in the size of the fund. The authors suggest the non-linear relation between management fees and fund size as proxied by NAV could bias Malkiel's results.

They examine annual data from 1976 through 1987 with separate models; one using their management fee variable, and the other using the management fee variable as defined by Malkiel. In addition, the authors include variables that measure unrecognized capital gains, the percentage of assets invested in restricted stock, and the percentage of assets invested in foreign stock. The overall explanatory power of the models employing Malkiel's measure are lower than those using Kumar and Noronha's variable and the management fee variable is significantly different from zero in more years (six versus four of the 11 examined). From the empirical evidence, the authors conclude that differences in management fees do explain a small proportion of the cross-sectional variance in closed-end fund discounts.

Kim, Chang-Soo. “Investor Tax-Trading Opportunities and Discounts on Closed-End Mutual Funds.” *Journal of Financial Research* 17.1 (Spring 1994), 65–75.

The author posits that arbitrage activities should induce parity between the net asset value (NAV) per share of a closed-end fund and the market price of its shares. Kim argues that at least a portion of discounts can be explained by the loss of tax-timing opportunities that are suffered by the investor who purchases the shares of a closed-end fund instead of purchasing the fund’s portfolio of assets.

Kim applies Merton’s (1976) option pricing theorem to the tax-timing difference between owning the fund’s shares and the underlying portfolio. He demonstrates the sensitivity of the tax-trading option value to changes in key parameters, and calculates that its theoretical value can be greater than 7% of the value of portfolio.

Although he does not estimate the value of tax-trading options for any actual closed-end fund, Kim argues that there is much market and fund data that are consistent with the model. He contends that both the evaporation of discounts for closed-end funds announcing that they are going to “open” up, and the fact that most closed-end funds that have opened up have been broadly diversified funds, are consistent with his model.

Malkiel, Burton G. “The Structure of Closed-End Fund Discounts Revisited.” *Journal of Portfolio Management* (Summer 1995), 32–38.

Malkiel updates and expands his 1977 study in an effort to determine if the previous persistence in closed-end fund discounts continues and whether there are rational explanations for the pattern of discounts observed. He utilizes a sample of 30 funds at the end of 1994 to test several hypotheses involving the following variables: size, historical return, insider holdings, restricted shares, turnover, payout, and foreign holdings.

In a series of univariate regressions, Malkiel finds support for the restricted stock and unrecognized capital gains hypothesis. Although he finds portfolio turnover is positively related to premiums, he also finds that turnover and unrecognized capital gains are negatively related. As a result of high turnover, funds generally have little or no unrecognized gains, and it is the latter factor that appears to drive the higher premium/lower discount. The other factors have no ability to explain the cross-sectional variation at the end of 1994 discounts/premiums.

Malhoutra, D.K. and Robert W. McLeod. “Closed-End Fund Expenses and Investment Selection.” *The Financial Review* 41.1 (Spring 2000), 85–104.

Malhoutra and McLeod engage in a two-part study of closed-end fund expense ratios. First, the authors produce an empirical model to predict the level of expense ratios in the period 1989–1996. Second, the authors look for the relation between fund expense ratios and return performance.

Malhoutra and McLeod relate yearly cross-sectional differences in the fund expense ratios to: type of fund (stock or bond), domicile of firm issuing the securities (domestic or foreign), size of the fund, age of the fund, and total return

of the fund. The authors find that bond funds systematically have lower expense ratios than stock funds, exhibit lower volatility in returns, and are younger. Within stock funds, domestic funds have systematically lower expense ratios than funds that specialize in foreign investments. In addition, domestic funds have lower volatility in returns and are older than their foreign counterparts.

The authors then examine the expense behavior of stand-alone funds compared with members of a “family” of funds. Fund families exploit economies of scale, but only when the number of funds exceeds five. In general, the authors find that older funds have lower expense ratios, which may be a result of the experience of their managers.

The relation between changes in the fund’s NAV and expense ratio is relatively weak, although statistically significant in five of the seven years examined. The slope coefficient on the performance variable is significant in five of the seven periods, but the coefficient is positive and significant in only two of the five periods. In the other periods there is either no relation or lower expenses are associated with higher returns. As with a myriad of other studies, this work fails to convincingly support the hypothesis that professional investment management yields benefits greater than its cost.

Woan, Ronald J. and Germain Kline. “Determinants of Municipal Bond Closed-End Fund Discounts.” *Journal of American Academy of Business, Cambridge* (September 2003), 355–360.

In this work the authors investigate the determinants of cross-sectional variation in discounts and premiums for both national and single-state municipal bond closed-end funds (CEFs). Although some earlier studies tangentially address municipal CEFs, this research represents the first formal study of these funds.

The authors utilize a sample of 183 municipal CEFs for 1997. The variables of interest include portfolio variances, leverage, maturity, and the more frequently addressed measures such as turnover, expenses, and performance. They report that on average the national and single-state CEFs have discounts of 3.9 and 3.3%, respectively. Further analysis reveals that discounts are strongly associated with several of their selected variables. They state that a caveat is in order owing to the high correlations among some of the independent variables, as well as the unanticipated signs on others. Nonetheless, they conclude that their results are inconsistent with the noise-trader argument of Lee et al. (1991).

Russel, Philip S. “Closed-End Fund Pricing: The Puzzle, The Explanations, and Some New Evidence.” *Journal of Business & Economic Studies* 11.1 (Spring 2005), 34–49.

In this article the author first reviews the efficient market and the investor sentiment hypotheses pertaining to closed-end fund (CEF) discounts. He discusses in detail several reasons why current explanations do not fully address the pricing behavior of CEF discounts: (1) efficient market-based explanations do not fully explain the existence, magnitude, or persistence of discounts, and (2) investor sentiment explanations are not thoroughly convincing as a panacea for the discount conundrum.

The author then re-examines the relationship between CEF discounts and five variables: expense ratio, turnover, tenure, family fund membership, and age of fund. The sample employed covers the 1994–2002 period and includes both domestic and foreign CEFs with a variety of objectives and holdings, such as equities, corporate bonds, convertible bonds, and government bonds. Results include the findings that expense ratios differ between domestic and foreign funds; turnover ratios vary over time; and foreign funds tend to be significantly smaller than their domestic counterparts. Their regression results show that these variables significantly affect the magnitude of discounts. However, they conclude that while their results are interesting, much needs to be learned about the closed-end fund puzzle.

Country Funds Studies

Bosner-Neal, Catherine, Gregory Brauer, Robert Neal, and Simon Wheatley. “International Restrictions and Closed-End Country Fund Prices.” *Journal of Finance* 45.2 (June 1990), 523–547.

Many countries, including the United States, impose restrictions on the real and portfolio investment activities of non-residents. To the extent that these restrictions are binding, they serve to segment the local capital market, making the price of risk a function of where capital is raised.

Bosner-Neal et al. propose a method to determine if restrictions are binding via an investigation of the premiums (discounts) on closed-end country funds (CECFs). The authors argue that if restrictions are binding, foreign investors will pay a premium over net asset value (NAV) for the shares of a CECF specializing in the segmented market. If capital market restrictions are subsequently loosened (tightened), the authors predict that CECF premiums will decline (increase).

They employ a sample of 33 domestic (U.S.) closed-end funds to serve as a control group and examine the behavior of weekly returns of 14 CECFs between May 1981 and January 1989. On average, the CECFs exhibit substantially smaller discounts during the sample period than the domestic control group (4.5 versus 11.2%).

The authors identify changes in international investment restrictions through a search of the *Wall Street Journal Index* and the International Monetary Fund’s *Exchange Arrangements and Exchange Restrictions*. The authors regress changes in CECF discounts against three dummy variables, with an intercept coefficient.

They find that four of the five country funds examined display a significant decrease in price-to-NAV ratios in anticipation of, or after the announcement of, investment restriction liberalization. They conclude that government-imposed barriers have been effective in segmenting asset markets.

Bailey, Warren and Joseph Lim. “Evaluating the Diversification Benefits of New Country Funds.” *Journal of Portfolio Management* (Spring 1992), 74–80.

The authors examine the proposition that shareholders of closed-end funds specializing in foreign investments (CECFs) reap the international diversification benefits thought to be gained by direct portfolio investments in these economies. They find CECF share returns to be strongly correlated with U.S. market returns. Conversely, the authors find substantially lower contemporaneous correlation between the target country market index and the U.S. market index. This suggests that the returns to CECF shareholders are determined more by U.S. than by target market conditions.

The authors also estimate an efficient frontier using the U.S. market index augmented by CECF shares and re-estimate the frontier using the U.S. and foreign market indices. Given the influence of the U.S. market on the CECF returns, it is not surprising that the frontier employing underlying assets dominates the frontier employing CECFs. However, the frontier with the CECFs dominates the U.S. market-only result. These results suggest that international diversification is beneficial but that CECFs are a poor vehicle for delivering those benefits.

In addition, the authors examine the volatility of returns to CECFs during trading hours (in New York) and during non-trading hours. Since many of the CECFs invest in markets that are closed when trading takes place in New York (or the overlap is minimal), one might expect the volatility of CECF returns to be highest when the market is closed. However, in most of the cases examined, this is not the case.

Johnson, Gordon, Thomas Schneeweis, and William Dinning. “Closed-End Country Funds: Exchange Rate and Investment Risk.” *Financial Analysts Journal* (November/December 1993), 74–82.

The authors examine four different risk-return issues for closed-end country funds (CFs). Using monthly data from 1989 through 1992 for a sample of 14 funds targeting 13 different countries, the authors develop a number of sample statistics for “raw” and “hedged” returns for the funds’ share price, the funds’ net asset value (NAV), and the local market indices. The results demonstrate that, from a U.S. (dollar-hedged) perspective, developed markets experience significantly less exchange rate volatility than do emerging markets. For the developed markets, returns during the period were highly correlated with U.S. returns; whereas many emerging markets’ returns were independent of U.S. returns.

The lack of a strong correlation between U.S. returns and emerging market returns suggests the possibility of significant diversification benefits for U.S. investors. To determine whether the CFs can deliver these benefits, the authors regress share price returns and NAV returns against local and U.S. market returns in a two-factor model. They report a much stronger relation between emerging market CF share price returns and the U.S. market than observed for developed market CF share price returns and the U.S. market. The authors

posit that their evidence supports the hypothesis that noise-trader sentiment explains a sizable portion of closed-end fund discounts.

They also examine the role of currency hedging in the evaluation of CF shares and find that complete hedging during this period actually increases the total variability of dollar denominated returns. By allowing the currency risk to go un-hedged, the overall variability of these investments is reduced, from a U.S. point-of-view.

Finally, the authors re-examine the ability of CFs to provide U.S. investors with reduced risk in the context of a total portfolio comprised of U.S. investments and CF investments. When split 75% (US)/25% (CF), the variability in portfolio returns declines (relative to 100% U.S.). This holds when the foreign component is either the fund's NAV or the local market. However, no decline in variability occurs when the foreign component is CF shares. As vehicles for delivering diversification benefits, CFs are easier than direct investments, especially in emerging markets, but they are not perfect substitutes.

Chowdhury, Abdur R. "The Behavior of Closed-End Country Fund Prices in the Asian NIEs." *Applied Economic Letters* 1 (1994), 219–222.

Prior analyses of the premiums/discounts that often characterize closed-end country funds (CECFs) report evidence consistent with the hypothesis that investment restrictions on foreign investors leads to premiums. In addition, prior research demonstrates that when an economy relaxes (increases) restrictions on foreign investment, the amount of the premium declines (increases) for CECFs. This paper re-examines these hypotheses through analysis of CECFs that target four newly industrialized economies (NIEs) in Asia: Hong Kong, Korea, Singapore, and Taiwan.

In all four instances, the government in question relaxes restrictions on foreign investors. In two cases, Hong Kong and Singapore, the economies have highly developed financial markets before the restrictions on investments are undertaken. Conversely, Korea and Taiwan have relatively undeveloped financial markets at the time the restrictions are relaxed.

For both Korea and Taiwan, the decrease in investment restrictions is accompanied by large and statistically significant declines in CECF premiums. Conversely, the decrease in investment restrictions in Singapore and Hong Kong has no statistically significant impact on their respective closed-end country fund premiums. The author concludes that changes in premiums associated with changes in foreign investor restrictions are conditional upon the extent of restrictions at the time of the change in policy.

Medewitz, Jeanette N., Fuad A. Abdullah, and Keith Olson. "An Investigation into the Market Valuation Process of Close-End Country Funds." *FM Letters* (Spring 1994), 13–14.

In this very short write-up, the authors report that changes in country funds' (CF) share prices and changes in their net asset values (NAV) are driven by changes in their local market index, when the country's capital markets are well established. However, changes in the S&P 500 explain changes in the Korean, Philippines, Singapore, and Thailand Funds' share prices and NAVs. The

authors also report that the ratio of fund share price to NAV (greater than one indicates a premium) is better explained by variations in a fund's share price than by variations in its NAV.

Chang, Eric, Cheol S. Eun, and Richard Kolodny. "International Diversification through Closed-End Country Funds." *Journal of Banking and Finance* 19.4 (1995), 1237–1263.

The authors examine the weekly returns of a sample of 15 closed-end country funds (CECFs) from January 1985 through December 1990. They find that returns to funds' shareholders exhibit a surprisingly strong correlation with U.S. market returns, but usually (10 of 15 funds) have a stronger correlation with their respective local market.

The authors use two factors (U.S. market return and local market return) to explain returns to shareholders and changes in net asset value (NAV). They find that 12 of the 15 funds' returns to shareholders have significantly higher U.S. market return betas than do their respective NAV returns.

The authors find that funds exhibit far greater pair-wise correlation than the correlation in changes in their respective NAVs or local market indices. When estimating efficient frontiers, the portfolios include many of the CECF shares, but the frontiers obtained using changes in NAVs dominate these results (i.e., higher returns for each level of risk). Thus, while the funds can provide diversification benefits, there is slippage.

Chang et al. use a variety of standard performance measures (e.g., Jensen's alpha) and find that only the Mexico Fund delivers positive abnormal performance during the period. Combined with the evidence above, the authors conclude that the gains to U.S. investors for holding CECFs come strictly from the diversification benefits.

Choi, Jongmoo Jay and Insup Lee. "Market Segmentation and the Valuation of Closed-End Country Funds." *Review of Quantitative Finance and Accounting* 7.1 (1996), 45–63.

The authors examine the pricing of closed-end country funds (CECFs) in an effort to gain evidence on the existence of international financial market segmentation. They analyze weekly returns from 1978 through 1990 for a sample of 21 CECFs and find that five of the funds have statistically significant discounts over the entire period, while 11 have significant premiums. They regress weekly CECF returns against weekly U.S. market returns. In addition, they estimate a three-factor model containing a market segmentation dummy.

Using a two-step technique, the authors estimate betas for their two- and three-factor models and find strong support for both market factors and the segmentation dummy. In addition, the authors adopt an alternate that suggests that only the local market factor and the segmentation dummy is priced. When the segmentation dummy factor is included, the pricing of the local market factor is dramatically reduced. This evidence is consistent with a market segmentation hypothesis, but only when the local market is characterized by significant barriers to foreign investor entry.

The authors also investigate the relation between CECF returns and changes in the value of the target market's currency, finding statistical significance for only four funds. They also estimate a cross-sectional model of CECF discounts and find some evidence in support of currency value effect, but no support for a growth rate, segmentation dummy, or capitalization rate effect.

La Barge, Karin P. and Richard A. La Barge. "Portfolio Sets for Latin American Closed-End Country Funds in the Changing Interest Rate Environments of 1992–1994." *The Journal of Financial Engineering* 5.1 (1996), 37–52.

The authors estimate a series of mean-variance (MV) efficient portfolios employing a sample including the S&P 500 index, U.S. T-bills (a risk-free proxy), and seven closed-end country funds that limit their investments to Latin America. They compare the composition of MV efficient portfolios estimated from return data drawn from a "stable U.S. interest rate" environment (May 1992 through January 1994) to the composition of MV efficient portfolios estimated from a "rising U.S. interest rate" environment. The variation in the composition of ex-post MV efficient portfolios suggests that active investment management may impart value for U.S. investors wishing to obtain a presence in Latin America.

Holding the Sharpe-ratio constants in each sub-period, the authors estimate the proportion of wealth that should be invested in each of the nine candidates. The authors do not permit short sales, thereby constraining portfolio weights to zero or more. They estimate the ex-post composition of portfolios that lie along the MV efficient frontier in the absence of a risk-free asset in each sub-period.

Holding the Sharpe-ratio constant in the stable-rate environment, T-bills gradually replace investments in the S&P 500 and the Mexico Fund. At the limit, the composition is 28.7% in the S&P 500 and 71.3% in the Mexico Fund. The monthly return dominates the S&P 500 by a large margin (2.6 versus 0.6%), but it is substantially more volatile. In the rising rate environment, T-bills gradually replace the Brazil Fund. The authors conclude that the instability in the composition of MV efficient portfolios and in the MV efficient frontier make any asset allocation strategy based on historic data problematic.

Arshanapalli, Bala, Jongmo Jay Choi, E. Tyler Clagget, Jr., John Doukas, and Insup Lee. "Explaining the Premiums and Discounts on Closed-End Equity Country Funds." *Journal of Applied Corporate Finance* 9.3 (Fall 1996), 109–117.

The purpose of this paper is to examine the cross-sectional variation exhibited by closed-end country funds. At the time of the study there were 28 country funds (representing 22 different countries) that specialized in equity investments. The authors examine the return performance of these funds from 1978 (or their inception) until 1995 and how these returns are correlated with returns on their own country's stock market index and with U.S. stock market returns.

They report that the correlation between returns to the shareholders of the country funds and the U.S. stock market is low, and in 12 of the 28 cases, lower than the correlation between the local market index and the U.S. stock market. This finding suggests that the closed-end fund may offer even greater diversification gains than are promised by the local market's index.

After an examination of the discounts/premiums commanded by the country funds, the authors report that discounts tended to be the largest for the funds that restricted their investments in developed markets (France, Germany, and the UK). Conversely, of the eight funds that sold at an average premium, six were associated with local markets that had substantial restrictions on foreign investment. Using a two-factor model of weekly returns to stockholders of country funds, the authors find strong evidence of a local market factor and surprisingly strong evidence of a U.S. market factor (significant in 26 of 28 cases).

Beckaert, Geert and Michael S. Urias. “Diversification, Integration and Emerging Market Closed-End Funds.” *Journal of Finance* 51.3 (July 1996), 835–869.

The authors study the diversification benefits to U.S. investors in a sample of 80 closed-end funds (EMCFs), 42 of which specialize in emerging capital market investments, with the remainder investing in developed/mature markets. Forty-three of the funds’ shares trade in the United States, while the remainder trade in the United Kingdom.

Utilizing a series of mean-variance spanning tests, the authors conclude that the U.S. investor’s efficient frontier computed with mature market indices shifts with the inclusion of U.K.-based EMCFs. However, the U.S. investor’s efficient frontier does not shift with the inclusion of U.S.-based EMCFs.

They also examine the impact of liberalizing entry into the capital markets of Brazil, India, Taiwan, and Korea. As an indirect test of whether the restriction binds, they investigate whether these changes produce significant differences in the spanning properties of these funds. In the case of Brazil and India, the restrictions are not binding before or after the change. For Taiwan, the constraint is binding before the change, but not after. The result is reversed for Korea. Thus, Brazil and India offer U.S. investors no special diversification benefits during the period. However, Taiwan offers benefits before liberalizing their capital markets, but not afterward. They report that Korea offers no benefits when their markets are restricted, but does after they are opened during the period of concern.

The authors also conduct a series of tests on the abnormal performance of pairs of U.S. and U.K. funds that invest in the same emerging market. In most cases, the U.K. funds outperform the U.S. competitors, although the majority of U.K. and U.S. funds fail to exhibit abnormal returns. The cause of the comparative advantage is unclear. It could be because of the portfolio selections of the managers, or it could be due to difference in the behavior of the premiums for the U.S. and U.K. funds.

Errunza, Vihang, Lemma Senbet, and Ked Hogan. “The Pricing of Country Funds from Emerging Markets: Theory and Evidence.” *International Journal of Theoretical and Applied Finance* 1.1 (1998), 111–143.

The authors argue that without restrictions on capital flows, arbitrage activities should equalize returns for bearing systematic risk across national borders. In the presence of restrictions, the return to investors in segmented markets will differ from the predictions of the non-arbitrage model. In markets with highly restricted access (usually emerging economies) to foreign investors,

one might expect a higher return to investors and conversely, a higher cost of funds to issuers.

With a sample of 32 closed-end country funds, the authors examine the behavior of returns in 1993 and estimate a multi-factor model of fund discounts consistent with their theoretical model. The sample contains 19 “emerging economy” funds and 13 country funds from “developed” markets. Consistent with other studies, the authors find that the country funds fail to perfectly mimic their target market stock index. This finding holds for both developed and emerging market funds.

The authors report two sets of regression estimates obtained from a cross-sectional model of country fund premiums. For the emerging economy funds, the authors find the global factor to have the most explanatory power, with investor access very important. For the 13 developed economy funds, the authors again find the global factor important in explaining discounts. Substitution and spanning factors have virtually no explanatory power, and lack of “access” is not a factor by definition. Although the empirical evidence is limited to a single calendar year, the results yield evidence that country funds are imperfect vehicles for gaining international investment benefits, as measured by national indexes.

Ghose, Subrata and Jeffery A. Born. “Asian and Latin American Emerging Market Closed-End Funds: Return and Diversification.” *Emerging Markets Quarterly* 2.2 (Fall 1998), 63–75.

Ghose and Born examine the return and risk characteristics of emerging market closed-end funds (EMCFs) investing in Asian and Latin American markets from January 1990 through March 1996. The authors attempt to determine if these markets and/or the funds that invest in them offer return and/or diversification benefits to U.S. investors.

They find the net asset values (NAVs) of the Asian funds to be virtually flat during the period, while the NAVs of Latin American funds increase. However, like the underlying local markets, the returns on the EMCFs exhibit a low correlation with U.S. market returns, suggesting the possibility of diversification benefits.

In an effort to determine how “transparent” the EMCFs are, the authors examine how closely changes in the fund’s NAV and its share price mirror changes in the local market index. Only six of the 51 funds have NAV “local market betas” greater than one, but the explanatory power of the single-factor model is high. Only four have share price local market betas greater than one, and the correlation and explanatory power are low. Slightly more than half of the funds have share price local market betas greater than their NAV local market betas.

Finally, the authors employ a two-factor model (the U.S. market and the target market) to examine the return to EMCF shareholders. They report the explanatory power of the model to be twice that obtained with only the target market factor. The U.S. market factor is statistically significant for 21 of the funds.

The authors stress that during this time period Asian and Latin American markets' returns are low and U.S. market returns are high. They conclude that the low correlation between U.S. market returns and foreign market returns could make investments in these markets attractive for diversification reasons.

Anderson, Seth C., Jay Coleman, Jeff Steagall, and Cheryl Frohlich. "A Multi-Factor Analysis of Country Fund Returns." *Journal of Financial Research* (2001), 331–346.

This paper re-examines the returns to shareholders of closed-end country funds (CECFs) in an effort to determine the underlying influence of the U.S. market. The authors provide an expanded version of the return-generating process for CECFs, including a local market, exchange rates, discounts/premiums, the U.S. market, and other country markets. They employ weekly data from 34 CECFs for the 222-week period from October 2, 1992 through December 27, 1996.

When returns to shareholders of the CECFs are analyzed, the authors find very strong evidence of the influence of local market returns and changes in the fund discounts. When the authors augment their four main factors with factors that measure the returns on the other local markets represented in the study, they find some evidence of co-movement. For example, returns to shareholders of the Brazil and Brazil Equity funds are positively related to changes in the Chile market return, and negatively related to changes in the Korean and Spanish market return. There are some cases where the inter-dependence seems to be explained by geographic location (e.g., Brazil–Chile) and others that seem best explained by substitution effects (e.g., Brazil–Korea).

The authors contend the influence of U.S. market returns on returns to shareholders of CECFs is often overstated because prior authors specify a return-generating process without enough factors. While CECF return benefits and their ability to mirror their underlying local market are still somewhat suspect, the authors conclude that CECF returns are not so dominated by the U.S. market conditions as previous research suggests.

Anoruo, Emmanuel, Sanjay Ramchander, and Harold Thiewes. "Cross-Border Linkages Among Asian Closed-End Funds." *Journal of Economics and Finance* 27.3 (Fall 2003), 357–372.

In this work the authors investigate the cross-border linkages among nine Asian closed-end stock funds (CEFs) that traded on the New York Stock Exchange (NYSE) over the period 1990–2001. The focus of their work is twofold: (1) an examination of the dynamics between a fund's share price, which is determined on the NYSE, and its net asset value (NAV), which is determined in the fund's target secondary market, and (2) an examination of the dynamic relationship of the funds' discounts.

The study employs co-integration and vector autoregression methodologies to investigate the funds' share price and NAV behaviors. They find that NAV and share prices are strongly linked in the long run, indicating that fund discounts are mean-reverting. The authors discuss how profitable trading strategies should occur when the narrowing of the discount is driven by share price

changes. They also discuss how Japan Equity and Korea Funds play a dominant role in determining the share price behavior of other funds.

They point out that their results yield important insights for portfolio management. First, there exists substantial risk from investing in these funds and their markets. Second, the low correlation between the emerging markets and the more developed markets offers a strong rationale for employing foreign securities or country CEFs in portfolios. Finally, their results show that since the Asian crisis, world markets have become more integrated and thereby more responsive to overseas shocks.

Movassaghi, Hormoz, Alka Bramhandkar, and Milen Shikov. “Emerging vers. Developed Markets Closed-End Funds: A Comparative Performance Analysis.” *Managerial Finance* 30:3 (2004), 51–61.

In this study the authors examine the fund level correlates of return and share price discounts/premiums for closed-end funds (CEFs) investing in emerging and developed capital markets. They also compare the performance of emerging markets’ CEFs by region versus single country focus.

They employ a sample of 100 CEFs which are categorized as emerging, developed, region, or single country, depending upon the particular analysis. The variables employed are price, net asset value (NAV), expense ratio, management tenure, performance, and turnover.

Their findings confirm those of several prior related investigations. Specifically, prior performance, size, age, expense ratios, and return volatility, are seen to be useful predictors of a fund’s future performance and share price relative to NAV. The study reports that the blend of factors influencing the funds’ returns and premiums/discounts varies between emerging market funds and developed market funds. However, they do not find strong evidence for consistent, superior performance by any particular regional or country emerging market funds.

Management Studies

Roefeldt, Rodney L. and Donald L. Tuttle. “An Examination of Closed-End Investment Companies.” *Journal of Business Research* 1.2 (Fall 1973), 129–140.

Roefeldt and Tuttle begin their work by addressing three usual explanations of closed-end fund discounts: (1) the built-in tax liability problem, (2) the lack of public knowledge, and (3) the costs of operation. They assert that all three hypotheses suffer from the same shortcoming: the factors can be used to explain discounts but not premiums. The authors contend that there should be a functional relationship between discounts and the market’s expectation of the fund manager’s ability to predict security prices.

They develop and test a theory to explain the existence of premiums as well as discounts. They hypothesize that closed-end funds sell at discounts or premiums because investors expect the funds to underperform or outperform the market, respectively. The purpose of a discount or premium on a diversified

fund is to increase or decrease the risk-adjusted expected return; otherwise an investor can expect to get the market return by simply buying a random portfolio.

The authors employ a linear regression model to estimate the risk-adjusted performance of 12 CEICs, based on their net asset values for the 1953–1970 period. They ascertain that their performance measure is negative when net asset value excess returns are the dependent variable. This finding suggests that when returns are risk adjusted, fund managers' performance is inferior. When share price excess returns are employed, the performance measure is no longer negative.

Roefeldt and Tuttle relate the abnormal performance measures to the size of the fund's discount or premium. They find that inferior performance based on net asset value excess returns is associated with continuous discounts, but find no relationship between the performance measure obtained with excess share price returns and fund discounts or premiums. From this evidence they conclude that discounts arise from inferior portfolio management. They find no strong evidence that fund shares are priced inefficiently.

Brauer, Gregory A. "Open-Ending Closed-End Funds." *Journal of Financial Economics* 13.4 (December 1984), 491–507.

Brauer investigates the rationality and informational efficiency of the market for closed-end shares by examining the "open-ending" behavior of 14 funds during the 1965–1981 period. Brauer shows that the funds exhibiting larger discounts are more likely than other CEICs to be open-ended. The average return from open-ending the 14 funds is 30.9%; the average return would be 19.3% if the other discount funds open-end.

Next, Brauer questions why all CEICs are not open-ended once discounts occur. To determine a possible agency relationship, he investigates two additional hypotheses: (1) funds that open-end have smaller expense ratios (a proxy for management compensation) than funds that maintain CEIC status, and (2) expense ratios are greater for CEICs than for other mutual funds. He shows that the average expense ratio is 22% smaller for open-ending funds than the ratio for CEICs that do not open-end. This finding supports his argument that an agency relationship gives rise to open-ending resistance. To investigate the second hypothesis, Brauer uses a paired comparison of closed-end funds and open-end mutual funds. He finds that CEICs' expense ratios are significantly larger than expense ratios for open-end mutual funds.

Finally, he investigates the monthly return behavior of open-ending funds for the 12 months before and after the announcement of open-ending. From the strong post-announcement abnormal return findings, Brauer concludes that, with respect to open-ending, the market for closed-end fund shares is generally efficient.

Brickley, James A. and James S. Schallheim. "Lifting the Lid on Closed-End Investment Companies: A Case of Abnormal Returns." *Journal of Financial and Quantitative Analysis* 20.1 (March 1985), 107–117.

Brickley and Schallheim examine the market's reaction to the reorganization activities of funds that have liquidated or converted to open-end status during the period 1962–1982. The authors argue that if discounts represent a true discrepancy between NAV and market value, funds with large discounts are prime targets for takeover, liquidation, or open-ending. They identify reorganization announcement dates for ten of the 16 funds and examine return and discount behavior around the dates. After rejecting the null hypothesis of no abnormal returns at the 1% level of significance, they conclude that discounts are not based solely on accounting phenomenon and that the market price of the funds prior to announcement is substantially below the liquidating value of the fund.

They examine the return behavior of funds, with management-sponsored proposals to reorganize, from the last day of the announcement month until the termination of the funds' closed-end status. They report an average significant abnormal return of 15.8% and conclude that their findings do not indicate necessarily an inefficient capital market.

Brauer, Gregory A. “Closed-end Fund Shares' Abnormal Returns and the Information Content of Discounts and Premiums.” *Journal of Finance* 43.1 (March 1988), 113–127.

Brauer uses a sample of 28 CEICs over the period 1965–1981 to investigate the information contents of funds' discounts. Fourteen of the funds open-end during the period and 14 remain closed-ended. He argues that although larger discounts should raise the likelihood of a fund's open-ending, fund managers are more likely to resist if the expense ratios are high.

Brauer's investigation reveals that higher-than-average discounts raise the likelihood of open-ending above the mean sample restructuring frequency. Also, higher-than-average expense ratios lower the chance of open-ending.

He also tests four strategies to determine whether average abnormal returns can be generated by using the open-ending regression. Four other strategies are employed to determine whether abnormal returns to an open-end-based strategy exceed those of a discount-only strategy. In both groups of test, he finds support for the use of strategies that yield significant abnormal returns. Brauer's findings lead him to conclude that holding CEIC shares in proportion to their discount size is, in effect, holding them in proportion to the incentives to restructure the funds.

Barclay, Michael J., Clifford G. Holderness, and Jeffrey Pontiff. “Private Benefits from Block Ownership and Discounts on Closed-End Funds.” *Journal of Financial Economics* 33 (1993), 263–291.

The authors begin with the proposition that discounts on a closed-end fund should evaporate when the fund is “opened” and begins making a continuous primary offering of new shares at their NAV. Prior works by Thompson (1978) and Brauer (1984) offer that closed-end fund managers might resist the “opening” of a closed-end fund because it could lead to their replacement as the fund's managers. This is especially so if the managers have small ownership positions in the closed-end fund.

Following this line of reasoning, one could argue that the likelihood of opening a fund should be positively related to the percentage of shares owned/controlled by management and/or insiders. The authors argue that as managerial ownership increases, the likelihood of a takeover and/or opening the fund increases, and the discount on the fund's shares should decrease.

They examine a sample of closed-end stock and bond funds in three different years: 1979, 1984, and 1989, and find that funds with management teams having substantial ownership positions sell at an average discount of 14.2%, whereas those without large positions have an average discount of 4.1%. In a cross-sectional regression where the discount is the dependent variable, the authors find evidence that "hostile" (to the management team) stock ownership tends to reduce the average discounts by about 40 basis points. This evidence is in direct opposition to the arguments above. They suggest that the analysis fails because as managerial ownership increases so does their ability to extract resources from the fund's shareholders.

Chance, Don M. "A Theory of the Value of Active Investment Management and Its Implications for Closed-End Funds and Investment Management Contracts." *Advances in Financial Economics* 3.2 (1997), 81–115.

This paper addresses the question of whether there is a difference between the ex-ante value of a passive portfolio and the ex-ante value of a portfolio actively managed. Does the expectation of trading securities add or destroy value? The author clearly demonstrates that in an efficient market, the expectation of trading destroys value, above and beyond the transaction costs of the trading.

Chance models the behavior of an active portfolio manager who attempts to identify under-priced portfolios from a set of portfolios known to be mispriced. Investors are assumed to have a logarithmic utility function. The concave nature of log utility functions yields critical insights into the market pricing of closed-end funds (CEICs). In an efficient market where the chance of identifying an undervalued portfolio is 50/50, the likelihood of identifying an overvalued portfolio by mistake is also 50/50. If the return on the undervalued portfolio is equal to negative one times the return on the overvalued portfolio, the expected return of active management is zero. However, utility gained from active management is less than the utility of making no trades – even if the trades are costless.

In order to generate a prediction of the shares of a closed-end fund selling at a premium to NAV, one must make one or more "aggressive" assumptions. One might assume that gains from an undervalued portfolio are greater than losses incurred from an overvalued portfolio. Alternately, the probability of correctly identifying an undervalued portfolio is greater than 50%. However, with a variety of numerical examples, the author demonstrates that a 57% success rate with symmetric returns is necessary to produce a discount of zero even when transaction costs are equal to zero.

In summary, the author demonstrates that the discounts that characterize closed-end funds are a logical result of active portfolio management in a costly market that can be characterized as efficient. Ironically, the model developed

here makes it more difficult to explain the existence of open-end funds (which must be purchased at NAV) than it does closed-end funds.

Porter, Gary, Rodney L. Roenfeldt, and Neil W. Sichernan. “The Value of Open Market Repurchases of Closed-End Fund Shares.” *Journal of Business* 72.2 (1999), 257–276.

Individual closed-end fund managers, industry analysts, and academics offer a number of motivations for the open-market repurchase of closed-end fund (CEIC) shares. If the purchase takes place while the shares are selling at a discount to net asset value (NAV), the act will enhance the NAV of the remaining shares through the capture of the discount. In addition, some argue that the repurchase signals the true value of the fund’s shares.

The authors employ a sample of 27 open-market repurchase announcements by closed-end funds in the period 1986–1995. The percentage of shares outstanding to be repurchased ranges from 3.2 to 26.7%, with a mean of 9.4%. The repurchase plans are slightly larger than are typically reported for industrial firms.

The authors develop a model that predicts the amount of re-pricing that should accompany an offer to repurchase shares. Regressing 2-day actual returns at the time of the announcement against this expected return, the authors obtain a slope coefficient that is different from zero and not different from one. This evidence is consistent with the hypothesis that the market prices out the capture of the discount, but there is no evidence of an additional signaling effect.

They expand the analysis of the announcement effect and find that fund size and pre-announcement trading volume fail to improve the explanatory power of the model. In addition, the authors find no evidence that the repurchase reduces the discount below what would be predicted by the repurchase of the shares and capture of the discount. Finally, unlike industrial firms, the authors find a positive relation between the amount of pre-announcement excess returns and the subsequent re-pricing of the closed-end funds.

Chay, J.B. and Charles A. Trzcinka. “Managerial Performance and the Cross-Sectional Pricing of Closed-End Funds.” *Journal of Financial Economics* 52.2 (1999), 379–408.

The authors test the hypothesis that closed-end fund premiums reflect the expected future investment performance of the fund. They argue that Malkiel’s (1977) measure of future performance is flawed and propose new tests. In addition, the authors cite the literature on the “hot hands” of certain investment managers. The studies suggest that investors may develop expectations of future performance and translate those expectations into demand for closed-end funds. Those funds expected to outperform (underperform) their peers should be expected to have the smallest (largest) discounts.

They examine monthly changes in the net asset values (NAVs) for a sample of 94 closed-end funds between 1966 and 1993. Using different benchmarks and different risk adjustments, the authors test a variety of hypotheses relating to investment performance of both closed-end stock and bond funds. In general,

they find a strong positive relation between the level of a fund's premium and the next year's NAV performance.

Because these results differed so strongly from Lee et al. (1991) the authors examine a number of other hypotheses that might explain this inconsistency. Chay and Trzcinka include closed-end bond funds in their study; whereas Lee et al. and others examine only stock funds. Holding out bond funds, Chay and Trzcinka find the relation between premiums and future performance strengthened for equity closed-end funds. They find no relation between discounts and any aspect of future performance for closed-end bond funds.

They conclude that strong managerial performance allows the average investor to recover approximately 78% of the premium that they pay if they hold the fund for 3 years. Although unable to explain the entire premium for better performing funds, the managerial thesis is an addition to the understanding of closed-end fund discounts.

Coles, Jeffery, Jose Suay, and Denise Woodbury. "Fund Advisor Compensation in Closed-End Funds." *Journal of Finance* 55.3 (June 2000), 1385–1414.

The authors seek to determine how compensation contracts may influence the structure, pricing, NAV performance, and share price performance of closed-end funds. They analyze a total data sample of 425-year-end observations comprising 326 bond funds and 99 stock funds over the 1978–1991 period.

The authors report that 55% of the fund managers are compensated with a flat rate based on the value of net assets under management. The remaining advisors in the sample are compensated by a declining marginal rate base. They find that only a small percentage of funds employ schemes that benchmark the performance of the advisors.

In their examination of the relation between a fund's discount and elements of the compensation scheme, they also make adjustments for the ownership position of the advisors. In general, the authors report that discounts on closed-end funds decline as the marginal compensation rises. The authors find little evidence that penalties for excess expenses or adjustments for excess income have an influence on the fund's discount. They find a positive relation between fund discounts and the ownership position of the advisory group/directors.

Row, Wei Wang and Wallace N. Davidson, III. "Fund Manager Succession in Closed-End Mutual Funds." *Financial Review* 35.3 (August, 2000), 53–78.

Over the past four decades there has been a large volume of research devoted to the question of managerial succession, subsequent firm performance, and returns to shareholders; and findings have been contradictory and ambiguous. In this paper, the authors restrict themselves to changes in management in the closed-end fund industry. Their sample comprises domestic equity funds, international equity funds, and bond funds, which made a total of 102 changes in management between 1993 and 1995. They test a variety of hypotheses to determine the extent to which agency issues peculiar to this industry may impact shareholder responses to this event.

Abnormal returns are defined as the actual return less risk-adjusted expected returns. Systematic risk estimators are obtained in the 180 trading-day period

prior to the announcement. Their decomposition of the announcement effects provides little insight into observed cross-sectional differences. In general, funds with larger discounts respond more positively than those with small discounts (or premiums) to news of management change. Conversely, insider ownership has a negative influence on the announcement effect; the opposite of what one would predict based on the alignment of shareholder and insider interests.

There is a small announcement effect due to the composition of the board of the directors. However, the authors' find that the composition varies widely by fund type and thus, it is impossible to distinguish between the influence of board composition and fund type. Overall, there are very small improvements in performance: expense ratios decline while portfolio returns increase. However, the average discount increases in the year following the change in management. The mixed nature of the findings and the lack of a significant announcement effect lead the authors to conclude that a change in top management is a non-event.

4.3 Perceptions, Expectations, and Sentiment Studies

Pratt, Eugene J. "Myths Associated With Closed-End Investment Company Discounts." *Financial Analysts Journal* (July–August 1966), 79–82.

The debate on the origin of closed-end fund (CEIC) share price discounts began in earnest with the appearance of the Pratt article. Pratt employs casual empiricism in addressing several of the competing hypotheses for CEIC discounts. He specifically addresses: (1) built-in capital gains liabilities, (2) liquidation and distribution policies, (3) management fees, (4) past investment performance, and (5) selling effort.

Pratt explains that there is no tax liability until capital gains are realized, regardless of the amount of unrealized appreciation in a fund's portfolio. He contends that, for the investor, the amount of unrealized appreciation is relatively insignificant as long as the gains that are realized each year are modest in proportion to the size of the portfolio. Moreover, Pratt argues that some investors seek unrealized gains in a portfolio. He argues, for example, that a company with unrealized gains can take capital gains during periods characterized by "low" market levels. If the fund realizes and distributes these gains, the investor maintains a higher cash-flow stream from the company. For this reason, investors may prefer funds with large unrealized gains.

Pratt dismisses the effect of the small management fees on discounts, asserting that investors are willing to pay for the services the company provides. He then compares the historical returns of closed-end funds with the returns in different categories of open-end funds. Because there is little difference between the two returns, he concludes that past performance does not affect discounts.

Finally, Pratt points out that closed-end funds are not aggressive in merchandising their shares. CEICs do no direct or indirect selling, nor are they advertised. Registered representatives may prefer to sell open-end fund shares because they provide considerably more commission than an equal dollar amount of closed-end shares. He concludes that investors' unawareness of closed-end funds explains their discounts.

Zweig, Martin E. "An Investor Expectations Stock Price Predictive Model Using Closed-End Fund Premiums." *Journal of Finance* 28 (March 1973), 67–78.

Zweig develops a theory of investor expectations consistent with Cootner's hypothesis that security prices move randomly within reflecting barriers. Zweig proposes that non-professional investors, who include CEIC owners, will pay more (less) than net asset value for funds during periods of market euphoria (gloom). Thus, discounts and premiums may be used in a stock price predictive model in an attempt to produce superior returns. Zweig theorizes that measurements of non-professionals' expectations may be valuable in predicting reversals in overall stock prices. For a sample of 24 funds during the period 1966–1970, Zweig uses a filter (alpha) to determine when CEIC discounts are sufficiently high (low) to signify a reversal in investors' expectations and thus a change in the direction of security prices.

At each alpha level, Zweig initiates a hypothetical portfolio with a beginning value of \$10,000. On BUY alpha signals, he purchases "shares" of the Dow Jones Industrial Average (DJIA) to establish long positions and to cover short positions; on SELL signals, he eliminates long positions and establishes short positions. He compares the terminal wealth positions he obtains from the filters to his results from a strategy of random buys and sells. His findings lend support to his theory. He concludes that these results warrant further investigation into investors' expectations as a useful securities predictive parameter.

Boudreaux, Kenneth J. "Discounts and Premiums on Closed-End Mutual Funds: A Study in Valuation." *Journal of Finance* 28.2 (March 1973), 515–521.

In this 1973 article, Boudreaux states that four commonly held explanations for closed-end fund share discounts are unlikely: (1) transactions cost and management fees, (2) prospects of sales of portfolio stocks depressing their market price, (3) the portfolio diversification effect, and (4) market irrationality or inefficiency. Boudreaux hypothesizes that market price of a fund's share should equal, or bear a constant relationship to, its net asset value only if the fund never alters its present portfolio. Boudreaux contends that market expectations about future portfolio alterations will result in proportional discounts (premiums) relative to expected poor (good) performance.

Boudreaux first presents simple correlations between various discount/premium measures and several fund variables. He reports that each turnover measure is significantly correlated with divergences of NAV and price.

He also presents the results from a multi-variate analysis of the relationship between the discount/premium measures, turnover, and the other proxy variables. The turnover ratio again is correlated positively with the mean of the

absolute value of the discount for each fund. Portfolio performance over the entire period is proxied by three variables, only one of which is significantly correlated with the discount/premium measure. The annual trading volume measure always is correlated positively with the discount/premium measure. Whether the shares of the fund are listed on the NYSE or ASE is not a significant explanatory variable. From the above, Boudreaux concludes that the price adjustments indicated by variations in the discount/premium measure reflect investors' changing perceptions of management's abilities.

Walters, Joan G. "Discussion." *Journal of Finance* 28 (March 1973), 538–539.

In a discussion of Boudreaux's work, Walters observes that the stability of the turnover rates within firms across time does not correspond to the variability of firm discounts and premiums. She suggests that more investigation is needed before market valuations of closed-end funds can be accepted as the "true" values.

Hanna, Mark. "An Investor Expectations Stock Price Predictive Model Using Closed-End Fund Premiums: Comment." *Journal of Finance* 32.4 (September 1977), 1368–1371.

Hanna casts significant doubts on Zweig's conclusion by showing that his model contains both theoretical and empirical errors. Hanna explains that Zweig's analysis relies on the arbitragers' profit incentive being caused by the arbitragers themselves and that covering positions would nullify the potentially profitable positions initiated. From this, Hanna argues that there is no logical framework in Zweig's exposition.

Hanna replicates Zweig's empirical work after cleaning the data as reported in the *Wall Street Journal*. His findings for the alpha strategies are different from Zweig's. He concludes that Zweig's work, though flawed, presents a useful method by which to test variables for market predictability.

McInish, Thomas H. "Publicly Traded Investment Company Discounts/Premiums." *Baylor Business Studies* (1980), 17–24.

McInish investigates the effects of fund expenses, interest rates, and investor sentiment on CEIC discounts. Although expenses are small relative to NAV, the present value of future expenses is important and is a function of interest rates. He contends that the existence of premiums is the result of investor sentiment, and his proxy for this variable is the mutual fund redemption rate.

McInish estimates two time-series regression equations, using annual data on eight CEICs for the period 1958–1975. He finds support for his claim that expenses are related directly to discounts. He also finds that the relationship of interest rates to discounts is significant as hypothesized. As interest rates increase, the present value of expenses decline and discounts decline. In concluding, he discusses that CEIC discounts are a function of investor sentiment as measured by the mutual fund redemption rate.

Lee, Charles M.C., Adrei Shleifer, and Richard H. Thaler. "Anomalies: Closed-End Mutual Funds." *Journal of Economic Perspectives* 4.4 (Fall 1990), 153–164.

This is the first of a series of articles to appear in this journal, which addresses apparent violations of the efficient market hypothesis. The authors first discuss the variability of and persistence of discounts on closed-end funds. They review a variety of “rational” explanations for these deviations between the share price and net asset value (NAV) of closed-end funds. They also consider the explanations that have been offered for the behavior of closed-end fund share prices soon after their initial public offering.

After moving through the normal set of “standard excuses” that are frequently offered to explain the apparent violation of the law of one price: agency costs, restricted stock ownership, and unrecognized capital gains, the authors conclude that these theories are ineffective or incomplete. They note that opening up closed-end funds causes discounts to virtually vanish overnight. The authors argue that prior theories are unable to explain waves in IPOs of this type of security. They conclude with an argument that the behavior of noise traders in response to changes in their investment sentiment/outlook may provide an explanation for the level and variability of closed-end fund discounts and for the cyclical pattern of closed-end fund IPOs. The paper anticipates empirical findings that are reported subsequently.

Lee, Charles M.C., Andrei Shleifer, and Richard H. Thaler. “Investor Sentiment and the Closed-End Fund Puzzle.” *Journal of Finance* 66.1 (March 1991), 75–109.

Here, the authors argue that changes in the level of discounts on seasoned funds and cycles in offerings of new closed-end funds can be explained by fluctuations in the level of investor sentiment. They critically analyze and reject three popular theories for explaining closed-end fund discounts: agency costs (e.g., excessive management fees), unrealized capital gains, and illiquid assets (restricted stock) in the fund’s portfolio. The authors contend that the level of these frictions is not sufficient to explain large and unstable discounts.

They offer the notion of noise trader sentiment as a possible explanation for the level and variability of closed-end fund discounts. It is argued that noise traders make use of incomplete information in valuating shares and/or believe that they have accurate information on the future direction of share prices. These beliefs are frequently translated into mispricing of stocks if the impact of these traders is not offset by the trading activities of rational investors.

In the case of closed-end funds, they argue that the relative absence of institutional ownership, combined with the costs that would be necessary to arbitrage systematic mispricing, keeps informed investors out of closed-end fund shares. The authors contend that if noise traders dominate closed-end fund trading, there should be a high correlation among changes in the funds’ discounts. The authors identify an initial sample of funds appearing within the 1960–1987 period. Upon investigating the behavior of discounts for nine funds, they find strong evidence of co-movement.

After examining the pattern of new fund offerings and average discounts on seasoned funds, the authors report evidence consistent with their hypothesis that new funds are offered when discounts shrink to near zero or move to a

premium. Additionally, the authors find a strong relation between the returns earned by small firms and the narrowing of discounts on closed-end funds. Like other small firms, closed-end fund share price returns exhibit a strong “January effect” – even when changes in the fund’s NAV do not. Upon further analysis, they find a negative relationship between changes in closed-end fund discounts and redemption of open-end funds, which they contend supports the small noise trader hypothesis. The authors conclude that closed-end fund discounts provide a strong measure of the sentiment of noise traders.

DeLong, J. Bradford and Andrea Shleifer. “The Stock Market Bubble of 1929: Evidence from Closed-End Funds.” *Journal of Economic History* 51.3 (September 1991), 675–700.

De Long and Shleifer reference the sharp run-up and subsequent decline in U.S. stock prices in late 1929 as one of the most striking episodes in U.S. financial market history. Many prior authors conclude that the run-up in prices was ex-ante rational – that is, based on bullish expectations for the performance of the U.S. economy. The subsequent decline in stock prices was also rational, if one believes that investors realized that the performance of the economy would be poor.

De Long and Shleifer argue that Lee et al. (1991) make a convincing case that the discounts on closed-end funds are a measure of noise trader investment sentiment. If this hypothesis is accepted, the behavior of closed-end fund (CEIC) pricing relative to net asset value (NAV) can be used to help interpret the events of 1929.

The authors conclude that almost half of the run-up in stock prices in 1929 was the result of irrational investment sentiment, because the median closed-end fund premium in late 1929 was approximately 50%. In addition, the authors note the heavy flood of CEIC IPOs during this period, which apparently took advantage of the irrational pricing of both the market and of seasoned closed-end funds. Thirdly, the authors find a strong correlation between changes in the median closed-end fund discount and share price returns during 1929.

In addition to the sentiment arguments, the authors make two additional contributions. First, the authors note that when the market began to decline sharply in October of 1929, closed-end funds began reporting the composition of their portfolios. Second, the authors suggest that the flood of closed-end fund IPOs in the late 1920s may have “crowded out” retail and manufacturing issues – contributing to the softness in the economy that followed.

DeLong, J. Bradford and Andrei Shleifer. “Closed-End Fund Discounts: A Yardstick of Small-Investor Sentiment.” *Journal of Portfolio Management* (Winter 1992), 46–53.

The authors argue that the narrowing of discounts on domestic closed-end fund discounts in the mid-1980s, from their prior levels of 15–20% down to 5%, was responsible for the mid-decade boom in closed-end fund IPOs. This assertion is based on their contention that discounts on closed-end funds are a

measure of the sentiment of small investors. When small investors are bullish (bearish) on stocks, the authors argue that discounts will shrink (increase).

They review evidence on the growth of closed-end fund IPOs in the United States during the 1920 s and cite the tremendous premiums at which some closed-end funds traded during the period just prior to the crash. After the crash, the situation reversed and most closed-end funds sold at substantial discounts.

The authors review evidence from the 1980 s more carefully and pronounce a linkage between the narrowing of discounts and the wave of closed-end fund IPOs. They also argue that the growth in foreign closed-end fund IPOs is to be expected when many of the early funds are at tremendous premiums to their NAV. After briefly discussing the issue of premiums, they conclude that discounts/premiums must be an index of small investor sentiment.

Chen, Nai-Fu, Raymond Kan, and Merton H. Miller. “Are the Discounts on Closed-End Funds a Sentiment Index?” *Journal of Finance* 48.2 (June 1993), 795–800.

In contrast to the findings of Lee, Shleifer and Thaler (1991) (LST) that discounts on closed-end funds are a measure of noise-trader sentiment, Chen, Kan, and Miller (CKM) find that changes in discounts are highly negatively correlated with the returns on “small” stocks in the 1965–1985 period. CKM note the failure of LST to find consistent evidence of a relation between small firm returns and discounts on closed-end funds. They state that when LST divided their sample into two 10-year periods, they report virtually no relationship in the 1975–1985 sub-period. They conclude that the finding strengthens their assertion because a number of institutions jumped on the small firm bandwagon during the same period.

CKM propose a more direct test of the investor sentiment hypothesis as it relates to small firms. They identify the decile of smallest firms and split this group into those small firms with virtually no institutional ownership (less than 10% of outstanding shares) and those with more institutional ownership. When the returns on the smallest firm sub-samples are regressed against changes in discounts and changes in the value-weighted index of the NYSE (as per LST), the results are statistically identical. CKM contend that this lack of significant difference casts doubt on any association between changes in closed-end fund discounts and returns on small firms.

CKM then regress returns to shareholders of closed-end funds against their contemporaneous changes in net asset value and find an explanatory power of nearly 73%. When the regression is augmented with portfolio returns based on size deciles, the size-based excess return measure is significant for all 10 deciles. However, the gain in explanatory power is small (not more than 4%), and there is nothing unique about the fit obtained with the smallest firm excess return measure. The authors conclude that their evidence refutes the small-firm/closed-end fund discount connection argued by LST and thus, critically undermines the investor sentiment hypothesis.

Chopra, Navin, Charles M.C. Lee, Andrei Shleifer, and Richard Thaler. “Yes, Discounts on Closed-End Funds Are a Sentiment Index.” *Journal of Finance* 48.2 (June 1993), 801–808.

The authors (CLST) respond to the CKM (1993) claim that the original work by Lee et al. (1991) tried to kill two birds (the closed-end fund puzzle and the small firm effect) with one stone and missed both. They address the critiques raised by CKM.

First, the CKM paper alleges that the smallest firm/closed-end fund discount link reported by Lee et al. uses a sample that is over-represented by utilities. CLST divide a portfolio of NYSE-listed utilities into three institutional ownership groups and regress the returns against changes in closed-end fund discounts and returns on the value-weighted NYSE. They find the low and medium ownership utility groups are more strongly linked to closed-end fund discounts than is the high ownership portfolio. This finding is robust when the sample period is split in half (1965–1975, 1975–1985).

Second, these authors argue that the CKM test of sub-samples of utilities created by institutional ownership (more than 10%, less than 10%) does not refute the conclusions of Lee et al. CLST point out that CKM’s portfolio of high institutional ownership really does not have high institutional ownership in an absolute or relative sense. They split each size-ranked decile into three sub-groups based on institutional ownership and re-run the Lee et al. regressions. They find that within each decile except the first, low institutional ownership firm returns correlate more strongly with discount changes than do medium and high institutional ownership firms.

Third, CSLT restructure a model put forward by CKM that appears to refute Lee et al. The authors subtract changes in a closed-end fund’s NAV from the contemporaneous change in the value of its shares, to produce an excess return. They regress these excess returns against the excess return of size-ranked portfolio returns and find that excess returns on closed-end funds are most strongly related to excess returns earned by the smallest firm portfolios. The authors argue that these findings are consistent with the prior findings and assertions made by Lee et al.

Noronha, Gregory M. and Bruce L. Rubin. “Closed-End Bond Fund Discounts: Agency Costs, Investor Sentiment and Portfolio Content.” *Journal of Economics and Finance* 19.3 (Summer 1995), 29–44.

The authors present a five-factor model to explain closed-end bond fund discounts. The factors are unrealized capital appreciation, restricted securities in the portfolio, large block holdings, management expenses, and investor sentiment. In addition, the authors include a measure of the shape of the yield curve and the spread between bond and stock yields to capture the effect of changing financial market conditions. Finally, the authors use the percentage of the fund’s portfolio invested in foreign securities, privately placed securities, and junk bonds as proxies for the restricted security factor. The authors employ a sample of 24 bond funds between 1980 and 1990 to investigate the factors of interest.

Using a multiple regression model, the authors find strong empirical support for the predicted influence of expense ratios on the closed-end bond fund discounts. In addition, the authors find that increased foreign asset and junk bond holdings increase the size of bond-fund discounts. No statistical significance is found for the percentage of private placement securities in the fund's portfolio, or the amount of shares controlled by large stockholders.

In additional tests, the authors examine the 1985–1987 period and find that discounts declined nearly 5% in these 3 years. They argue that this is a result of small investors having an unusual interest in junk bonds and thus bidding up the price of the closed-end bond funds. They adopt the Lee et al. (1991) position of explaining swings in discounts as a manifestation of investor sentiment.

Bodurtha, James N. Jr., Dong-Soon Kim, and Charles M.C. Lee. “Closed-End Country Funds and U.S. Market Sentiment.” *Review of Financial Studies* 8.3 (Fall 1995), 879–919.

The authors extend the Lee et al. investor sentiment hypothesis to closed-end country funds (CECFs). The authors observe that CECFs trade in the U.S. market; whereas the value of the fund's assets (NAV) is determined in a foreign market. If U.S. investors over- or under-react to information from the foreign market or respond to information that has no intrinsic value, there would be a de-coupling of movements in the CECF share price and its underlying NAV. Put differently, the premium/discount on the CECF will react to domestic forces, and the authors claim such changes capture the noise-trader sentiment.

The authors examine the contemporaneous correlation in weekly changes in CECF discounts for 33 funds between January 1986 and December 1989. In general, they report that CECFs traded at a premium during the period, premiums were largest for Asian funds, and European funds traded at an average discount. Many pairs of CECFs exhibited substantial contemporaneous correlation in the movement of their premiums/discounts. In addition, changes in the premiums/discounts on CECFs were positively correlated with U.S. market returns.

The authors then examine the relation between changes in CECF discounts, share prices and NAVs relative to: local market returns, U.S. market returns, and exchange rates. They find that changes in CECF discounts and CECF returns are positively related to U.S. market returns; whereas changes in CECF NAVs are positively related to local market returns.

Finally, the authors examine the ability of CECF premiums to predict future changes in the premiums, future CECF share price returns, and future CECF NAV returns. The authors report that high (low) levels of CECF premiums are associated with lower (higher) CECF share price returns – results consistent with a mean-reversion process that has been previously reported for domestic CEIC trading rules.

Leonard, David C. and David M. Shull. “Investor Sentiment and the Closed-End Fund Evidence: Impact of the January Effect.” *The Quarterly Review of Economics and Finance* 36.1 (Spring 1996), 117–126.

The authors seek to resolve the controversy among the above authors over the linkage between changes in closed-end fund (CEIC) discounts and returns to small firm shareholders. They employ a sample of 38 closed-end stock funds for the 1965–1994 period. They demonstrate that the positive relation between returns to small firms and closed-end fund shareholders is very strong between 1965 and 1980, but weak in the period from 1980 to 1994. The authors find that the strong relation in the first half of their sample period is due to returns to both small firms and CEICs in the month of January. They offer that the co-movement may vanish after 1980 because of increased institutional activity in smaller firms. While the authors do not exclude the possibility that investor sentiment drives closed-end fund pricing, they do conclude that tax motivations are important for the individual investors who are primary holders of closed-end fund shares.

Swaminathan, Bhaskaran. “Time-Varying Expected Small Firm Returns and Closed-End Fund Discounts.” *Review of Financial Studies* 9.3 (Fall 1996), 845–887.

Swaminathan undertakes an extensive investigation of the ability of discounts on closed-end funds (CEICs) to explain expected returns on small firm stocks. The author replicates and expands the analysis of Lee et al. (1991) in investigating the relationship between small firm stocks and CEIC discounts using 33 funds’ data for July 1965 through December 1985.

Swaminathan begins the analysis by demonstrating that the long-term stability between excess returns on CEIC share prices and NAVs is strongly and virtually identically related to changes in dividend growth rates and real interest rates. As a result, the author argues that changes in real interest rates and dividend growth rates are not the driving force of changes in closed-end funds’ discounts. The author then analyzes the relation between fund discounts and returns to small firm stockholders.

His results indicate that CEIC discounts forecast future excess returns on small firms. Further tests show that discounts forecast future inflation and future earnings growth rates, especially small firm earnings.

While the author establishes a linkage between closed-end fund discounts and returns to small firm shareholders consistent with the investor sentiment hypothesis offered by Lee et al., the other findings do not support the hypothesis. A noise trader investment sentiment view of closed-end funds requires that noise traders behave in an irrational manner, perhaps for extended periods of time. The finding that closed-end fund discounts have some ability to predict real earnings growth (and to a lesser extent, future inflation) does not support the irrationality portion of the hypothesis.

Sias, Richard. “The Sensitivity of Individual and Institutional Investors’ Expectations to Changing Market Conditions: Evidence from Closed-End Funds.” *Review of Quantitative Finance and Accounting* 8.1 (1997), 245–269.

Sias begins with the standard argument that closed-end fund prices can differ from the fund’s portfolio net asset value (NAV) due to the existence of “frictions.” However, the author asserts that variations in discounts could be a result

of shifts in shareholder expectation of management performance. Conversely, he suggests that the variability in discounts could be a result of differences in changes in expectations of the future performance of the assets held by the portfolio.

The author uses a sample of monthly returns from 54 closed-end funds between July 1965 and December 1990. He investigates returns to closed-end fund shareholders, returns on closed-end funds' NAV, and changes in closed-end fund discounts relative to six economic variables and three investor sentiment variables.

Sias finds that the six economic factors explain about 12% of the variability in closed-end fund discounts, and the explanatory power doubles when odd-lot trading volume is added to the set of independent variables. Individuals (through the discount) appear to be more sensitive to changes in: consumption growth, the default premium, the yield curve, and unanticipated inflation. The author concludes that the impact of the odd-lot trading volume factor and the differential slope estimates (small versus large) is consistent with the "over reaction" to economic data hypothesis that is ascribed to small investors by Lee et al. (1991) and DeLong et al. (1990).

Sias, Richard. "Price Pressure and the Role of Institutional Investors in Closed-End Funds." *Journal of Financial Research* 20.2 (Summer 1997), 211–229.

The author compiles a data set of closed-end fund share (CEIC) transactions that identifies traders as institutional or individual investors for the November 5, 1990 through January 25, 1991 period. With this data the author examines the impact of order-flow imbalance on movements in closed-end fund share prices and discounts as well as the role of institutional traders on the market for shares of CEICs. Low net ownership of institutional investors has been used to imply that this group of investors has little influence on the pricing of CEICs. The role of institutional investors is critical to the hypothesis that discounts on closed-end funds are a measure of the sentiment of small investors.

Sias tests the price-pressure hypothesis by examining the effect of order-flow imbalance on CEIC prices. If price pressure influences closed-end fund share prices, positive order-flow imbalance (i.e., a preponderance of buy-initiated orders) should increase share prices and shrink discounts. The converse should also hold.

The author employs the Lee and Ready (*Journal of Finance*, 1991) method to classify orders as buy- or sell-initiated, by examining the relationship of the transaction price to the bid and ask prices prior to the sale. If the transaction is at or near the asking (bid) price, the transaction is classified as "buy-initiated" ("sell-initiated"). Once classified, the author constructs an index of relative order-flow imbalance for each fund that reflects the cumulative weekly net balance in orders. Returns on closed-end fund shares and changes in the discount are seen to be positively related to buy order-imbalance. This impact holds even when contemporaneous changes in NAV are incorporated into the analysis.

The author employs a sample of control firms with similar market values and compares the percent of institutional ownership of the closed-end funds to the control group, finding significantly less ownership for the funds. The author compares the trading volume of institutional investors in CEICs to the trading volume in the control group and finds much more activity. Sias finds that buyer-initiated institutional volume is dramatically higher for closed-end funds than for the control group. Institutions are more actively involved in the market for closed-end funds shares than is evidenced by end-of-quarter measures of ownership.

The author then regresses the changes in closed-end fund share returns and discounts against the measures of institutional and individual order-imbalance and reports that both have positive influences on price and a negative influence on discounts. Moreover, Sias finds that the sensitivity measures for institutional and individual order-imbalance are statistically identical.

Finally, Sias finds no support for the hypothesis that the trading behavior of individual investors exposes institutional investors to risks. There is no evidence that trends in pricing continue, which would be consistent with the irrational behavior hypothesis that has been ascribed to small investors. In short, the micro-market performance of CEIC shares appears to be similar to that of other firms.

Klibanoff, Peter, Owen Lamont, and Thierry A. Wizman. "Investor Reaction to Salient News in Closed-End Country Funds." *Journal of Finance* 52.2 (April 1998), 673–699.

The authors examine the reaction of closed-end country fund (CF) share prices to changes in their portfolio's net asset value (NAV) from 1984 to 1994. Reporting conventions in the United States require reporting the NAV figure for closed-end funds only at the close of trading on Friday; whereas open-end funds report daily. Of interest is whether intra-week returns would anticipate actual changes in NAV based on observable movements in local market indices during the week. The initial results suggest that a contemporaneous movement in the CF's share price captures only 64% of the movement in NAV.

The authors proceed to examine the hypothesis that reporting of CF country-related news items on the front page of the *New York Times* (NYT) should not change the reaction functions. Put differently, the NYT reporting should be redundant if NAV responses are efficient. The evidence does not support the redundancy hypothesis, as the share price response relative to changes in the NAV is stronger in weeks where news items appear in the NYT than in other weeks.

The authors examine differences in trading volume (news versus non-news weeks) and find a substantial increase in weeks where news items are reported on the front page of the NYT. This evidence is consistent with the hypothesized behavior of noise traders. They test a number of alternative hypotheses (e.g., liquid versus illiquid foreign markets causing lags in NAV changes) to explain the difference in behavior and find support for no other alternatives.

Abraham, Abraham, Don Elan, and Alan J. Marcus. “Does Sentiment Explain Closed-End Fund Discounts? Evidence from Bond Funds.” *Financial Review* 28.4 (November 1998), 607–619.

Abraham, Elan and Marcus employ a sample of 71 stock and 120 bond closed-end funds (CEICs) from January 1985 through December 1989 to compare the discount behaviors of these two types of funds. They find that, on average, stock CEICs sell for substantial discounts to their net asset value (NAV); whereas bond funds sell at small premiums to NAV.

The authors assert that the Lee et al. (1991) sentiment index hypothesis requires a narrowing of discounts as market returns rise. They argue that if changes in noise trader sentiment are highly correlated across funds, this should increase the systematic risk for this group of assets. To compensate potential investors for this source of risk, closed-end funds should sell at a discount to their NAV. Hence, if this systematic source of risk to investors is larger for stock funds than bond funds, there should be a higher beta estimate for stock funds than bond funds when one regresses changes in discounts against the return on the market.

The authors’ estimates of the relation between changes in fund discounts and rates of return on the market on a fund-by-fund basis are rarely significant. However, with a pooled sample, the authors obtain highly significant but similar negative slope coefficients for both stock and bond funds. They argue that the failure to obtain different slope coefficients is inconsistent with the investor sentiment hypothesis.

Kramer, Charles and R. Todd Smith. “The Mexican Crisis and the Behavior of Country Fund Discounts: Renewing the Puzzle of Closed-End Fund Pricing.” *International Journal of Theoretical and Applied Finance* 1.1 (1998), 164–171.

The authors address the investor sentiment hypothesis posited by Lee et al. (1990) (LST) and apply it to the behavior of closed-end country funds specializing in Mexican investments. Around the time of the peso crisis in 1994, they contend that one would expect funds to sell at large discounts, especially after the collapse. Instead, the authors find that in the 5 months prior to the collapse, the four Mexican funds sold at modest discounts of 3–5% relative to net asset value (NAV). They find that at the collapse of the peso, the four Mexican funds began to sell at premiums. Immediately after the collapse of the peso, the funds sold at premiums as high as 60%.

The authors explain that on the surface, the cause of the high premiums for the four Mexican funds is rather simple – the NAVs of the funds collapsed far more rapidly than the funds’ prices in the United States. They point out that the collapse in NAVs was in part due to the collapse of the peso, which is used to convert peso asset values into dollar asset values, and in part due to the decline in Mexican security prices, which are quoted in pesos.

The authors examine the impact of the peso crisis on the discounts/premiums of other country funds. They report that other Latin American funds’ discounts shrank during the peso crisis. Conversely, the discounts on Asian funds

remained virtually unchanged during the peso crisis, while discounts on developed market closed-end funds (Germany, Switzerland) were steady or increased over this time. In short, there is no evidence of a contagion impact of the peso crisis on closed-end fund discounts. The authors contend that these findings are inconsistent with the investment sentiment hypothesis espoused by LST. They argue that the evidence is more consistent with a loss-aversion hypothesis, that is, the disutility from a loss is more than the utility increase from an equal size gain.

Neal, Richard and Simon M. Wheatley. "Do Measures of Investor Sentiment Predict Returns?" *Journal of Financial and Quantitative Analysis* 33.4 (December 1998), 523–547.

The authors examine the ability of three factors often associated with small investor sentiment to predict common stock returns or differential rates of return between large and small firm stocks. The three factors are: the average discount on closed-end funds (CEICs), the ratio of odd-lot sales-to-purchases, and the net redemption of open-end mutual funds. The analysis is conducted over different time periods.

When examining the predictive power of closed-end fund discounts, the authors use calendar year-end discounts reported by Wiesenberger from 1933 to 1993. At year-end, the value-weighted discount for unlevered closed-end domestic stock funds average 12%, ranging from a high of 30% in 1940 to a low of –10% (a premium) in 1969. The authors estimate a number of models examining the predictive power for the next month, quarter, 1-, 2-, 3-, and 4-year periods.

For the univariate models employing CEIC discount as the explanatory factor for common stock returns, the authors find the strongest relation when predicting small firm returns. The year-end discount is statistically significant for small firms, but never significant when predicting large firm returns. The consistency and strength of these findings are argued to be consistent with the investor sentiment hypothesis. When small investors turn bearish, they sell closed-end fund shares and drive the discount higher. Subsequent return evidence in the overall market proves their timing to be wrong – share prices ultimately rise even when the month of January is excluded. The authors also report similar findings for the net redemption factor but not the odd-lot factor.

Brown, Gregory W. "Volatility, Sentiment, and Noise Traders." *Financial Analysts Journal* 55.2 (March/April 1999), 82–90.

The author argues that noise traders are irrational investors acting coherently on a noisy signal and that this can cause systematic risk. If these traders impact asset prices, the noisy signal is "sentiment" and the risk is manifested in asset return variability. This analysis leads the author to predict a positive relation between closed-end fund discounts and their volatility. The author extends the analysis to predict that this volatility must be at work only when the market is open and that sentiment-driven volatility should be positively related to trading volume.

Brown compiles daily trading data for 1993 and 1994 for a sample of 17 diversified domestic equity closed-end funds (CEFs) and computes a variety of variability measures for each of the funds. In contrast to earlier studies, the author employs a direct measure of investor sentiment computed from weekly data taken from the American Association of Individual Investor Sentiment Survey.

The author finds a strong positive relation between CEF volatility and both changes in discounts and in market volatility. In addition, he reports that changes in investor sentiment are associated with increases in CEF price volatility. The author reveals that sentiment-driven volatility is strong during open-market periods and is virtually non-existent during closed-market period. The coefficient on the change-in-discount variable is significant for closed-market periods, which suggests that discount information is incorporated into prices during this time. In addition, the author finds evidence of a "week-end" effect in CEF trading. Monday trading activity in closed-end funds is elevated beyond what one would expect, given market volatility and changes in discounts. The author concludes that his findings lend support to the Lee et al. irrational investor hypothesis.

Burch, T.R., D. Emery and M.E. Fuerst. "What Can 'Nine-Eleven' Tell Us About Closed-End Fund Discounts and Investor Sentiment?" *Financial Review* 38 (2003), 515–529.

In this work the authors test the hypothesis that closed-end fund (CEF) discounts from net asset value (NAV) reflect investor sentiment surrounding the events of September 11, 2001. They explain that September 11 offers a unique experiment in investor sentiment because this event was an unforeseen negative shock to the capital markets and to investor sentiment. They employ a sample of 391 CEFs that experienced a mean discount change from 3.3% on Friday, September 7, 2001, to 7.7% on the following Friday. They also find that over the following month, discounts essentially returned to their pre-September 11 levels in conjunction with the stock market rebound.

They posit that small-investor sentiment improved as the capital markets stabilized and investors came to realize that the economy would avoid disaster. The authors interpret their findings on short-term discount behavior to lend strength to the investor-sentiment argument as a determinant of discounts. However, they note that a similar interpretation of the month-long discount behavior finding is more speculative.

4.4 Trading Strategies, IPO, and Idiosyncratic Studies

Trading Strategies Studies

Simon, Julian L. "Does 'Good Portfolio Management' Exist?" *Management Science* 15.6 (February 1969), 308–319.

Simon examines the performance of six CEICs from 1937 to 1963 to determine whether some portfolio managers are really better than others. CEICs are particularly well suited for this type of analysis because, unlike open-end fund managers, the closed-end manager is never forced to purchase or sell securities because of the inflows or outflows of funds caused by purchases or redemptions by investors.

Simon begins by reporting the mean and standard deviation, reflected in parentheses, of the yearly performance of six funds: *Adams Express* +11.8% (16.7%), *Shawmut* +8.9% (7.9%), *Consolidated* +14.4% (17.7%), *Lehman* +13.0% (15.9%), *National Bond & Share* +11.2% (15.5%), and *Niagara* +11.1% (16.1%). Using an analysis of variance technique, Simon cannot reject the null hypothesis that all of the means are equal.

Simon continues the analysis by ranking the firms each year. His two-way analysis of variance shows no significant difference in the ranked performance of the funds. In another attempt to determine the consistency of relative performance, he compares each firm's yearly performance to the mean of the six firms in that year. This time, Simon finds significant differences in relative performance.

After determining that the observed differences among firms may not be due to chance, Simon examines the hypothesis that performance is serially correlated. Correlating successive annual performance measures, he finds little evidence of positive serial correlation. He does, however, find some evidence of negative serial correlation: good performance is followed by bad.

Next, to ascertain whether the discount on the firm's shares is a good predictor of performance during the next period, Simon examines the relationship between ranked discounts and ranked performance in the following year. His data show that low (high) discounts are good predictors of high (low) returns in the following year. He concludes that the market does not rationally price closed-end investment companies' shares.

Fishbein, Richard. "Closed-End Investment Companies." *Financial Analysts Journal* 26 (March–April 1970), 67–73.

Fishbein puts into perspective the role of closed-end funds in the growth of the investment industry since World War II. He attributes the low growth of CEICs (\$0.8 billion to \$5.2 billion), relative to open-end funds (\$1.3 billion to \$56.9 billion), to the lack of investors' interest in shares that are discounted or that cannot be redeemed. Despite their lackluster performance, Fishbein contends that CEICs foment small business investment companies, real estate investment trusts, and dual purpose funds. Closed-end funds also have been instrumental in pioneering funds with foreign investment (e.g., Eurofund, Japan Fund, and American-South African), venture capital objectives, and oil and gas exploration programs. He insists that CEICs are attractive to informed investors and have several advantages over open-end funds.

One alleged advantage is the chance that an investor can purchase shares at a discount and then sell at a premium. Because closed-end funds do not redeem shares, they can invest in venture capital, foreign securities, and real estate

projects that might be illiquid and thus inappropriate for open-end funds. As an example, he refers to American Research and Development, the top performer (1,636% appreciation) for all investment companies in the United States during 1959–1968. Another potential advantage is that CEICs can be registered with the SEC as a non-diversified fund and thereafter can take controlling positions in public firms. Fishbein maintains that this type of activity improves operating efficiencies for the controlled companies, thereby benefiting all shareholders. Finally, he explains how shareholders might benefit from a CEIC's use of leverage.

Ingersoll, Jonathan E. “A Theoretical and Empirical Investigation of Dual Purpose Funds.” *Journal of Financial Economics* 3 (January–March 1976), 81–123.

Ingersoll investigates a special type of closed-end fund (CEIC) – dual purpose funds. To provide investors with present income or long-term capital appreciation, a fund issues two classes of stock, with different claims on the underlying portfolio. Income shares receive all of the income from the fund's underlying asset portfolio. These shares are redeemable at a set price at the maturity (i.e., termination) date of the fund. Capital shares are redeemable at maturity for the net proceeds after the retirement of all income shares. Capital shares often trade at discounts to net asset value, and these discounts are the focus of Ingersoll's investigation.

In the first four sections of the paper, Ingersoll formulates a dual purpose fund pricing function, based on the option pricing model developed by Black and Scholes and by Merton. He determines that under the ideal conditions described in the option pricing model, dual purpose fund capital shares should sell at a discount to their NAV until the maturity date, given management fees and the lack of a redemption privilege for capital shares.

Ingersoll tests his model using seven dual purpose funds and finds inconsistent results. Using a modified model, his results improve with the inclusion of an income tax factor and the possibility of dividend payments prior to the liquidation of the fund.

Ingersoll also observes that the capital shares of many of the funds trade at significant premiums to NAV for significant periods of time. These findings are inconsistent with both the original and the modified version of his model. Ingersoll posits that these premiums may result from market imperfections rather than from his modeling approach. For example, he argues that the lower transaction and information costs for the fund (versus a private investor) may be sufficient to offset management fees.

To test whether these premiums result from market imperfections or market inefficiencies, he performs a simulation test by forming arbitrage portfolios. Each week he compares the estimated value of the capital shares obtained from his model to the closing price. If the market is efficient, the arbitrage portfolio should yield no systematic gains or losses. Since the returns on the arbitrage portfolio are not significantly different from zero, Ingersoll can not reject the

efficiency of his valuation model. Thus, he concludes that the premiums that have been observed for dual purpose funds are a result of market imperfections.

Litzenberger, Robert H. and Howard B. Sosin. “The Structure and Management of Dual Purpose Funds.” *Journal of Financial Economics* 4 (March 1977), 203–230.

In the first section of their paper, Litzenberger and Sosin discuss the economic incentives for creating dual purpose fund shares; in the second section they examine the investment performance of dual purpose fund portfolios. Of primary interest, however, are the third and fourth sections in which they explain why dual purpose capital shares may trade at a discount and whether the capital shares are priced efficiently.

Litzenberger and Sosin explain that arbitrage activities will equate the market value of the shares to the NAV in a perfect market. However, proceeds from short sales are not available for use, and such proceeds earn no interest. Thus, arbitrage activities would only create an upper and lower bound for the market price of the shares relative to their NAV. Examining a sample of seven dual purpose funds, they determine that actual discounts lie within the boundaries that would be expected, assuming proportional transaction expenses and no interest income from impounded short-sell monies.

In the fourth section of their paper, the authors test for market efficiency by determining the profitability of a series of hedged investment strategies based on whether the capital or the income shares are selling at a discount or a premium to NAV. If shares are selling at a discount or premium, a long or short position is taken in the shares and a short or long position in the fund's underlying portfolio. Based on the results of these tests, Litzenberger and Sosin conclude that the existence of discounts or premiums is not useful information for constructing profitable trading rules, and thus the market for capital and income shares is likely to be efficient.

Malkiel, Burton G. and Paul B. Firstenberg. “A Winning Strategy for an Efficient Market.” *Journal of Portfolio Management* 4.4 (Summer 1978), 20–25.

In an entertaining piece, Malkiel and Firstenberg explain that purchasing closed-end funds at a discount is effectively the same as buying the market at a discount. Directing their article toward investment managers who are seeking to achieve above average returns on their portfolios, the authors set out the efficient market hypothesis and its implications for index funds. However, CEICs are a means of achieving above average returns because of the discounts on the funds.

By purchasing CEICs, investors take advantage of a current inefficiency in the market. If the funds hold diversified portfolios, they will perform as well as the market; thus, purchasing them at a discount allows investors to outperform the averages. Malkiel and Firstenberg circumvent the problem of discounts widening, which will hurt performance, by suggesting the purchase of dual funds shares to be redeemed at a specified maturity date.

They give several reasons why the funds sell at discounts/premiums: the built-in capital gains tax liability, the funds' holding of securities with restricted

liquidity, the exclusive commitment to invest in foreign securities, the payment of regular capital gains distributions, the funds' past performance, the high portfolio turnover, the level of management expenses, and the lack of support for funds by an active marketing campaign. This last reason is argued to be the most reasonable explanation for the discounts. The authors continue by giving criteria for selecting various funds and conclude by explaining how to structure a portfolio of CEICs.

Thompson, Rex. "The Information Content of Discounts and Premiums on Closed-End Fund Shares." *Journal of Financial Economics* 6 (June–September 1978), 151–186.

Thompson investigates whether discounts or premiums on closed-end funds provide information about expected abnormal rates of return. The study's data are obtained from 23 funds for the period 1940–1975. Thompson uses three performance measures over different periods for various combinations of closed-end funds with certain discount characteristics.

He employs four trading strategies to determine if portfolios of closed-end funds' pre-tax returns are significantly greater than the market, as measured by three traditional rate-of-return benchmarks. An "All Funds" strategy serves as a control group and comprises each of the funds over the entire period. The "Premium" strategy selects those funds selling at premiums or selling exactly at NAV at the beginning of each year. The other two strategies are "Discount, Equal Weights" and "Discount Weighted," which include funds selling at discounts in equal-weighted amounts and discount-weighted proportions, respectively.

Thompson reports that the "Discount Weighted" strategy indicates that investors earned higher returns from closed-end fund shares at discounts than from other NYSE stocks. Over the entire period the strategy generates an annual abnormal return of 4.13%. This return is statistically significant at the 0.01 level. The "Discount, Equal Weights" strategy yields a 2.12% abnormal return that is also statistically significant. This strategy contrasts with the "Premium" and "All Funds" strategies' returns which yield negative and nil returns, respectively, over the entire period. Thompson is unable to determine whether his results reflect capital market information inefficiency or result from a breakdown in the applicability of the two-parameter asset pricing theory.

Richards, R. Malcolm, Don R. Fraser, and John C. Groth. "Premiums, Discounts, and the Volatility of Closed-End Mutual Funds." *The Financial Review* (Fall 1979), 26–33.

In this paper, the authors explore the implications of discounts for investors who consider CEICs. Richards, Fraser, and Groth hypothesize that changes in the discount or premium, as well as changes in NAV, determine returns. The discount or premium may behave differently depending on the general trend of the market, and this behavior may differ among funds.

They employ weekly NAVs, market prices, and payout data for 18 funds over the period 1970–1976. Using the Standard and Poor's 500 Index, they estimate two betas for each fund – one based on NAV and one based on market

price. The market price beta is generally higher than the NAV beta, but the opposite is true for five specialized funds. These results support the Miller (1977) hypothesis that non-homogeneous valuations of securities by investors result in larger discounts for diversified funds than for specialized funds.

Richards, Fraser, and Groth then estimate NAV and market price betas when markets, as measured by the S&P 500, increase or decrease by 2.0% or more. “Down” market betas are generally lower than “up” market betas for their sample of funds. They conclude that an asymmetric risk relationship exists between the relative volatility of share price and of net asset value; thus investors may expose themselves to less risk by purchasing CEIC shares rather than the underlying portfolios.

Richards, R. Malcolm, Don R. Fraser, and John C. Groth. “Winning Strategies for Closed-End Funds.” *Journal of Portfolio Management* 7.1 (Fall 1980), 50–55.

In this paper, Richards, Fraser, and Groth (RFG) are concerned not with explaining discounts, but with earning excess returns from discount-based trading strategies. They use weekly data for a sample of funds for the 1970–1976 period.

In their first tests, the authors choose arbitrary buy and sell points for the series of strategies shown in Table 4.1. For example, under Strategy 1, a fund’s shares are added to a hypothetical portfolio when the discount exceeds 5% and sold when the share price equals or exceeds the NAV. They begin with an initial portfolio of \$100,000 for each strategy. An equal proportion of the money in the portfolio is invested in each fund’s shares that exhibit discounts greater than the purchase discount. For example, under Strategy 1, if at the beginning of 1970, four funds have discounts greater than 5%, then \$25,000 is allocated to each fund’s shares. Each of the funds’ shares is held until the discount drops to zero. If a discount drops to zero, the shares are sold and the proceeds are allocated to the remaining three funds’ shares in the portfolio. Similarly, if another fund begins to

Table 4.1 Richards, Fraser, and Groth’s closed-end fund trading rules

Strategy	Purchase	Sale	All funds	Diversified funds	Specialized funds
1	0.05	0.00	0.264	0.212	0.297
2	0.10	0.05	0.293	0.218	0.268
3	0.15	0.10	0.447	0.317	0.446
4	0.20	0.10	0.277	0.090	0.241
5	0.25	0.10	-0.010	-0.072	0.245
6	0.20	0.15	0.917	0.501	1.111
7	0.25	0.15	0.340	0.146	0.694
8	0.30	0.15	0.280	0.059	0.966
	Buy and Hold S&P 500	0.222	-0.050	-0.153	0.046

sell at a discount exceeding 5%, a proportion of the currently held funds' shares is sold and the proceeds are used to purchase the new fund's shares.

In addition to the buy-and-sell strategies, they employ an equally weighted buy-and-hold strategy for all funds, for diversified funds, and for specialized funds, as well as a buy-and-hold strategy for the Standard and Poor's 500 Index. These results are seen in Table 4.1. Several "All Funds" and "Diversified Funds" strategies yield greater returns than the S&P 500 buy-and-hold strategy. All "Specialized Funds" strategies yield returns greater than the S&P 500 buy-and-hold strategy.

In a second group of tests Richards, Fraser, and Groth employ a series of filter rules to seek excess returns. The authors monitor the funds for a rise or fall of X% or more, and if a rise or fall occurs, they assume an investment or short position of \$1,000 in the fund's shares. The position is held until an X% move in the opposite direction at which time the long or short position is reversed, and so on. The results from the filter rules show that the largest returns are associated with the largest filters, but only a few of the funds' shares are purchased or shorted with the large filters. Again, the specialized funds dominate the diversified funds. From their findings, Richards, Fraser, and Groth conclude that although it may be possible to employ trading rules to earn excess returns, the various strategies may require adjusting over time.

Anderson, Seth C. "Closed-End Funds versus Market Efficiency." *Journal of Portfolio Management* 21 (Fall 1986), 63–65.

In this paper Anderson tests, more generally, the strategies examined by Richards, Fraser, and Groth (RFG 1980). He uses a slightly different sample of 17 funds and examines the periods 1965–1969, 1970–1976, and 1977–1984. The strategies used are the same as those used by RFG. Under Strategy 1, those funds selling at a 5% or greater discount at the beginning of a period are weighted equally in a portfolio of \$100,000. Over the period, any included fund whose discount falls to 0% is sold, and the proceeds are allocated equally to the remaining funds' shares. If another fund's discount becomes larger than 5%, a proportion of the currently held funds' shares is sold, and the proceeds are invested in the new entrant's shares. Anderson's findings generally support RFG's.

In a second series of tests, Anderson, like RFG, uses filter rules to search for abnormal profits. At the beginning of each period, he monitors the 17 funds for a rise or fall of X%. If the fund's shares initially rose or fell by X%, a long or short position of \$1,000 was entered. Once the shares exhibit an X% reversal, the position is closed and an opposite one is established, and so on. The findings from these tests are consistent with those of RFG.

Anderson concludes that filter rules do not provide a basis for generating profits but that trading strategies do generate profits, although the standard deviation of returns is no larger than that for the overall market. His findings support some of the conclusions earlier researchers have drawn about possible inefficiencies of the market for closed-end fund shares.

Anderson, Seth C. "An Analysis of Trading Strategies for Closed-end Equity Funds." *Quarterly Journal of Business and Economics* 26.1 (Winter 1987), 3–19.

In this article Anderson further investigates the earlier findings of Richards, Fraser, and Groth (RFG). He uses a sample of funds identical to theirs but examines the periods 1965–1969 and 1977–1984 as well as 1970–1976. He also considers the effects of an alternative discount metric and commissions.

In the first series of tests, Anderson employs buy-and-sell strategies with an initial portfolio of \$100,000 in the manner of RFG. Under Strategy 1, each fund selling at a discount of 5% or greater at the beginning of the period is purchased in an equal proportion. During the period, funds in the portfolio with discounts that decline to 0% are sold, and the proceeds are allocated equally among the remaining funds. Similarly, if other funds' discounts increase to 5% or greater during the period, an equal proportion of the portfolio's members are sold, and the proceeds are allocated to the new fund's shares. In the first tests Anderson replicates the tests performed by RFG using their discount metric where price is divided into the difference between net asset value (NAV) and price (MV). The discounts (D) are then computed following Wiesenberger where,

$$D = \frac{\text{NAV} - \text{MV}}{\text{NAV}}$$

and the tests are reiterated. Anderson also replicates RFG's series of filter rule tests but is unable to support RFG's findings. He concludes that using discount-based trading strategies may improve investment performance for investors.

Anderson, Seth C. "Evidence on the Reflecting Barriers Model: New Opportunities for Technical Analysis?" *Financial Analysts Journal* 45.3 (May/June 1989), 67–71.

In this article Anderson explains Cootner's reflecting barriers model, which requires both informed and uninformed investors as market participants. The informed investors are those professionals who estimate the value of securities, and the uninformed are those non-professionals who buy and sell securities randomly.

The author uses NAVs of closed-end funds as proxies for their true value and employs trading strategies based on the size of discounts. Under strategies, professionals (PRO) buy funds when discounts are greater than a given percent and sell these funds when discounts fall to a pre-determined percent. The non-professionals (REVERSE) take the opposite side of the transaction.

Anderson first uses weekly data for the 1965–1985 period to show that the PRO strategies are profitable and that the REVERSE strategies generally result in losses. The author then runs three PRO series of tests, assuming an initial portfolio of \$100,000 and 0, 0.3, and 1.3% trading costs, respectively. In the first two test groups, the terminal values for each strategy exceed the buy-and-hold strategy. In the most conservative test group, seven of the eight strategies exceed the buy strategy. The largest profits are gained by purchasing funds in the 20–25% discount range and selling them in the 10–15% range. Anderson concludes that Cootner's model is supported and that CEIC shares can be mispriced.

Arak, Marcelle and Dean Taylor. “Risk and Return in Trading Closed-End Country Funds: Can Trading Beat Holding Foreign Stocks?” *The Quarterly Review of Economics and Finance* 36.2 (1996), 219–231.

The authors examine two aspects of closed-end country funds’ (CECFs’) discounts. First, they examine the mean-reverting behavior of discounts. Do very large discounts “naturally and predictably” decline to some level (e.g., zero)? Second, the authors examine the ability of discount-based trading rules to produce returns that exceed those earned either by a buy-and-hold strategy for the fund’s shares or its portfolio.

The authors construct a filter rule that provides them a model for timing the decision to alter one’s portfolio. They sell a previously owned portfolio of foreign stock that is identical to the CECF when the discount on the fund reaches a given level. The proceeds are used to take a position in the CECF’s shares. Those shares are held until the discount declines to a given level.

The authors compute the long-term average discount for a sample of 15 funds from 1986 to 1991. They omit CECFs if the market is closed to foreign investors (e.g., Korea and Brazil) because it would be impossible for investors to purchase the fund’s underlying portfolio. They report a grand-mean average discount of 9.4%, with a standard deviation of 10.4% and also report evidence that discounts on these funds exhibit strong autocorrelation.

Investors are assumed to purchase the fund’s portfolio when the fund’s discount reaches 9.4% and sell those shares when the discount increases to 19.8% (mean less one standard deviation). The authors assume a 4% commission charge. They report the strategy outperforms a simple buy-and-hold strategy for the funds’ portfolios by 23%. Because CECF returns and premiums are positively correlated with U.S. market returns, the authors examine the systematic risk of CECFs to determine if the class of funds is extraordinarily “risky.” Making a risk-adjustment to their excess return measure, the authors show that their trading strategy outperforms a simple buy-and-hold by 21.8%.

Arak, Marcell and Dean Taylor. “Optimal Trading with Mean-Reverting Prices: Switching between Foreign Stocks and Closed-End Country Funds.” *Applied Economics* 28 (1996), 1067–1074.

The authors begin with a restatement of the law of one price. They argue that investors will engage in arbitrage when the difference in the asset’s price in two markets differs by more than the transaction costs necessary to undertake the arbitrage transaction. The authors observe that shares of closed-end funds trade at pronounced discounts from their net asset (NAV) for prolonged periods of time, and the discounts are much larger than one can explain by arbitrage transaction costs alone.

They extend the noise trader hypothesis to suggest that rational trading rules based on closed-end fund discounts may produce substantial profits. The authors suggest that trading one security (e.g., the closed-end fund’s shares) for another (e.g., the closed-end fund’s portfolio) is akin to exercising an option – including the loss of the remaining time value of the option. However, the act of

buying the second asset (e.g., the portfolio) gains the investor a new option to “switch back.”

Modeling the “switch” decision as an American option, the authors examine the conditions under which the exercise should take place. The key parameters are the volatility of the underlying assets, the expected rate of convergence between the two assets’ prices, and the level of transactions costs. Not surprisingly, they find that the greater the volatility and transactions costs, the larger the discount must be to justify a switch.

The authors present evidence on the mean-reverting nature of closed-end fund discounts and examine the ability of their estimated trading strategy to generate excess returns for a sample of 15 funds. They report extremely long average holding periods for the closed-end fund’s common stock for their trading rule – averaging over 4 years between switches. The rules generate excess returns in 12 of the 15 cases where a trade was suggested. The average excess return is 5–7% annually.

Sias, Richard William. “Optimum Trading Strategies for Closed-End Funds.” *Journal of Investing* (Spring 1997), 54–61.

The author argues that returns to shareholders of closed-end funds can be decomposed into the return on the fund’s portfolio and the return due to changes in the fund’s discount. The later component represents the return that can be earned as a result of the mean-reverting behavior of closed-end fund discounts. He collects monthly returns to shareholders of 57 closed-end funds, changes in the funds’ underlying portfolios, and the difference between the funds’ price and net asset value (NAV) from July 1965 through December 1989.

Sias examines a very simple trading rule: buy funds that are selling at a price below their NAV. The author applies different weights to the securities that the investor hypothetically purchases. The following trading rule schemes are proposed: (1) an equal weight for each fund selling at a discount, (2) a discount-weighting scheme that puts more wealth into funds with the largest discount, and (3) a strategy that raises each weight in (2) to a different power. In the latter scheme, the proportion of wealth invested in the fund with the largest discount grows exponentially.

The author demonstrates that the returns to the simple discount weighting are 4% higher than a simple equally weighted scheme. In addition, the author shows that abnormal returns grow as the exponent applied to the discount-weight grows. Sias demonstrates that the change in excess returns declines monotonically as the exponents grow.

Anderson, S.C., J. Coleman, and J.A. Born. “A Closer Look at Trading Strategies for U.S. Equity Closed-End Investment Companies: The Impact of Trigger Points and Transaction Costs.” *Financial Services Review* 10 (December 2001), 237–248.

The authors extend Anderson’s earlier trading analyses of 1986 and 1989, and evaluated an extensive number of strategies by incorporating transaction costs ranging from 1 to 3%. They find that the role of the span between buy and

sell trigger points is highly significant in determining trading returns, and that transaction costs mitigate the influence of the trigger point span.

Their work reveals that with low transaction costs, narrow-span strategies provide the greatest returns, and that when transaction costs are high, narrow-span strategies generate negative, abnormal returns. However, the ten most successful strategies for each transaction cost level exhibit lower coefficients-of-variation than does the Standard & Poor's 500. These findings are consistent with Anderson and Stanford's (1993) findings and those of other authors who report that mean reversion appears to characterize closed-end fund discounts.

Hughen, J. Christopher, Prem G. Mathew, and Kent P. Ragan. "A NAV a Day Keeps the Inefficiency Away? Fund Trading Strategies Using Daily Values." *Financial Services Review* 14.3 (Fall 2005), 213–230.

The main purpose of this article is to determine if daily net asset value (NAV) information on closed-end fund (CEF) shares can be used to form short-term trading strategies. The authors note that many CEFs report daily NAVs, although they are only required to report end-of-week data. They employ a sample of 24 equity CEFs that release daily data from as early as 1994 until 2003. They first investigate how fund share prices react to large discount fluctuations. A large daily discount change is defined as one that is greater than 3% in absolute value.

It is seen that returns after a large discount change for days one to five are all positive and significant. The authors offer investor psychology as a reason for large discount changes, possibly signaling extreme swings of investor optimism or pessimism. Next, they examine fund returns after large discount changes at various discount levels and find that fund returns apparently emanate from mean reversion in the discount rather than gains in the underlying portfolio. Thus, they propose two trading strategies: (1) to buy fund shares when the share price falls relative to the net asset value, creating a large discount, and (2) to short a fund's shares after a large positive change in the discount. These strategies are implemented both with and without commissions.

In summary, their analysis indicates that fund shares provide significant, positive market-adjusted returns after large, negative daily discount changes. Even after accounting for commissions, these strategies are profitable on average over five trading days following the change. However, on average the trading strategies that short funds after discount increases generally do not result in profits.

IPO Studies

Peavy, John W. III. "Closed-End Fund IPOs: Caveat Emptor." *Financial Analysts Journal* (May/June, 1989), 71–75.

In this earliest study of behavior of closed-end fund IPOs, the author documents their unusual behavior. He reports that the 34 new closed-end funds in his

sample sold at an average 7.54% premium to NAV. The author also reports that the first-day return on these funds was a miniscule 0.88%, which was not significantly different from zero. This is in sharp contrast to the strong first-day returns reported for industrial IPOs.

Upon further examination, Peavy finds that 3 of the 34 funds had received special permission to invest in foreign markets that were off-limits to U.S.-based investors. These three funds experienced a first-day return of +21.11%. The remaining 31 funds in his sample had a mean first-day return of -1.08%.

Peavy reports that the cumulative raw and market-adjusted returns to investors in the first 100 trading days (excluding day one) are negative. Much of the poor performance can be attributed to the behavior of the fund's premium, not the actual investment performance of the fund. After opening with an average premium of 7%, the funds close the first 100 days with an average discount of 16%, a decline of 23%. Peavy speculates that the poor performance of these investments is due to the over-sold nature of many of the closed-end fund IPOs.

Anderson, Seth C. and Jeffery A. Born. "The Selling and Seasoning of CEIC IPOs." *Journal of Financial Services Research* 2 (Summer 1989), 131-150.

In this paper the authors examine returns to investors on a daily basis for the first 5 days and 20 weeks following the public offering of equity closed-end funds. Unlike the strongly positive returns reported for common stock IPO investors on the initial offer day and the following trading day, Anderson and Born find no evidence of significant price appreciation in new CEIC shares.

As reported in Table 4.2, the day-by-day average returns and mean daily return over the first five trading days are essentially zeros. Unable to find any evidence of exceptional returns to CEIC investors in the first five trading days following the IPO, Anderson and Born expand their analysis to the first 20

Table 4.2 Anderson and Born's returns to CEIC IPO investors

	Day 1	Day 2	Day 3	Day 4	Day 5	Mean	t-stat
All funds	0.0093	0.0010	0.0061	-0.0033	-0.0078	0.0011	(0.31)
Domestic funds	-0.0059	-0.0016	0.0043	-0.0024	-0.0090	-0.0029	(-1.17)
Foreign funds	0.0253	0.0038	0.0081	-0.0042	-0.0066	0.0053	(0.55)

weeks following the initial public offering. The authors use contemporaneous returns on a sample of "seasoned," domestic and foreign when appropriate, CEICs as a proxy for expected returns. Failing to find evidence of significant positive abnormal returns in the 20 weeks following the post-offering period, Anderson and Born argue that the negative abnormal and realized returns to shareholders are a result of declines in the new fund's NAV, declines in their premiums, or both. An examination of NAVs in the post-announcement period yields no evidence of a marked decline for new CEICs. This pattern is to be

expected, given the short period of time the funds were under management. However, the marked decline in new CEIC premiums, relative to the decline in seasoned CEIC premiums, does explain the vast portion of the poor post-announcement performance.

Weiss, Kathleen. “The Post-Offering Price Performance of Closed-End Funds.” *Financial Management* 18.3 (Autumn 1989), 57–67.

In this paper Weiss examines returns to investors in 64 CEICs that come to market between February 1985 and November 1987. Weiss segregates the IPOs into three separate groups: domestic stock funds, foreign stock funds, and bond funds.

The author examines both the raw and adjusted return to CEIC IPO investors in the first trading day following the public offering. Abnormal returns are obtained by subtracting the contemporaneous daily return on three different expectation proxies from realized returns to investors. The daily return on the Shearson Lehman Bond Index, the S&P 500, and the FT-Actuaries World Indices (expressed in U.S. dollars) are used as expected return proxies for the bond, domestic stock, and foreign stock fund returns, respectively. In addition, the S&P 500 daily return is used as an expected return proxy for the bond and the foreign stock funds.

Weiss finds no evidence of abnormal price appreciation on the first trading days for the new CEICs, with the exception of the foreign stock funds. However, when the author expands her analysis to the first 120 trading days following the initial public offering, she finds that on average all IPO investors lose significantly.

Investigating the source of these significantly negative returns to CEIC IPO investors, the author turns to behavior of the premiums. Although all the funds are brought to market at a premium over their NAV, the author reports that within 24 weeks of the initial offering, 58.3, 11.1, and 14.3% of the bond, domestic stock, and foreign stock funds are still selling at a premium, respectively. The author concludes that the collapse in the premiums is largely responsible for the poor initial investment performance.

Upon further analysis, Weiss can find no consistent evidence that the poor initial performance of the new CEICs is related to the existence of anti-takeover amendments. However, she does find evidence that institutional participation in new CEIC offerings is substantially lower than participation in a control sample of other contemporaneous IPOs. From this evidence, the author concludes that investors in CEIC IPOs can be characterized as “uninformed” investors.

Peavy, John M. “Returns on Initial Public Offerings of Closed-End Funds.” *Review of Financial Studies* 3.4 (1990), 695–708.

In this paper, Peavy considers the aftermarket pricing behavior of new CEICs issued between 1985 and 1987. The author seeks to determine if CEICs can be characterized as “underpriced” like other new issues, as commonly alleged.

Examining unadjusted and adjusted returns to new CEIC investors in the first trading day following the public offering of the shares, Peavy finds no evidence of price appreciation. Also of interest to Peavy are the returns to new CEIC IPO investors in the 100 trading days following the public offering. Peavy finds no evidence of abnormal positive returns in the first 20 days of this period; however, he reports evidence of significant negative abnormal returns in the last 80 days of this period. Peavy employs the contemporaneous returns on treasury bills and the S&P 500 as proxies for the funds' expected return when constructing his abnormal return metric. Finally, Peavy examines the possibility that investors incorporate the past return history of CEIC IPOs into the demand for shares of new CEICs. Peavy finds that the vast majority of new CEICs issued between January 1986 and December 1987 are stock funds; however after the crash of November 1987, the majority of new CEICs issued are bond funds. Peavy concludes that the poor after-market performance of the stock funds, combined with the poor performance of stocks in general, leads to a decline in demand for new stock funds.

Anderson, Seth C., Jeffery A. Born, and T. Randolph Beard. "An Analysis of Bond Investment Company IPOs: Past and Present." *Financial Review* 26.2 (May 1991), 211–222.

In this paper, the authors examine returns to CEIC bond fund IPO investors. The authors focus on two waves of CEIC bond fund offerings: the period 1970–1976 and the period 1985–1987. The poor short-term performance after the initial public offering of CEIC bond funds issued in the 1980 s leads the authors to examine the possibility that this behavior is unique to this time period.

They begin by identifying a sample of 43 CEIC bond funds that are brought to the market during the two time periods. Examining unadjusted returns to shareholders in the first five trading days following the public offering, Anderson, Born, and Beard find no evidence of exceptional performance for the full sample or offering period. The behavior of the bond funds in both sub-periods is essentially the same as the behavior of the stock funds during the 1985–1987 period.

Failing to find evidence of any short-run price appreciation, the authors expand their analysis to the 20-week period following the initial public offering. They examine the relative premiums of the new CEIC bond funds and find that they exhibit a rate of decay of about 0.3% per week (i.e., about 5–6% in the first 20 weeks). The rate of decay in the 1985–1987 period is no different than the decay in the 1970–1976 period. This result suggests that investors apparently do not remember the poor initial performance of CEIC bond funds in the 1970 s when buying new CEIC bond funds in the 1980 s.

Hanley, Kathleen Weiss, Charles M.C. Lee, and Paul J. Seguin. "The Marketing of Closed-End Fund IPOs: Evidence from Transactions Data." *Journal of Financial Intermediation* 5.1 (Spring 1996), 127–159.

The authors note that closed-end funds experience a –12.6% excess return in the 5 months following their IPOs; whereas industrial and manufacturing firms

experience an 18.5% excess return in the same period following their IPOs. If the market were completely rational, investors would incorporate this information into their demand for closed-end fund IPOs. In such a market, new funds would not be brought to market, let alone at a premium to the net asset value (NAV). Also, most of this decline begins to occur after 30 trading days following the IPO. This begs the question of why the shares do not immediately decline in value in light of the large underwriting expenses categorizing closed-end fund IPOs.

The authors examine after-market transactions for fund IPOs and document large sell-to-buy imbalances by large traders – transactions in excess of \$10,000 market value. The high underwriting fees earned by members of the syndicate encourage them to sell to large sophisticated investors who have no long-term interest in owning the shares but who hope to earn a short-term profit by “flipping.” The lead underwriter faces a difficult time trying to police members of the syndicate stabilizing the price of the new offering, without losing reputation capital or their share of the underwriting fees.

They document a sharp decline in the prices of closed-end fund IPOs once the support underwriting period has ended. In addition, the authors demonstrate that funds have negative cumulative excess returns at day +100 following the IPO date. Nearly 75% of the decline is experienced on a single day, which almost always occurs after the underwriting stabilization period ends.

They report that those funds with strongest selling pressure in the first few days of trading experience the greatest declines in the first few weeks. They also demonstrate a strong relation between the duration of stabilization activities and the exercise of over-allotment options. While this may seem curious, it is not. When flipping is unexpectedly low, the syndicate members find it profitable to exercise over-allotment options in order to satisfy the strong demand. This keeps members of the syndicate active in the underwriting process longer than they would be in the absence of the demand that led to the exercising of the over-allotment options. Not surprisingly, shares of funds that have no options exercised experience their first drop in share price at day +24; whereas funds with exercised options experience their first price drop at day +35. This difference grows with the rate at which options are exercised.

The authors posit that closed-end fund IPO behavior is best explained by a “profitability to underwriters who market” hypothesis. They conclude that flippers and small investors participate in the IPO, but it is the small investors who are left holding the bag when the price stabilization activities are abandoned.

Booth, Lena Chua and Hassan Tehranian. “Aftermarket Performance of Closed-End Funds Invested in International versus Domestic Securities.” *Journal of Applied Finance* 15.1 (Spring 2005), 24–34.

In this analysis the authors compare the IPO aftermarket performance of both domestic and international closed-end funds (CEFs) from inception through 3 years of trading. Their motivation lies in the often-held position that redeemable shares may not be efficiently priced when the underlying assets

lack liquidity and transparency. Thus, they posit that CEFs may be more attractive when they hold illiquid assets such as international securities.

In their investigation, they employ a sample of 352 CEFs that went public in the 1986–1998 period. They compare aftermarket share returns while controlling for fund characteristics such as offer price, underwriter reputation, fund type, investment proceeds, and portfolio strategy. The authors report significantly different average first-day returns of 0.3% for domestic funds and 2.3% for international funds. In examining the 3-year share returns, they find positive unadjusted returns for all types of funds. However, once appropriate adjustments are made, the returns become negative.

Other Studies

Sharpe, William F. and Howard B. Sosin. “Closed-End Investment Companies in the United States.” *Proceedings Issue of the 1974 Meeting of the European Finance Association*, Edited by B. Jacquillat. Amsterdam: North-Holland Publishing Co., 1975.

Sharpe and Sosin investigate how deviations of closed-end fund share prices from net asset value affect the investment quality of closed-end funds vis-à-vis open-end funds (proxied by NAV per share). Deviations are measured as the ratio of the market price per share relative to net asset value per share. Focusing on the period 1966–1973, Sharpe and Sosin find that quarterly returns to CEIC shareholders generally exceed the returns earned on the underlying portfolio of the fund. These results lead the authors to consider the various components of the total return to CEIC shareholders.

Sharpe and Sosin disaggregate the total return to CEIC shareholders into: (1) the return generated by changes in the NAV, and (2) the positive or negative return from an increase or decrease in the price/NAV ratio. They compare quarterly returns to closed-end fund shareholders with the contemporaneous NAV return obtained for a sample of closed-end funds. Over the period 1966–1973, most funds’ shares outperform their portfolios.

The authors then examine the total risk of each fund’s shares by quarter and over the entire sample period and find that the risk of the average fund’s shares using quarterly and annual data is 28 and 17% greater than its portfolio, respectively. When the authors regress the return component generated by changes in the price/NAV ratio against the contemporaneous return on the S&P 500, they find no significant relationship.

In the final analysis, Sharpe and Sosin investigate whether the current value of the ratio of price/NAV provides any information about the expected return on the ratio in the future. Using weekly data to compute price/NAV ratios from 1966 to 1973, they conduct a moving time-series examination of the relationship between the 13 forward-week percentage changes in the price/NAV ratio to the current price/NAV ratio and find that the future percentage changes in the

ratios are related inversely to the current price/NAV ratio. Sharpe and Sosin conclude that a fund's price/NAV ratio (i.e., discount) is significant in determining risk and return characteristics of closed-end funds.

Leonard, David C. and Nicholas R. Noble. "Estimation of Time-Varying Systematic Risk and Investment Performance: Closed-End Investment Companies." *Journal of Financial Research* 4.2 (Summer 1981), 109–117.

Leonard and Noble measure the risk-adjusted performance for both the portfolios and the shares of 19 funds. In their analysis, they depart from previous studies by rejecting the assumption of risk level stationarity. To test for non-stationarity, they use a Quandt switching regression model. The empirical results indicate substantial non-stationarity in the systematic risk and investment performance of both the portfolios and the CEIC shares.

Leonard and Noble conclude that: (1) the evidence of non-stationarity questions the performance results of studies using ordinary least squares parameter estimates of systematic risk; and (2) the absence of consistent superior or inferior risk-adjusted performance is consistent with the joint hypothesis of information efficiency and a two-parameter asset pricing model. From these findings they infer that it is unlikely that any information is contained in CEIC discounts.

Schnabel, Jacques A. "Corporate Spin-Offs and Closed-End Funds in a State-Preference Framework." *Financial Review* 27.3 (August 1992), 391–409.

Using an Arrow-Debreu state-preference model, the author provides rigorous support for the series of articles by Miller (1977, 1978, and 1989). In those articles, Miller argues that if short-selling is restricted, the price of risky assets will be driven above the prices they would reach in the presence of short-selling. Further, Miller argues that the sum of the values of the individual parts of a firm would likely exceed the value that investors would pay for the whole of the firm. These assertions made by Miller at once appear to explain why closed-end fund shares sell at discounts from their net asset value (NAV) for prolonged periods of time and why firms' experience increases in share price when divestitures are announced.

Schnabel demonstrates that value additivity will not hold in a world where a short-selling constraint is binding. Moreover, he demonstrates that if a short-selling constraint is not binding, value additivity will result regardless of whether expectations are heterogeneous or if utility functions are state-dependent. Put differently, investor clienteles may develop in such a market, but they will not systematically impact asset pricing. Finally, Schnabel suggests that tax-timing options will exist, regardless of a binding short-sale restriction.

Marcus, Matityahu and Uzi Yaari. "How a Closed-End Fund Can Out-Perform Its Own Stock Portfolio." *International Journal of Finance* 1.1 (Autumn 1988), 1–14.

The Investment Company Act of 1940 allows funds to be exempt from federal income tax as long as they pass through 95% of their dividend/interest income and their net capital gains. The authors show that under certain circumstances a fund could earn a higher after-tax return on a portfolio of securities

than its shareholders could earn by directly investing in the securities, even when the fund elects to retain income and pay federal income taxes on that income.

The authors argue that the source of the gain results from the opportunity of the investment company to reinvest the income received from its underlying portfolio at a rate of return that might exceed the return required by its investors. If the investment company can capture the value added from such an investment policy, the net gain above the tax penalty to its shareholders could be positive. Once the possibility of such an arbitrage is possible, the value of the investment company becomes an increasing function of the percentage of its income that it retains. The ability to arbitrage suggests that the fund should minimize its portfolio turnover, thus minimizing its brokerage charges and maximizing the amount of funds that it can invest in the arbitrage activity.

The authors provide a variety of numerical examples based on the tax code before and after the major changes in 1986. While the model prepared by the authors is viable, they do not explore the kinds of conditions that must hold for the arbitrage to exist. For example, a necessary condition would appear to require a lag of one period or more in the ability of investors to observe the true risk of the fund's portfolio. If the fund's portfolio is transparent, it would appear impossible for the discount rate applied to the fund's shares to systematically deviate from the average discount rate of the fund's portfolio.

Caks, John and Emilio R. Zarruk. "Closed-End Fund Discounts: Pedagogical Note." *Financial Practice and Education* (Spring/Summer 1993), 95–97.

In this brief paper, the authors argue that management fees and other costs act as a drain on the possible cash disbursements by a closed-end fund. Thus, if the fund is not expected to liquidate in a reasonable period of time, the shares of the fund would be expected to sell at a discount to their net asset value (NAV) per share. The amount of discount would be equal to the amount of the costs, discounted by the expected return for the fund, which should be a weighted average of expected returns for the underlying assets.

The authors construct a small sample of seven closed-end funds and compute the average expense ratio for the funds from 1976 to 1986, which is three quarters of one percent. Discounted by the average dividend yield of the S&P 500, the authors generate a set of justifiable discounts that range between 13 and 21% during the period, with an average of 17%. The average discount for the seven funds in the sample ranges from 6 to 26%, with an average of 14%. The authors make additional adjustments for capital gain distributions to obtain a range of discount estimates.

Peavy, John W. III. "New Evidence on the Turn-of-the-Year Effect from Closed-End Fund IPOs." *Journal of Financial Services Research* 9.1 (1995), 49–64.

The author argues that one of the most persistent anomalies in financial markets is the so-called January effect. Prior research documents an abnormal positive return to stockholders in the month of January, as compared with the other 11 months of the year. This impact appears to be stronger for firms with

small market values. Peavy proposes to examine the returns to the shareholders of recently floated closed-end funds (CEFs) in an effort to determine what may be at the heart of the January effect.

With a sample of 71 closed-end funds that went public between 1986 and 1990, Peavy examines the behavior of returns in their first year of public trading and in their first January. As reported in other venues, the initial returns to shareholders of new closed-end funds are negative. Institutional ownership in the new CEFs is limited. However, average returns to shareholders in the first few days of January are positive.

Peavy places the funds into size-ranked portfolios and finds that the smallest CEFs experience the most negative shareholder returns in their first year of public trading. He also finds that the smallest CEFs experience the largest early-January rally. This result seems to be driven more by tax-loss selling the prior December than as a result of the size of the fund. In a cross-sectional regression, fund size is insignificant, but prior year returns are highly significant in explaining early January returns. This evidence strongly supports the tax-loss selling hypothesis, but not the firm-size hypothesis.

Pontiff, Jeffrey. “Closed-end Fund Premia and Returns: Implications for Financial Market Equilibrium.” *Journal of Financial Economics* 37 (1995), 341–370.

The author reexamines the empirical relation between the discounts on closed-end funds and their subsequent returns. He clearly delineates that the paper is not an attempt to explain either the level or changes in discounts. Rather, the author is troubled by the apparent pay-off of trading rules developed for closed-end funds based on their discount from their net asset value (NAV). After documenting the predictive power of closed-end fund discounts, the author searches for an explanation for their predictive power.

He finds strong evidence that shareholders of funds with large (small) discounts earn large (small) returns on their investment. Discounts are not found to predict subsequent changes in the fund NAVs. Consistent with other authors, Pontiff reports that the source of the “return” to stockholders is primarily the mean-reverting nature of the discount.

Pontiff attempts to explain the ability of the discounts to predict future movements in the prices of closed-end fund shares. He relates movements in the excess returns to: the month of the year, dividend yield on the fund’s portfolio, a measure of the bid-ask spread, the systematic risk of the fund’s portfolio, and level of discounts. The author concludes that discounts are a significant explanatory variable.

Pontiff, Jeffrey. “Costly Arbitrage: Evidence from Closed-End Fund Discounts.” *Quarterly Journal of Economics* 107 (November 1996), 1135–1151.

The author contends that closed-end funds provide a perfect vehicle for examining mispricing in financial markets. In the spirit of DeLong, Shleifer, Summers, and Waldman (1990), the author suggests that the irrational actions of noise traders can lead to prolonged and pronounced deviations from an efficient market equilibrium, in spite of the existence of rational investors.

Further, the author contends that rational investors will try to profit from irrational pricing by noise traders when the benefit of such actions outweighs the costs.

He argues that the ability to exploit closed-end fund discounts is made too costly when the fund's portfolio is difficult to mimic, when interest rates are high, when the bid-ask spread is high, and when the dividend income from the fund's portfolio is low. Using the price of the fund's shares as a proxy for the bid-ask spread, quarterly dividend yield, and the residuals from a prior regression that finds correlation between changes in closed-end funds' NAVs and changes in open-end funds' NAVs, Pontiff estimates a multi-variate regression model of closed-end fund discounts.

He finds that all of the proposed causal factors enter the estimated relation with the proper sign. While most of the variables have low statistical significance, the overall model explains about 20% of the variability in closed-end fund discounts. The author argues that because closed-end country fund portfolios would be difficult to mimic, one should expect their discounts to be larger and more variable than domestic funds.

Finally, Pontiff argues that the premiums observed on municipal bond closed-end funds are largely a result of market frictions. Short-sellers of municipal bond funds could replicate the dividend payment made to the lender of the shares, but not its tax-exempt status. As a result, Pontiff argues that short selling of closed-end municipal bond funds should be virtually non-existent.

Pontiff, Jeffrey. "Excess Volatility of Closed-End Funds." *American Economic Review* 87.1 (March 1997), 155–167.

Pontiff examines the volatility of returns on portfolios held by closed-end funds and the contemporaneous volatility of the returns to shareholders of the funds. He argues that if closed-end funds were simply a transparent reflection of the underlying portfolio of the fund, the value of the fund's shares and the net asset value (NAV) would behave identically.

Using an identical sample to that in Lee et al. (1991), the author first examines the relation between the NAVs of open- and closed-end fund NAVs to changes in the CRSP value-weighted index and concludes that the funds follow similar investment strategies. Pontiff's primary finding is that closed-end fund shares are 64% more volatile than the assets that they own. He reports that only 15% of the average funds' excess volatility is explained by market risk, small firm risk, book-to-market risk, or risk associated with discount movements of other funds.

Pontiff attempts to explain the excess volatility with a variety of factors. The author finds that closed-end funds with large discounts have portfolios that have more stocks with high book-to-market risk than closed-end funds with small discounts. There is some weak evidence that the closed-end funds with large discounts have portfolios with smaller average systematic risk measures. The author concludes that the efficient market hypothesis is not supported by his findings.

Lofthouse, Stephen. “Closed-End Fund and Investment Trust Discounts.” *Journal of Investing* (Spring 1999), 27–37.

Investment trusts (ITs) are investment vehicles that trade on U.K. capital markets. Like closed-end funds, most ITs are sold to the public at a small premium to their net asset value (NAV) but soon slump to a discount. On rare occasions seasoned ITs trade at a premium to their NAV, but for the most part they trade at discounts like their American closed-end investment company (CEIC) cousins. However, the tax treatment of ITs differs significantly from CEICs.

To maintain their tax-exempt status, ITs must pay out at least 85% of the dividend and interest income that they receive. While there are potential tax complications from foreign-source income, ITs can generally avoid any unfavorable withholding taxes with a strong payout policy.

ITs can avoid capital gains taxes only if gains are not distributed, which is the opposite of the U.S. treatment. U.K. shareholders pay capital gains taxes when they liquidate their shares in the IT at a price above their basis. Thus, Lofthouse argues that the tax-trading hypothesis offered to explain discounts on CEICs would not appear to hold in the U.K., where price discounts to NAV abound.

Lofthouse also argues that the noise-trader hypothesis of closed-end fund discounts would require that most CEICs shares be held by small investors who are presumably noise traders. In the case of ITs, Lofthouse finds that on average only about 20% of their shares are owned by small investors, while the bulk is owned by institutions or management. The author argues that this pattern of ownership does not support a noise-trader hypothesis of discounts for ITs and thus, undermines the strength of this explanation for CEICs’ pricing.

Finally, Lofthouse examines the recent history of arbitrage activities in IT shares and finds that a number of funds have been taken over or reorganized. Cash takeovers have generally been achieved at 95–98% of NAV; while other takeovers have involved share swaps. Share buy-backs by ITs are highly regulated, but not impossible. Conversion to open-end status has also occurred with some regularity. The variety of avenues available to exploit differences between IT share prices and NAV, combined with the regularity at which takeovers occur, are at odds with the hypothesis that the lack of arbitrage activities explains IT, and by extension CEIC discounts.

Olienyk, John P., Robert G. Schweback, and J. Kenton Zumwalt. “WEBS, SPDRs, and Country Funds: An Analysis of International Cointegration.” *Journal of Multinational Financial Management* 9 (1999), 217–232.

Olienyk, Schweback, and Zumwalt address the extent to which national stock indices exhibit positive correlation in their returns by making use of two new types of securities: WEBS (World Equity Benchmark Shares) and SPDR (Standard and Poors Depository Receipts). Both securities are similar to closed-end funds, but they serve as “index” funds; whereas true closed-end funds (including country funds) can engage in active trading. The authors examine daily returns from March 18, 1996, through October 31, 1998, for 17 WEBS, the SPDR, and 12 closed-end country funds.

They employ time-series analysis and conclude that while none of the WEBS and SPDR series is stationary in its level, they are all stationary in first differences as their returns follow a random walk. The authors then conduct a series of pair-wise tests for co-integration and report that 24 out of 45 possible European pairs, 8 out of 10 Asian, and 2 out of 3 North American series exhibit significant cointegration (i.e., contemporaneous correlations are different from zero). The authors note that the U.S. market “Granger-caused” only the Mexican market (WEBS) to move contemporaneously, but that movements in the U.S. market were next-day “Granger-caused” in 13 of the 17 European markets (WEBS) examined.

Next, the authors employ time-series analysis and conclude that the 12 closed-end country fund series are not stationary in levels, but are stationary in first differences. The authors report substantial support for co-integration between the country-fund returns series and its WEBS series, as one would expect.

Bers, Martina K. and Jeff Madura. “The Performance Persistence of Closed-End Funds.” *Financial Review* 35.3 (August, 2000), 33–52.

The authors compile a sample of 384 domestic closed-end funds from January 1976 (or inception) to December 1996 and measure abnormal performance depending upon the type of fund analyzed. To compute the persistence in performance, an abnormal return metric in a subsequent period is regressed against the metric in the current period. Using 24- and 36-month measurement periods, the authors find weak evidence of positive abnormal performance for the portfolios of equity funds. Neither the taxable nor municipal bond fund sub-samples yield evidence of abnormal performance.

Estimation of performance persistence was more enlightening. In the case of taxable bond funds, the authors find strong evidence of positive portfolio performance persistence looking 12, 24, and 36 months into the future. However, the authors can detect statistically significant persistence in price performance only for the 36-month window.

In the case of municipal bond funds, the evidence is mixed. The authors report significant negative persistence in the 12-month period, but positive persistence in the 24-month figure when measured on the net asset value (NAV). The share price performance persistence is positive and significant in the 12-month period; whereas the NAV relation is negative.

The authors report extremely strong persistence in the NAV performance in the 12-, 24-, and 36-month periods for equity funds. The persistence is matched in strength and sign by market price persistence. Finally, the authors find evidence that investment managers for equity and taxable bond funds exhibit strong positive performance persistence in their portfolios, but only the stockholders of equity funds are rewarded with strong positive performance on the fund’s shares.

Copeland, Lawrence. “Arbitrage Bounds and the Time Series Properties of the Discount on UK Closed-End Mutual Funds.” *Journal of Business Finance & Accounting* 34.1 (2007), 313–330.

The author introduces this work by discussing how discounts on closed-end funds (CEFs) persist in both the U.S. and the U.K. markets even after decades of academic investigation in this area. He explains that rather than directly addressing this apparent anomaly his work will visit the issue of modeling the time series processes for evidence, either consistent or inconsistent, with the explanations given in the literature. In doing so, he looks for evidence of mean reversion within bounds which may be generated by arbitrage.

If discounts behave in this manner, the further they wander from a steady state level, the greater the potential for arbitrageurs to capture capital gains. Thus, larger discounts should generate stronger mean reversions. To implement an investigation, the author employs a sample of 133 British investment trusts over the 1990–2004 period. Analysis reveals that these trusts exhibit a mean discount of 13%. The author furthers this study via examination of the long-run equilibrium level of discounts and their short-term fluctuations around this level.

He finds that if there is co-integration between price and net asset value, the relationship does not imply a long-run zero discount. Rather, the evidence indicates a long-run discount process with mean reversion, which is consistent with a number of possible non-linear processes, including that of a bounded random walk.

4.5 Summary of Research Findings

Cash Flows

The impact of market frictions, such as fees, turnover expenses, and taxes, on CEIC discounts has been a topic of interest over the life of the literature. As for management fees and turnover expenses, research findings have been varied but generally have shown a positive association between them and the size of discounts. In the case of unrealized gains, there have been numerous studies with conflicting results concerning their impact on discounts.

Another issue which has been investigated at length is the impact of illiquid securities on CEIC valuation. In this instance, the findings are generally consistent in that discounts become larger as the holdings of a firm's illiquid securities increase. This parallels the amount of diversification in CEIC portfolios as an explanatory variable; discounts have been found to be positively related to a lack of diversification.

Country Funds

Although several early works consider the topic of foreign assets, country fund studies *per se* began in earnest in the 1990s and have focused largely on market

segmentation and diversification effects. Those studies investigating whether international investment restrictions impact country fund CEICs, report that these shares generally are characterized by price premiums to NAV. However, these premiums tend to disappear once the host government liberalizes their restrictions to foreigners.

Those studies that investigate diversification benefits of country funds report that such benefits generally result from the inclusion of these funds in portfolios. It should be noted that oftentimes these funds are less desirable candidates for diversification than would be the inclusion of their respective country primary equity indices. However, these results tend to be period-specific.

Management

Findings of the impact of management issues on CEIC discounts cover a variety of topics, from ownership to compensation. For example, one early study concludes that discounts arise from inferior portfolio performance. Also, Chay and Trzcinka (1999) report that strong management performance is associated with smaller discounts. In another study it is seen that the majority of fund managers receive compensation as a flat percentage of assets. In a different vein, it has been reported that the average discount increases in the year following a change in management, even though only small changes in performance ensue.

Trading Strategies

Over the past decades there have been a large variety of trading strategy papers which investigate whether discount information can be employed to earn abnormal returns. Specifically, the strategy of buying shares at deep discounts and selling them once they narrow has been back-tested for various time periods. Some of these tests have yielded superior performance returns to a simple buy-and-hold strategy. However, other researchers have concluded that these results do not necessarily indicate inefficiency in the market for CEIC shares.

IPOs

Numerous studies have investigated the behavior of CEIC IPOs, and their findings are similar with regard to these offerings. In the case of domestic stock and bond IPOs, initial trading days returns are essentially nil as compared to returns of 7–9% on average for industrial IPOs. In contrast, country fund IPO returns are often significant depending upon the fund's target country.

However, the post-seasoning returns for all CEIC IPOs are negative. The primary reasons offered for investor participation in these IPOs are investor naiveté and underwriter promotions.

Perceptions, Expectations, and Sentiment

A substantial portion of research on CEIC discounts focuses on investor perceptions, expectations, and sentiment. Specific explanations for discounts and their variability have included positions from investor unawareness to investor gloom and euphoria. In an early study Zweig (1973) proposes and finds support for the thesis that non-professional investors' expectations are revealed in CEIC discounts, and that discount behavior could be used to predict overall market returns. Similarly, another work reports strong correlation between discount changes and market returns during the 1929 period. This author concludes that a large portion of the increase in stock prices during this time was due to irrational investor sentiment, as the average fund premium was approximately 50% over net asset value.

Yet other studies have employed variables ranging from odd-lot statistics to consumer sentiment in an effort to verify that discounts are a function of unsophisticated investor emotions. Although many of these researchers concur that discounts may be related to unsophisticated investor sentiment and perception, at least one study shows that institutions are more active in the CEIC market than previously assumed. Nonetheless, the issues of perceptions, expectations, and sentiments have generated numerous studies with interesting, yet often conflicting, findings.

Chapter 5

Exchange-Traded Funds: Issues and Studies

Abstract Since the introduction of the first exchange-traded fund (ETF) in the form of Standard & Poor's Depository Receipts (SPDRs) in 1993, ETFs have become popular investment vehicles in the financial markets. At the end of October 2008, assets under management totaled \$460 billion, a reduction of \$300 billion since the end of March 2008 in response to the credit crisis. ETFs offer multiple advantages to investors, including easy diversification in the equity, fixed income, and even commodities markets, low cost, tax efficiency, continuous pricing, and low premiums/discounts from the net asset value (NAV) of the underlying assets. However, it is possible for the ETF to exhibit premiums or discounts from the net asset value of the underlying assets due to their structure and dividend treatment. Unlike traditional mutual funds, ETFs can be sold short and purchased on margin. Although the ETF market has shrunk in response to the credit crisis, new innovations in the ETF include active management and retirement ETF products.

Keywords SPDR · Tax efficiency · NAV · Short selling · Margin · Premium · Discount · Authorized participant · Creation and redemption · Transaction cost · Tracking error

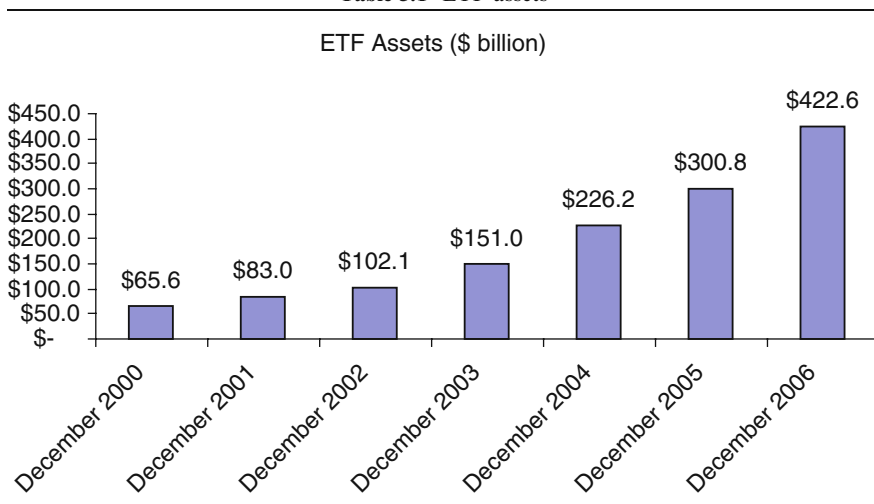
5.1 What are ETFs?

Exchange-traded funds (ETFs) are index funds representing a basket of stocks that trade on a stock exchange throughout the day. ETFs are designed to correspond to a stock market or bond market index, a sector, a style, or a geographic region. This allows investors to capture the performance of an entire stock or bond index with only a single trade. For example, an investor wanting to invest in the broad-based S&P 500 index could purchase Standard & Poor's Depository Receipts (SPDRs or "Spiders").

ETFs have become very popular since the SPDR was created in 1993. At the end of the first quarter of 2008, 1,280 ETFs existed with combined assets under management of \$760.8 billion. ETFs are managed by 79 managers and are

traded on 42 exchanges throughout the world. Managers of ETFs include Barclays Global Investors (iShares), Merrill Lynch (HLDRs), State Street Bank and Trust Company, and the Bank of New York (SPDR funds). Table 5.1 provides a brief history of the ETF asset size through 2006.

Table 5.1 ETF assets



Source: Investment Company Institute, http://www.ici.org/home/bro_ETF.html

Exchange-traded funds are legally structured in one of three ways. First, they can be structured as open-end index funds. With this type of fund, dividends are reinvested and paid to investors via a quarterly cash distribution. ETFs using this structure are also allowed to use derivatives and loan securities. SPDRs and iShares are structured as open-end index funds. The second possible ETF structure is a unit investment trust. With a unit investment trust, dividends are not reinvested and the fund pays them out via a quarterly cash distribution. Qubes (QQQs) and DIAMONDS are structured as exchange-traded unit investment trusts. The third structure is a grantor trust. With this structure, the fund distributes dividends directly to shareholders and allows investors to maintain their voting rights in the underlying securities within the fund. Fund shares can be purchased (created) and sold (redeemed) in 100-share lots only. The Merrill Lynch HLDR funds are structured as grantor trusts. Of the three legal structures, the open-end index fund and unit investment trusts structure fall under the purview of the Investment Company Act of 1940, while the grantor trust does not.

Generally speaking, ETFs are based on broad indexes. For example, DIAMONDS indexes the Dow Jones Industrial Average. The SPDR indexes the S&P 500 index. Some of the popular international exchange-traded funds are based on the Morgan Stanley Capital International (MSCI) indexes, such as the

MSCI EAFE index, which is a market-capitalization weighted index composed of companies representative of the market structure of 20 developed market countries in Europe, Australia, and the Far East.

In a sense, buying or selling ETFs, which can be bought and sold like individual stocks, is like buying and selling an index. For example, consider a broad-based ETF like the iShares Russell 3000, which is based on the Russell 3000 Index. Since the creation and redemption process (see below) of ETFs results in very low (if any) discounts or premia from NAV, investors are basically able to purchase the 3,000 in the Russell 3000 Index with the purchase of only one ETF.

ETFs have been created not only for stocks but also for bonds. For example, the iShares Lehman Aggregate Bond Fund is based on the Lehman Aggregate Bond index, which is composed of securities from Lehman Brother Government/Corporate Bond Index, Mortgage-Backed Securities Index, and the Asset-Backed Securities Index. Since investors are able to purchase this ETF like a stock, bond market liquidity is enhanced.

5.2 How ETFs are Created and Priced

The prices of ETFs adjust throughout the day, just like a regular stock. In the United States, ETFs are traded on the New York Stock Exchange, the American Stock Exchange, and the NASDAQ. Consequently, investors can buy and sell ETFs just like regular stocks through their broker. While it may at first appear that ETFs are like stocks, the important difference is that ETFs are more diversified and are composed of an underlying portfolio of securities that closely track an index. If ETFs are composed of underlying securities that track an index, then who makes these securities available? This leads us to the creation process for an ETF.

Exchange-traded funds feature a unique creation and redemption process, which also separates them from mutual funds. In this process, blocks of ETF shares are created by authorized participants, which are usually institutional investors, market makers, or specialists. In order to qualify as an authorized participant, they must file a participant agreement with a particular ETF sponsor or distributor. To create ETF shares, the authorized participant must deposit with a custodial bank a specified portfolio of stocks or bonds closely approximating the composition of the specific index and specific amounts of cash in return for a creation unit aggregation of shares of the specific ETF. Thus, authorized participants interact with the fund on an “in-kind” basis. Creation of ETF shares occurs at the end-of-day NAV of the fund.¹ The

¹ The NAV of an exchange-traded fund is computed like the NAV of other mutual funds, by taking the total assets of the ETF, subtracting the liabilities, and dividing by the number of ETF shares outstanding.

creation unit size can vary by fund, but ranges from 25,000 to 600,000 shares. The ETF prospectus lists the creation and redemption fees that authorized participants are charged. Generally, the Depository Trust Clearing Corporation is the channel through which the stock certificates and ETF certificates flow. Redemptions of ETF shares are simply the reverse of the creation process.²

Why would the various parties be interested in participating in the ETF creation process? The fund managers take a small portion of the fund's annual assets as their fee. The investors who loan the stocks or bonds to authorized participants receive a small interest payment. The trustees (custodial banks) also receive a portion of the fund's assets.

The authorized participants benefit by either arbitrage opportunities resulting from the difference between the prices of the underlying securities and the ETF shares and/or from the bid-ask spread of the ETF itself, since the authorized participants are free to sell the created ETF shares on a retail basis in smaller increments. Another reason why authorized participants, particularly specialists and market makers, may be interested in creating ETF shares is to provide liquidity to the market. Since ETFs are open-ended, the volume of ETFs itself is not a good indicator of liquidity, since ETF shares can be readily created using the underlying shares. This provides the potential for greater liquidity to be added to the market than the volume of ETF shares itself would indicate.

Creations and redemptions are also aided by the Portfolio Composition File, which is a file created by the ETF fund manager or trustee each day after the market closes. The file informs authorized participants of the securities and share quantities that would be required to create or redeem ETF shares on the next trading day.

Every 15 seconds, an Intraday Indicative Value (IIV) is calculated and disseminated. The IIV is a real-time estimate of the ETF's NAV. This value is designed to give investors a sense of the relationship between a basket of securities that are representative of those owned in the ETF and the share price of the ETF on an intraday basis. The IIV is calculated, on a per-ETF share basis, based on the prices of the securities and share quantities specified in the Portfolio Composition File.³ The existence of a real-time estimate of NAV makes it unlikely that price differences between the ETF shares and the underlying assets will persist, as the authorized participant is likely to conduct arbitrage in this case.

Once the authorized participants have sold the ETF creation units in smaller increments, the ETF shares trade in the secondary market like regular shares of

² The "in kind" transfer of securities involved in the creation and redemption process means that the transactions are not taxable events for the ETF. Consequently, any imbalances between the supply and demand for ETF shares can be satisfied without having an adverse taxable effect upon existing ETF shareholders.

³ The prospectus will typically refer to the IIV as the "Underlying Trading Value," "Indicative Optimized Portfolio Value," or "Intraday Value."

stock. However, the pricing of ETFs does not typically correspond to 100% of the value of the underlying asset. For example, DIAMONDS, which tracks the Dow Jones Industrial Average, is priced at 1% of the level of the Dow. SPDRs are priced at 10% of the level of the S&P 500 index.

5.3 ETFs Compared to Index Mutual Funds

ETFs are often compared to index mutual funds. However, the two are substantially different, as illustrated in Table 5.2:

Table 5.2 ETF versus index mutual funds

	ETF	Index fund
Ownership	ETF investors own a share in a "creation unit."	Index fund investors purchase a pro-rata interest in the securities that make up the fund's portfolio.
Method of purchase	Investors can buy ETF shares only through a broker-dealer.	Index funds can be purchased through a variety of distribution channels, including through a broker-dealer or directly from a fund company.
Pricing	ETFs are priced continuously and investors can buy and sell their ETF shares throughout the day at the current offering price. As a result, two investors selling ETF shares at different times on the same day may receive different prices for their shares.	Traditional mutual funds are priced at the close of the markets each day. While an investor may purchase or sell traditional mutual fund shares at any time on a trading day, the price the investor receives will be the price determined at the end of that trading date, which will be the same for all shareholders in the fund.
Management style	Passive. ETF managers only make changes to the ETF portfolio when there is a change in the underlying index.	Passive. Fund managers only make changes to the fund portfolio when there is a change in the underlying index.
Transaction costs	Because ETFs are purchased through a broker-dealer, an ETF investor pays a brokerage commission when buying or selling ETF shares. In addition to any commissions charged, ETF investors also may pay a management fee, which is deducted from the ETF's assets.	Depending upon the distribution channel, an investor in a traditional mutual fund may be required to pay a commission when buying or selling shares. In addition to any commissions charged, mutual fund shareholders also pay an ongoing management fee, which is deducted from the fund's assets.

Source: Investment Company Institute, http://www.ici.org/home/bro_etf.html

There are also differences between ETFs and closed-end funds. First, ETFs allow investors to create or redeem shares in-kind, representing a non-taxable transaction. Closed-end fund investors, on the other hand, cannot redeem their shares directly from the fund company. Second, ETFs are more liquid than closed-end funds, since an ETF's liquidity represents both the liquidity of the ETF itself and the liquidity of the underlying securities. For ETF investors, this means both a lower bid-ask spread and the potential sale of ETF shares at a higher price than a corresponding closed-end fund share. Also, due to their nature, the bid-ask sizes for ETFs tend to be larger than for closed-end funds, meaning that ETFs can execute larger orders without adversely moving bid-ask prices.⁴

5.4 Advantages and Disadvantages of ETFs

Perhaps the main benefit of ETFs relates to their tax efficiency. Since there is very low turnover in the securities comprising an index and since ETFs only sell securities to reflect changes in the underlying index, ETFs generate very few capital gains. For example, in 2007, only 83 out of over 600 ETFs paid capital gains distributions. Furthermore, unlike mutual funds and because of the creation and redemption process described above, ETFs are not required to sell securities to meet investor cash redemptions, which have the potential of generating capital gains for the other investors in the fund. For the fund and the authorized participants, the creation and redemption process also represents an "in-kind" transfer of securities, which is not taxable.

Because most ETFs are passively managed, ETFs carry very low expense ratios, ranging from 0.09 to 0.99% of fund assets. For grantor trusts, an annual custody fee of 0.08% is charged if any of the underlying stocks pay dividends. Naturally, investors still incur a brokerage commission when buying and selling the ETFs, which is an added expense relative to mutual funds. However, unlike mutual funds, ETFs do not carry a sales load or 12b-1 fees. The dividends paid by fixed-income ETFs are taxable as ordinary income.

Also, unlike traditional mutual funds, which are priced at the end of the day, ETFs are continuously priced, as they can be purchased or sold at existing market prices throughout the day. This is particularly attractive for institutional investors in the bond market, as the continuous pricing feature allows them to respond to intraday bond market movements. An added benefit here is that ETFs can be sold short and purchased on margin. This continuous pricing makes ETFs very attractive for portfolio managers who seek to track benchmarks or seek to quickly gain exposure to a particular market segment and for investors who prefer to maintain market exposure while switching between

⁴ Also see Stout and Chen (2006) for a more in-depth comparison of closed-end mutual funds and ETFs.

investment styles. Moreover, the ability to purchase on margin and sell ETFs short makes them suitable vehicles for hedging strategies. Additionally, options are available on some ETFs, which can also be used to hedge or simply to generate income.

An additional advantage of ETFs is their transparency. ETFs are designed to replicate the holdings and correspond to the performance and yield of their underlying index. While mutual funds disclose the holdings of their funds in their semiannual report, these holdings change more often. Consequently, regular mutual funds are less transparent than ETFs.

Despite their many advantages, there are some disadvantages associated with ETFs. First, the ETF price is determined by the supply of and demand for ETF shares, not by the underlying net asset value. Consequently, investors may purchase ETF shares at a premium or discount relative to their net asset value. Another disadvantage of ETFs is that they may exhibit a tracking error relative to the index they have been designed to track. The main reason for this is that ETFs only pay dividends out on a quarterly basis, while the stocks in the ETF may pay dividends throughout the quarter. Thus, the ETF may hold cash temporarily even though the underlying index does not contain cash.

Depending on the type of ETF, there can be additional disadvantages. For example, there is market risk resulting from the fluctuation of market prices of securities, credit or default risk resulting from the inability of borrowers to make interest or principal payments on debt securities included in an ETF, and there is interest rate risk for bonds.

5.5 The Current State of ETFs

ETFs are continuing to grow, and new products are constantly being developed. However, the recent volatile market has had an impact on ETFs. On November 3, 2008, the *Wall Street Journal* reported that total ETF assets shrank from \$620 billion at the end of 2007 to \$440 billion at the end of October 2008. Moreover, although 25 ETFs were launched in the third quarter, 43 ETFs were shut down so far in 2008.

Nonetheless, new innovations in the ETF market keep emerging. On November 19, 2008, the *Wall Street Journal* reported that several ETF managers are developing target-date ETFs to capture a portion of the 401(k) market. These funds are directing specific allocation to stocks and bonds as workers approach retirement. Among the managers that have developed these types of funds are Barclays, Amerivest Investment Management, and XShares Advisors.

Also developed by Barclays in 2006 were so-called exchange-traded notes (ETNs). Unlike ETFs, ETNs are debt securities that are classified as structured products. Their main advantage relative to ETFs is tax-related, since ETNs are treated as prepaid contracts. As such, the difference between the purchase price and sale price is taxed as a long-term capital gain, whereas any ETF

distributions are made on an annual basis. Another advantage of ETNs relative to ETFs is that they allow investors to invest in less-accessible commodities like oil and, particularly, Indian stocks.

Another recent development in the ETF market is active management. In February 2008, the SEC approved the first actively managed ETFs. The introduction of active management within the ETF universe has the potential of directly competing with actively managed mutual funds and hedge funds.

5.6 Research Related to ETFs

Since ETFs have only been around since the early 1990s, the research on exchange-traded funds is relatively limited. Nevertheless, some research has already been conducted using both domestic and foreign ETFs. The primary areas of research focus are (1) the pricing of ETFs, (2) the tax and operational efficiency of exchange-traded funds, and (3) international diversification benefits of using ETFs.

Pricing of ETFs

Partly due to their tax and operational efficiencies, ETFs have become very attractive in recent years. Bansal and Somani (2002) offer a review of the advantages ETFs can provide investors. Berkman et al. (2005) investigate the execution costs and the impact of trade size for stock index futures and find that spreads in the stock index futures market are small compared to stock markets and that trades in stock index futures have only a small permanent price impact. These findings offer one possible explanation for the success of equity index products like ETFs.

Generally speaking, domestic ETFs seem to be priced in correspondence with the NAV of the underlying assets. Research by Engle and Sarkar (2006) indicates that domestic ETFs exhibit very small and transient premiums or discounts, lasting only several minutes and averaging only about 15 basis points. This indicates that the arbitrage process leads to efficient pricing in the domestic ETF market. Indeed, it appears that ETFs have become so popular that the elimination of an exchange-traded fund can have serious consequences for the stocks comprising the underlying index. For example, Biktimirov (2004) examines the effect of demand on stock prices by analyzing the conversion of the TIPs 35 and TIPs 100 ETFs into the i60 Fund, which occurred at the Toronto Stock Exchange in 2000. As a result of this conversion, 40 stocks that were not members of the new units of the i60 fund were sold to complete the conversion. Biktimirov finds that the resulting decrease in demand produced a permanent stock price decline, accompanied by significant abnormal trading volume.

Conversely, inclusion of stocks in an ETF appears to improve their liquidity. Richie and Madura (2007) find that the liquidity of the underlying stocks in the QQQ improves following its creation. Madura and Ngo (2008) find that there are positive and significant valuation effects for stocks in response to the inception of ETFs. Specifically, the authors find an increase in the included stocks' trading volume, which is especially pronounced for relatively small stocks with low liquidity and is contained within relatively large ETFs.

Besides a price impact on the underlying stocks, ETFs may also contribute to price discovery. Hasbrouck (2003) investigates price discovery in the U.S. equity index market. He finds that price discovery for the S&P MidCap Index is shared between regular futures contracts and ETFs and that the S&P 500 index contributes markedly to price discovery in sector ETFs. Related to this is the study by Chou and Chung (2006) which finds that after decimalization of ETFs in 2001, ETFs started to lead index futures (which continued to be priced in their original tick sizes) in the price-discovery process. Tse et al. (2006) find that multi-market trading on exchanges and ECNs leads to greater price efficiency. Likewise, Nguyen et al. (2007) find that multi-market trading leads to a decline in trading costs and does not harm price efficiency.

Tax and Operational Efficiency of Exchange-Traded Funds

One important characteristic of exchange-traded funds that distinguishes them from their mutual fund counterparts is their tax characteristics. ETFs are considered very tax efficient, as shares do not need to be sold to fund cash redemptions. This is because shares are only created and redeemed via in-kind share contributions and redemptions. These redemptions can be accomplished tax free for the ETF. Poterba and Shoven (2002) compare the pretax and after-tax returns on the SPDR trust and the Vanguard Index 5000 fund. Results suggest that between 1994 and 2000, the before- and after-tax returns on the SPDR trust and this mutual fund were very similar. Both the after-tax and the pretax returns on the fund were slightly greater than those on the ETF. These findings suggest that ETFs offer taxable investors a method of holding broad baskets of stocks that deliver returns comparable to those of low-cost index funds. Bernstein (2004) compares the tax efficiency of ETFs, open-end mutual funds, and closed-end mutual funds and concludes that it is difficult to make a generalization about the tax efficiency of the various types of funds. Dellva (2001) finds that transaction costs limit ETF attractiveness for small investors, but that in-kind creation and redemption processes provide the ETFs with significant tax efficiencies. Dellva also finds that tax deferred, long-term retirement investors have little or no advantage in using ETFs as opposed to traditional mutual funds.

Gastineau (2004) directly compares the operational efficiency of ETFs with conventional mutual fund competitors. He finds that the ETFs for the Russell

2000 index and the Standard & Poor's 500 Index have underperformed their most comparable conventional mutual fund competitors. Gastineau argues that the reason for this underperformance is due to the inability of ETF managers to reduce transaction costs embedded in the index modification process (also see Blume and Edelen [2008]), since they have to wait until the end of the trading day to know what creations or redemptions will occur. Conversely, conventional mutual fund managers try to anticipate upcoming changes in indexes in order to perform modifications by trading at a better time.

International Diversification of ETFs

Khorana et al. (1998) examine changes in discounts and trading volume on closed-end funds around the introduction of international iShares and find that the iShares' performance is similar to that of closed-end funds in the 6-month period following the introduction of the iShares. Furthermore, the authors find that closed-end country funds experience a decrease in trading volume and an increase in discounts from net asset value following the introduction of the iShares. These studies suggest that ETFs may provide a more effective, low-cost strategy of diversifying internationally than CEFs. However, Jares and Lavin (2004) find that nonoverlapping trading hours between the U.S. and the Japanese and Hong Kong markets cause deviations between the iShares for those markets and the value of the underlying securities. Moreover, these deviations are positively related to subsequent ETF returns and therefore may create profit opportunities.

Patro (2001) investigates the announcement effect of listing 17 international iShares on the returns of the corresponding market index returns and closed-end fund premiums. The author finds a positive market reaction for the market indexes and a decline in the premium for closed-end funds. Another study investigating ETFs is that by Olienyk et al. (1999), who utilize these exchange-traded funds to investigate the cointegration across 18 countries and find that substantial cointegration exists. They also utilize closed-end funds to investigate the existing cointegration. Pennathur et al. (2002) find that international iShares do replicate the foreign index but also have a high degree of U.S. market exposure. Consequently, the potential for diversification is limited. The present study therefore extends this previous literature by comparing the risk and return performance of closed-end country funds, which represent another potential diversification method, and ETFs.

Harper et al. (2005) compare the risk and return performance of exchange-traded funds (ETFs) available for foreign markets and closed-end country funds. They utilize 29 closed-end country funds (CEFs) for 14 countries over the sample period from April 1996 to December 2001. The performance proxies are mean returns and risk-adjusted returns. Results indicate that ETFs exhibit higher mean returns and higher Sharpe ratios than foreign closed-end funds,

while CEFs exhibit negative alphas. This indicates that a passive investment strategy utilizing ETFs may be superior to an active investment strategy using CEFs. Moreover, research by Lin, Chan, and Hsu (2006) indicates that the pricing of a specific foreign ETF – the Taiwan Top 50 Tracker Fund designed to mimic the Taiwan 50 Index – closely corresponds to the underlying index.

For international ETFs, the pricing seems to be less efficient than for domestic ETFs. Simon and Sternberg (2005) investigate whether European iShares overreact to development after the close of European trading and find that deviations from NAVs overpredict and lead to next day iShare price reversals that average roughly three-eighths of the size of the deviations. Similarly, Richie and Madura (2006) find that the overreaction of ETF losers is more pronounced for informed events following extreme price decreases. They conclude that particular market conditions can signal that a prevailing large change in the price of an ETF is due for a correction. Engle and Sarkar (2006) also find that international ETFs exhibit greater and less transient deviations from NAV than domestic ETFs, which the authors attribute to the higher cost of creating and redeeming international products. More specifically, Ackert and Tian (2008) find that country ETFs deviations from NAV exhibit large positive autocorrelations in fund premiums, which is related to momentum, liquidity, and size effects. DeJong and Rhee (2008) find that this mispricing can be exploited. Specifically, investigating 17 international iShares, the authors find that contrarian returns can be maximized over a 1-day formation and holding period, while momentum returns can be maximized over a 20-week formation and holding period.

Complementing the studies in the previous paragraph, Tse and Martinez (2007) find that international ETF trading in U.S. markets is driven by information released during each local market's trading session and not during the U.S. trading session. Cheng et al. (2008) also find that the iShares TSE/Xinhua China 25 Index is priced primarily according to events in the Hong Kong home market.

Despite the studies listed above, Miffre (2007) argues that ETF cost and tax efficiency, combined with low tracking errors and the ability to sell ETFs on downticks, render country-specific ETFs a superior alternative to global index open- or closed-end funds in terms of efficiency gains.

Chapter 6

Hedge Funds: Issues and Studies

Abstract This chapter provides an overview of the characteristics of hedge funds and the academic literature on them. By limiting their investors and their marketing efforts, hedge funds are exempt from most of the major securities acts adopted by the United States over the past 75 years. Because disclosures by hedge funds are voluntary, there exist serious challenges to those who analyze hedge fund performance results and trading strategies. Some of the interesting findings about these funds are as follows: (1) Many hedge funds undertake significantly more aggressive/risky trading strategies than those adopted by other investment companies; (2) the contingent incentive fee structure employed by hedge funds can lead to significantly more income for their managers than managers of other investment companies per dollar of performance; (3) the after-fee performance of hedge funds does not appear to be significantly different from that of other investment companies; and (4) there is no conclusive evidence that hedge funds have exacerbated (or caused) any of the significant worldwide financial crises during the past 25 years.

Keywords Hedge fund · Fee structure · Contingent incentive fees · Survivorship bias · Performance persistence · Contagion · Risky trading strategies

6.1 History

The first widely cited article about hedge funds, “The Jones Nobody Keeps Up With,” was written by Carol Loomis and appeared in *Fortune* in April 1966. This piece highlighted the outstanding returns earned by investors in the fund managed by Albert Winslow Jones, which had been in existence since 1949. Not surprisingly, an article that highlights rates of return that consistently exceeds those of the most successful mutual funds got the attention of the investing community. There was a virtual explosion in the formation of this type investment company. However, before proceeding with this brief history, an overview of two important, distinguishing features of hedge funds is appropriate.

Hedge funds are limited partnerships that are not subject to regulation under the Investment Company Act of 1940. This exemption is obtained by limiting the number of investors to 100 or, subsequent to 1996, to investors who are “qualified,” as discussed below. This attribute establishes *prima facie* evidence for treating an investor as informed and sophisticated and therefore not in need of the protections offered by the Act of 1940. Another distinguishing attribute of hedge funds is that the management of the fund receives a portion of the total return earned by the fund (e.g., 20% of the total return, plus a regular management fee based on the net assets of the fund). Such a fee structure proved to be most appealing to many in the industry.

As noted in the 1999 article “The Performance of Hedge Funds: Risk, Return, and Incentives” by Akerman, McEnally, and Ravenscraft (AMR), over 40% of the open-end investment companies formed in 1968–1969 adopted various incentive fees. However, this prompted a predictable regulatory response in the 1970 amendment to the Investment Company Act of 1940, which requires the performance-based fees of regulated investment companies to be symmetric. AMR report that incentive fee structures were present in about 10% of all open-end funds by 1972, and that this fell to less than 2% of all open-end funds by 1995.

Nonetheless, the initial explosion in the creation of hedge funds was quickly dampened by the dismal investment environment in the United States resulting from the end of the 1969 bull market and the oil price induced recession of 1973–1974. However, interest in hedge funds was rekindled with an article by Julie Rohrer entitled, “The Red-Hot World of Julian Robertson,” that appeared in the May 1986 issue of *Institutional Investor*. The Robertson-led Tiger Fund was reported to have earned an average return of 43% (above expenses and incentive fees) over its 6-year life.

The 1980s was a period of substantial primary market activity and rapidly rising securities prices, and there ensued another flurry of hedge fund formation. Such an environment was ripe for financial shenanigans, many of which occurred, and a number of perpetrators were caught and sentenced with much fanfare and disgust. During this period most hedge funds flew under the radar while the strategies employed by these funds proliferated. By the early 1990s it is thought that the industry had grown to nearly 1,000 funds.

In 1992 the financial world was riveted by news that the Quantum Group of Funds (managed by George Soros, “the man who broke the Bank of England”) earned as much as US \$1.8 billion by shorting the British pound and going long the Deutschmark. However, several years later, this event was overshadowed by the dramatic collapse of the Russian ruble, which led to a US \$2 billion loss by the Quantum Group, and which led to the Federal Reserve-orchestrated bailout of Long-Term Capital Management after its US \$4 billion loss.

Long-Term Capital Management had been started in 1994 by John Meriweather (former head of Solomon Brother’s bond trading unit), and its managers included Nobel laureates Myron Scholes and Robert Merton. Ultimately, the positions of Long-Term Capital Management were liquidated,

reportedly at a small profit to those who participated in the bailout. The intercession of the Federal Reserve under Greenspan was the topic of much debate, but soon calmed, and a wide-spread contagion was avoided. However, the industry was developing a bad reputation in the general public – aided by the vacuum of public information caused by the lack of reporting.

The past 10 years have seen a significant rise in the academic understanding of hedge funds, due in part to the creation of two sources of industry data: Hedge Fund Research, Inc., and TASS Management Limited. Both groups collect data that is submitted voluntarily by hedge fund operators. A third source of data, Managed Account Reports, comprises annual reports submitted by hedge funds that trade in futures and options. These data sources have been used to address a number of academic and practitioner concerns, and much of this evidence is summarized later in this chapter.

The decline in security prices that has accompanied the collapse of the sub-prime mortgage market beginning in 2007 has led to the closing of a number of hedge funds. Save a short-lived requirement that hedge fund operators register as investment advisors (for a 6-month period in 2006), there has been no wide-spread regulation of the hedge fund industry. Their activities remain shrouded from public scrutiny, which occasionally is punctuated by the story of a large speculative gain or loss.

6.2 The Legal Environment of Hedge Funds

The Investment Company Act of 1940 prescribes a variety of reporting requirements for investment companies and regulates their activities. The act was passed to protect small, unsophisticated investors who invest their savings primarily in open-end mutual funds. These mutual funds began accumulating significant assets in the United States after the deep depression of the 1930s. It is almost certain that the framers of the act never anticipated the creation of hedge funds that would be formed from a limited number of wealthy investors. However, by 1949 these funds began to emerge.

Although hedge funds are legally defined as investment companies, their limited-access private statue permits them to operate under two major exemptions from registration under the 1940 Act as set forth in Sections 3(c)1 and 3(c)7. First, there are specific limitations on the number on investors allowed in a fund wherein a “3(c)1 Fund” can have no more than 100 accredited participants, and a “3(c)7 Fund” must register its securities if participants exceed 499 in number. Accredited investors are defined as having a minimum net worth of US \$1 million or a minimum income of \$200,000 for the prior 2 years. Such individuals and/or organizations are assumed to be sophisticated and capable of assessing the risks associated with offerings of unregistered securities. Although it is possible to admit non-accredited investors to a fund, the combined restrictions under the 1940 Act and Regulation D of the Securities Act of

1933 effectively prevent this from happening. In addition to limiting offerings to accredited investors, there must be no organized sales effort; word-of-mouth communication of the offering is permitted.

Originally, hedge funds employed hedging and arbitrage techniques in trading on the corporate equity market. However, over time, selected funds focused on trading in futures or options, and such funds were required to register as a “commodity pool” under the Commodity Exchange Act of 1936. A commodity pool operator at a minimum must report annually to the National Futures Association (created in 1982) and the Commodity Futures Trading Commission (created in 1974). Annual financial statements must be made available to all investors/partners in the hedge fund. Trading in futures and options brings the hedge fund under the antifraud provision of the Commodity Exchange Act and the audit powers of the National Futures Association.

Domestic hedge funds are typically formed as limited liability partnerships; this allows them to avoid the double taxation of profits that would result if they were corporations. However, various tax considerations have encouraged a number of hedge funds to be formed offshore, generally in so-called tax havens such as the Cayman Islands. These hedge funds can be organized as limited liability corporations, but they must rule out the involvement of U.S.-based persons/corporations in order to avoid tax reporting requirements in the United States. There are numerous other tax issues concerning the participation of U.S.-based investors in offshore related investments which are beyond our focus.

As limited liability partnerships, hedge funds generally have two classes of partners: limited liability partners (e.g., the investors), and full liability partners, who are usually the managers of the fund. Under current tax law, income inferred to the limited liability partners is treated as ordinary income for tax purposes. Should the hedge fund become insolvent or bankrupt, the exposure of limited partners is limited to their invested capital. In contrast, general partners face potentially unlimited liability from the fund’s investment activities. However, they can limit their liability via the use of a corporation or limited liability company. Nonetheless, general managers are subject to the anti-fraud provisions of the federal securities laws.

6.3 Distinguishing Operational Features of Hedge Funds

In addition to a lack of regulations, hedge funds differ from other investment companies in several important ways. First, hedge funds routinely lock-up the investment of limited liability partners for a significant period of time, usually 6 months to as much as 3 years. This puts hedge funds somewhat in the middle of open-end funds, which provide investors with a virtually unconstrained ability to redeem their shares for cash at NAV, and closed-end funds, which provide no put options to their shareholders. However, the shareholders of closed-end funds can sell their shares to other investors in the market; whereas hedge fund ownership is illiquid.

Second, hedge fund managers receive a contingent incentive fee, in addition to a management fee based on the net assets of the fund, the latter of which generally exceeds the management fees earned by open-end fund managers. The incentive fee is calculated as a percentage of the fund's net returns, and may be subject to a hurdle rate or high-water mark provision. With the former, the performance fee is paid only on returns in excess of some hurdle rate, such as some variable index. With a high-water mark, a hedge fund must recover any losses (return to the last high-water mark) before incentive fees can be charged. The impact of this fee structure on managing partner behavior has been the topic of intense academic research interest.

Lastly, hedge funds have generally taken advantage of their unregulated nature to engage in and adopt investment strategies that are more speculative than their regulated open-end and closed-end counterparts. For example, while open-end and closed-end investment companies are permitted to borrow, the amount of leverage is limited; whereas in theory, hedge funds can employ an unlimited amount of leverage.¹ Also, hedge funds actually engage in aggressive activities, such as short-selling, that many open-end and closed-end funds retain the right to do, but in practice do not.

6.4 Review of Selected Academic Articles

Fung, William and David A. Hsieh. "Empirical Characteristics of Dynamic Trading Strategies: The Case of Hedge Funds." *The Review of Financial Studies* 10.2 (Summer 1997): 275–302.

This appears to be the first article that empirically investigates the behavior of hedge funds. The authors initially employ a Sharpe multi-factor model to investigate the behavior of hedge funds' returns relative to the "style" factors of open-end funds.

With the model, they replicate the work of Sharpe with an updated sample containing 3,327 open-end funds. Fund returns are regressed against eight different return indices: three equity series, two bond series, and three other factors (the 1-month Eurodollar deposit rate, the price of gold, and a trade-weighted U.S. dollar index). Results are similar to those previously reported: 47% of the open-end funds have R^2 greater than 0.75, and 92% have R^2 greater than 0.50.

¹ As stated by Franklin Edwards in his seminal work "Hedge Funds and the Collapse of Long-Term Capital Management": "It is hard to imagine a greater misnomer than 'hedge fund,' since hedge funds typically do just the opposite of what their name implies: they speculate." Nonetheless, many hedge funds are not as leveraged as other financial institutions, as evidenced by the Report of the President's Working Group on Financial Markets concerning Long-Term Capital Management in which they state, "This issue [leverage] is not limited to hedge funds; other financial institutions are often larger and more highly leveraged than most hedge funds."

The authors then repeat the analysis with a sample of 409 hedge funds. They report that nearly half of the hedge funds have R^2 less than 0.25, and that 25% have negative betas. They argue that this evidence is consistent with the hypothesis that hedge funds employ different styles than open-end managers, and that the low R^2 indicates that hedge fund managers change their trading strategies. Thus, hedge fund managers undertake dynamic trading strategies; whereas most open-end fund managers engage in buy-and-hold strategies.

Next they employ a factor model to identify statistically important dimensions in hedge fund returns. The factors are identified as: value, systems/opportunistic, global/macro, systems/trend-following, and distressed. The authors regress these factors against the eight open-end style factors and find that the overall explanatory power of the eight style factors is incomplete. They add additional factors that are designed to capture the returns from highly levered trading strategies, from the use of options, and from a junk bond return index. The resulting 12-factor model explains a much higher proportion of hedge fund returns than the open-end eight-factor style model.

Finally, the authors address the question of survivorship bias. Because hedge funds voluntarily register their results, the estimation of attrition is difficult. However, they estimate the yearly rate of attrition to be between 4.3 and 8.6%. They argue that this compares to rates previously reported for the open-end fund industry by Grinblatt and Titman (1989).

The authors conclude that hedge fund managers' flexibility allows them to combine traditional "relative return" investment approaches from the open-end fund industry with additional strategies to construct "absolute return" investment styles. This produces rates of returns that are empirically unrelated to the standard style factors that drive open-end returns. However, the authors caution that these hybrid styles make hedge funds susceptible to extreme tail results.

Edwards, Franklin R. "Hedge Funds and the Collapse of Long-Term Capital Management." *Journal of Economic Perspectives* 13.2 (Spring 1999): 189–210.

Following the collapse of Long Term Capital Management (LTCM), Edwards met a need by academics and others to understand these relatively obscure investment vehicles. The paper provides an insightful introduction to world of hedge funds and then focuses on the collapse of LTCM. The author's perspective on hedge funds is obvious, as is seen from this opening quote (p. 189): "It is hard to imagine a greater misnomer than 'hedge fund,' since hedge funds typically do just the opposite of what their names implies: they speculate."

The paper presents a brief review of investment company regulations and of how hedge funds have developed as unregulated firms. He discusses the growth of the hedge fund industry and focuses on the attrition rate in the industry.

In turn, three hypotheses are offered for the existence and growth of hedge funds: (1) the low correlation in fund returns with broad market indices, (2) the ability of incentive fees to attract high quality management, and (3) the ability of hedge funds to engage in high-risk strategies which produce high rates of return. While the evidence is limited, Edwards concludes that hedge funds have

achieved historic returns that are virtually uncorrelated with broad indices like the S&P 500. This statistical independence suggests that hedge funds have an economically significant role to play in the diversification of large portfolios.

Edwards is less sanguine about incentive fees' ability to attract highly talented investment managers who can deliver abnormally higher rates of returns to hedge fund stockholders. Likewise, he contends that the evidence of high historic returns as measured with metrics, such as Jensen's alpha, are suspect. He explains that hedge funds engage in novel strategies which are far riskier than traditional empirical measures like beta would suggest.

The author also provides a detailed review of the collapse of LTCM. While stopping short of blaming the fund's management of impropriety, he does suggest that LTCM strategies made them particularly vulnerable to the freak storm that developed in financial markets after the collapse of the Russian economy/stock market. Edwards also addresses the Federal Reserve's intervention into the LTCM case. He argues that the Fed jumped in because capital markets were perceived as particularly fragile after the Russian meltdown, and that Greenspan wanted to halt contagion before it started.

Edwards is particularly harsh on the banking sector. He argues that the banks did not understand the risks that LTCM was taking and over-extended credit at favorable terms, which encouraged more speculation. Further, he argues that the previous success of LTCM encouraged copycat operations and that the collapse of LTCM could have caused a host of other funds to fail. He concludes by making a strong case for the regulation of the industry.

Fung, William and David A. Hsieh. "A Primer on Hedge Funds." *Journal of Empirical Finance* 6.3 (September 1999), 309–331.

This article provides a thorough background on hedge funds and in some respects should be read before the authors' more empirical piece that appeared in the *Review of Financial Studies*. The paper presents a history of hedge funds, reviews the growth of the industry, and discusses contingent fees. They construct a careful review of security regulations in the United States and examine how hedge funds have developed as highly unregulated entities.

The paper provides an early taxonomy of hedge funds investment styles and presents the historic returns generated by funds of various styles. They close with a review of the collapse of Long Term Capital Management.

While much less substantial than their earlier work, this primer has proven to be highly popular with academic authors and has received numerous citations. It is probable that the readable nature of the paper (i.e., few equations or empirics) has made it a popular way to introduce hedge funds into the classroom, to potential new hedge fund shareholders, and to individuals in the investment community.

Ackermann, Carl, Richard McEnally, and David Ravenscraft. "The Performance of Hedge Funds: Risk, Return, and Incentives." *Journal of Finance* 54.2 (June 1999), 833–874.

Ackermann, McEnally, and Ravenscraft expand the early hedge fund literature by conducting an in-depth study of fund return characteristics. The authors' contributions include a treatment of domestic and off-shore hedge funds, a careful investigation of survivorship bias, an analysis of the determinates of hedge fund performance, and an examination of the riskiness of hedge fund strategies. They also provide a brief historical treatment of the industry.

The authors compare the performance of a hedge fund sample for the 8-year period ending December 31, 1995, to two common indices: the S&P 500 and the Morgan Stanly Capital Index of international stock returns. They segregate the funds by style and report that roughly half outperform the indices. Next, the authors compare the performance of hedge funds to open-end mutual funds using a Sharpe ratio and report that hedge funds consistently outperformed their mutual fund benchmarks in the period examined. However, the authors caution that the volatility of hedge funds is significantly higher than the open-end fund benchmarks.

In an effort to determine the source of hedge fund abnormal performance, the authors regress the Sharpe ratios against their descriptive features and their investment style. They employ a variety of return windows (2-, 4-, 6-, and 8-year) and find the Sharpe ratio to be positively and significantly related to incentive fees. Then they replicate the analysis using volatility as the dependent variable, and find the incentive fee to be no longer statistically significant. They conclude from these two tests that incentive fees are associated with extra returns for shareholders – but without the excessive risk that many have warned against.

Lastly, the authors provide an in-depth study of survivorship bias. They were the first to obtain information about whether hedge funds exiting the standard data sets do so voluntarily (stopped reporting) or because they failed. The authors report that the returns of hedge funds that exit data sets are not significantly different from those with complete data. They posit that high-performing hedge funds may choose to discontinue contributing data, thereby offsetting the poor returns one would expect for funds that failed.

Liang, Bing. "Hedge Funds: The Living and Dead." *Journal of Financial and Quantitative Analysis* 35.3 (September 2000), 309–326.

This paper investigates the issue of hedge fund survivorship. The two major sources of data on hedge funds became sensitive to the survivorship bias issue, and beginning in 1994, both began to retain return data for funds that went out of business or quit participating in their sample. Using updated data, Liang reports that the survivorship bias was about 2% per year – much higher than figures reported by Ackerman, McEnally, and Ravenscraft (AMR) just 2 years earlier.

Liang reports that the HFR data base (used by AMR) contains an extremely low survivorship bias of about one-third to one-eighth of the rate reported for open-end funds. In contrast, the TASS database rate is significantly higher at 2.24 versus 0.16% reported for HFR. Liang suggests that this is partly because the TASS database contains more off-shore funds. However, he concludes that

HFR contains a much lower number of dissolved funds and thus significantly over-states returns for the hedge fund industry, especially in the pre-1994 period.

Having established that the HFR set has a significant survivorship bias, Liang shifts his analysis to the TASS database. His empirical evidence suggests that the primary reason for the dissolution of hedge funds is inferior performance. Using Probit regression analysis, Liang finds that younger and smaller hedge funds experiencing poor returns are the most likely candidates to dissolve.

Liang also analyzes the overlap of the two major data sets and finds that they have only 47% of their observations in common. The TASS data set covers a larger set of funds, and it covers the overlap funds longer than the HFR set. Also, the TASS set has more information on the NAV of the funds. Comparing NAV per share, Liang reports the two sets agree on 83.3% of NAV observations. Similarly, Liang reports that management fees differ in 18.1% of cases and that the HFR set systematically reports higher fees. Rounding errors are seen to cause the bulk of the discrepancies in returns between the two sets because of their impact on cumulative returns. Finally, Liang examines the amount of survivorship bias by investment style and determines that the bias by style breakdown in the TASS data set differs substantially from that in the HFR set.

Brown, Stephen J., William N. Goetzmann, and Roger G. Ibbotson. "Offshore Hedge Funds: Survival and Performance, 1989–1995." *Journal of Business* 72.1 (January 1999), 91–117.

In this work the authors investigate the universe of offshore hedge funds for the period 1989–1995. Most of these off-shore hedge funds are registered in so-called tax havens such as the British Virgin Islands, the Bahamas, Bermuda, the Cayman Islands, and Luxembourg. Many of the funds are non-U.S. mirrors of domestic offerings.

Brown et al. report that off-shore funds generally are larger than the average domestic hedge fund, and contend that these funds should be more successful than their domestic counterparts in attracting the best managers. Hence, it follows that the performance of off-shore funds should be better than their domestic rivals.

Surprisingly, the average annual rate of return for off-shore funds during the entire period was 321 basis points below the return on the S&P 500. However, off-shore hedge funds did have substantially less variability in their return series than the S&P 500. Furthermore, the authors report that off-shore funds have an average market model beta of 0.36. This evidence suggests that many off-shore funds engage in risk-neutral trading strategies.

After further investigation, the authors report that there is no empirical relationship between the funds' relative performance measures and the funds' performance fees. While low-fee fund managers comprise about the same number of winners and losers, high-fee fund managers comprise more losing observations than winners.

The authors examine attrition rates in the off-shore hedge fund industry and report that nearly 20% of all funds in the MAR dataset disappear every year. They conclude that the survivorship bias could overstate hedge fund performance by several hundred basis points. They also find that 1995 was a particularly strong year for the S&P 500, but not for off-shore hedge funds.

The authors also examine the persistence of off-shore hedge fund performance and find that early in their sample period, winning years follow winning years. However, the pattern reversed in 1993–1994 and 1994–1995. There are significant differences across the various hedge fund styles – short-selling funds are consistent losers during the sample period of rapidly rising share prices, while funds engaged in market timing strategies generate the best performance figures.

Fung, William and David A. Hsieh. “Measuring the Market Impact of Hedge Funds.” *Journal of Empirical Finance* 7.1 (May 2000), 1–36.

The authors examine the potential role that hedge funds played in major market events: the 1987 stock market crash, the 1992 European Rate Mechanism (ERM) crisis, the 1993 global bond rally, the 1994 bond market turbulence, the 1994–1995 Mexican crisis, and the 1997 Asian currency crisis. In their examination the rates of return to various hedge fund styles are compared with various market return indices.

The authors find evidence that hedge funds were active in the 1992 ERM crisis, the 1993 global bond rally, and the subsequent decline in the bond market in 1994. They conclude that hedge funds might have contributed to the price momentum and variance during these events. However, the authors find the role of hedge funds in the Mexican crisis and the Asian currency crisis was probably not significant.

Brown, Stephen J., William N. Goetzmann, and Roger G. Ibbotson. “Hedge Funds and the Asian Currency Crisis of 1997.” *Journal of Portfolio Management* 26.4 (Summer 2000), 95–101.

Almost contemporaneous with the Asian currency crisis of 1997, there were calls that the speculative activity of hedge funds (in particular George Soros) was either a causal factor or a contributing factor to the crisis. Brown, Goetzmann and Park investigate this possibility but with a significant disadvantage: they can not directly observe the currency positions of the hedge funds. Thus, they employ a Sharpe (1992) returns-based style analysis with currency variables to determine if hedge fund returns “load” on the currency factors, thereby reducing fund exposure. The authors examine returns between 1993 and 1997 for a group of 11 global strategy funds. Although these funds’ total capitalization is small compared to the trading volume in the currencies, their use of leverage could magnify their positions significantly.

The authors report weak evidence that the funds had net negative positions in the Malaysian ringgit. They report that the implied net short positions of the funds were actually declining during the steep decline in the ringgit. Thus, the funds were buying-in their short positions during this time. Such transactions would have helped to curtail the fall in the ringgit rather than to contribute to it.

The authors take a special interest in the hedge funds managed by George Soros. His successful speculation on the pound made him an obvious suspect in the serial devaluation of many East Asian currencies. However, they find that Soros' funds essentially broke even during the currency crisis. The authors contend that it was the capital flight of Malaysian investors (an outflow twice the size of the market capitalization of the hedge funds) that was most responsible for the collapse of the ringgit. The data fail to support the claims of some government officials that hedge funds were causal agents in the Asian currency crisis. The authors conclude that hedge funds could possibly benefit from greater transparency.

Asness, Clifford, Robert Krail, and John Liew. "Do Hedge Funds Hedge?" *Journal of Portfolio Management* 28 (Fall 2001), 6–19.

The authors of this paper explain that hedge funds often hold portfolio positions that can not easily be marked-to-market. Many of these assets are valued with stale prices which can smooth their volatility and thus the volatility in the hedge funds' reported returns. To study this issue, the authors examine a fund sample for the period January 1994 to September 2000. They report that, except for dedicated shorts and futures hedge funds, all of the fund classes report strong excess returns (see a truncated version of their Table 6.1):

Table 6.1 Summary statistics

Portfolio	Excess returns	Standard deviation	Sharpe ratio	Correlation with S&P 500
Aggregate hedge fund index	8.0%	10.0%	0.80	0.52
Convertible arbitrage	5.4	5.1	1.07	0.13
Event driven	7.0	6.7	1.05	0.60
Equity market neutral	6.4	3.5	1.85	0.48
Fixed income arbitrage	1.6	4.4	0.36	0.08
Long/short equity	11.8	12.6	0.94	0.62
Emerging markets	2.3	20.8	0.11	0.50
Global macro	7.7	14.4	0.54	0.36
Managed futures	−1.2	11.1	−0.10	0.01
Dedicated shorts	−7.1	18.6	−0.38	−0.76

The authors use a market model (S&P 500) in order to estimate alphas and betas. While the R^2 s are frequently low, the performance measures (alphas) are very different from the excess return measures of performance. For example, the Dedicated Short funds have an average beta of -0.99 and thus, their estimated alpha is $+7.34\%$ (as opposed to -7.1% using excess returns).

The authors then estimate a variety of lagged betas, which is a standard method for estimating the riskiness of illiquid assets. They find strong evidence that the lagged betas are statistically significant, both individually and summed.

In general, adding the contemporaneous betas with the lags has the effect of increasing contemporaneous betas (the positive become more positive; the negative become more negative).

It follows that abnormal performance measures (alphas) re-estimated with a market model that employs the summed lag betas will decrease. In the presence of lagged betas the hypothesis that hedge funds deliver positive abnormal returns is not supported by the data. The authors then demonstrate that hedge funds exhibit significantly different “up market” betas from “down market” betas. However, making standard adjustments for estimating the riskiness of illiquid assets, the authors find that abnormal returns evaporate. They conclude that the smoothing effect of illiquid securities on fund returns provides management with the discretion to report valuations that some wryly refer to as “marketing supportive accounting.”

Agarwal, Vikas and Nayaran Y. Naik. “Multi-Period Performance Persistence Analysis of Hedge Funds.” *Journal of Financial and Quantitative Analysis* 35.3 (September 2000), 327–342.

Hedge funds routinely restrict the ability of investors to withdraw their funds until a minimum period passes. While there is considerable variance across the universe of known hedge funds, the most common lock-up period is 2 years. Agarwal and Naik examine the hypothesis that hedge fund managers make use of the restricted liquidity of invested funds to adopt trading strategies that yield significant multi-period returns. Specifically, the authors test the hypothesis that “wins” are followed by “wins” at a rate greater than would be suggested by chance.

The authors note that Hedricks, Patel, and Zeckhauser report in “Hot Hands in Mutual Funds: Short-Run Persistence of Relative Performance 1974–1988” that open-end fund managers who win in one period are more likely to win in the subsequent period. These “hot hand” open-end fund managers appear to deliver higher returns for about 2 years.

In order to test the hot hand hypothesis for hedge funds, the authors employ two measures of abnormal returns: Jensen’s alpha and the appraisal ratio (alpha standardized by the fund’s residual standard deviation) constructed from their sample of hedge funds. A fund is deemed to have won when its performance measures exceed the median funds’ return in the period. This opens the possibility that some styles of hedge funds might achieve more persistent positive (negative) returns than others.

The authors use non-parametric statistics to test the frequency of funds that win-win, win-lose, lose-win and lose-lose to determine if it differs from chance. They examine three different performance periods: quarterly, semi-annually, and annually, from 1982 through 1998. They find that the most compelling case for performance persistence is on a quarterly basis with pre-fee income. There is virtually no persistence found in yearly returns.

Brunnermeier, Markus K. and Stefan Nagel. “Hedge Funds and the Technology Bubble.” *Journal of Finance* 54.5 (October 2004), 2013–2039.

In this work the authors investigate hedge fund behavior during the technology bubble involving Internet stocks, which predominantly traded on the NASDAQ between 1998 and 2000. They discuss Ofek and Richardson's work, "The valuation and market rationality of internet stock prices," which estimates that at its peak, the Internet sector was priced as if the *average* rate of future earnings growth would grossly exceed the rates historically achieved by the fastest growing firms in the segment. The authors argue that by any standard, the pricing of Internet stocks into the spring of 2000 was a bubble.

They note that in an efficient market, price bubbles cannot persist. This result is obtained by assuming that rational investors will short (go long) over-priced (under-priced) stocks and earn abnormal returns when rationality returns and the shares fall (rise) in value. However, the authors note that there are theoretical papers that suggest that bubbles might persist in the presence of informed and rational investors if: (a) they are reluctant to trade against mispricing, and/or (b) they are uncertain about the behavior of other informed investors. These theoretical works suggest that informed investors might attempt to ride a bubble and earn abnormal returns – even if they believe asset prices are too high.

Brunnermeier and Nagel obtain portfolio data from the 53 hedge funds with assets in excess of \$100 million that were required to file with the SEC each quarter during the Internet stock bubble. The authors report that as a group, hedge funds were relatively small players in the overall market at that particular time, as less than 0.3% of the market value of all shares was held by hedge funds.

The authors compare the proportion of hedge fund assets invested in high price/sales (p/s) stocks to their weight in the CRSP index. They report that in September 1998, hedge funds held about 29% of their assets in high p/s stocks, compared with a 17% weight in the CRSP value-weight index. Over the following 6 months, the value of NASDAQ high p/s stocks rose by 100%.

As the Internet bubble burst, hedge funds reduced their investments in high p/s stocks to virtually the same level as that in the CRSP index. In short, the sampled hedge funds loaded up on Internet stocks just before they took off, and then started to liquidate their holdings as their prices started to plummet. This good timing in the high p/s segment was not matched by abnormal returns in other market segments. The major difference between hedge funds and open-end funds appears to be the exaggerated degree to which hedge funds were willing to jump into the Internet sector when they anticipated its rising.

The authors examine the holdings of several important hedge funds and find that they followed different Internet stock strategies. The Tiger Funds were unwilling to bet on over-priced Internet stocks, and their relatively poor performance led to massive withdrawals from the fund while the NASDAQ soared. Conversely, the Soros fund ratcheted up their holdings in high p/s stocks from less than 20% to over 60% by the third quarter of 1999. The Soros' fund booked enormous profits, but then watched withdrawals soar as the NASDAQ market soured.

Agarwal, Vikas and Nayaran Y. Naik. “Risk and Portfolio Decisions Involving Hedge Funds.” *The Review of Financial Studies* 17.1 (Spring 2004), 63–98.

Agarwal and Naik take a close look at the return series reported by hedge funds in an effort to better understand their strategies and risks. The authors fit a piecewise linear function to hedge fund returns and find that it explains a higher proportion of variance than a simple linear regression. This suggests a non-linear, option-like payoff for many hedge fund strategies.

Their finding is in line with the observation that hedge fund managers engage in more complicated strategies than do open-end fund managers (who are frequently characterized by buy-and-hold strategies with adjustments). These complex strategies do not map well into a single index market model. Part of the appeal that hedge funds appear to offer large investors is the independence of their returns. However, Agarwal and Naik suggest that the low R^2 (statistical independence) is due to poor modeling rather than the nature of fund returns.

The authors then use a multi-factor, two-step and find that including return series from both at-the-money and out-of-the-money puts and calls on the S&P 500 adds explanatory power. Also, employing return series from small firms, commodities, the trade-weighted value of the dollar, and various international return indices, adds explanatory power.

They conclude that non-linear return models suggest that investors in hedge funds are exposed to statistically greater chances of extreme returns. Whether such extreme event risk will undermine the long-term viability of hedge funds is still to be seen. Nonetheless, many hedge funds also exhibit substantial market (beta) risk.

Brown, Stephen, William Goetzmann, Bing Liang, and Christopher Schwarz. “Mandatory Disclosure and Operation Risk: Evidence from Hedge Fund Registration.” *Journal of Finance* (forthcoming).

For a brief time in the 1990s, hedge funds were required to register with the SEC under the proviso that they were investment advisors. Taking advantage of this public information, Brown et al. test the potential value and materiality of funds’ operational risks and conflicts of interest.

Filing investment advisers must complete a Form ADV with the SEC. Among other things, funds must disclose items that allow investors to assess the risk of fraud and whether the funds have adopted appropriate compliance controls. About 16% of the 2,299 funds in their sample indicate at least one legal or regulatory problem.

The authors find that “problem” funds have lower mean returns, Sharpe ratios, and appraisal ratios than “non-problem” funds. In addition, problem funds are more likely to have external relationships than non-problem funds. These external relationships, such as manager relationships with brokers, dealers, banks, or insurance companies, etc., present the possibility of conflict of interest. They also find that problem funds have smaller relative fund inflows than non-problem funds.

External debt has long been argued to reduce agent problems. Not surprisingly, problem funds exhibit lower debt ratios than non-problem funds. This suggests that lenders are able to assess the operational risks that problem funds present and thus limit their financial commitments. Similarly, the authors find that a dominant investor is likely to keep agency issues to a minimum, and that problem funds are less likely to have a controlling shareholder than are non-problem funds. They conclude that operational risks are correlated with conflicts of interest, thus making the disclosure (especially of the conflicts) desirable.

6.5 Summary of Empirical Findings

Fees and Returns

Perhaps the most probed aspect of hedge funds is their fee structure. Of particular interest is whether the large and contingent nature of fees has led to positive abnormal performance. As a reminder, open-end funds risk-adjusted returns fail to match the returns that one would earn from a buy-and-hold strategy from a broadly diversified portfolio. The evidence for hedge funds is that fees are negatively associated with net returns. Thus, increasing the earnings potential to managers through higher contingent fees or management fees based on the NAV of the hedge fund does not appear to attract better management.

Also, adjusting hedge fund performance for risk proves to be a particularly daunting task because many funds make extensive use of options, futures, and other strategies that defy a simple beta-like risk measure. Hence, some authors have resorted to complex multi-factor models in order to control for risk. Overall, findings show that expense and incentive fee-adjusted hedge funds' returns are not abnormal and that any excess returns are generally strategy and event-period specific.

Survivorship Bias and Performance Measurement

Measuring the performance of hedge funds is complicated by the fact that funds voluntarily submit data to one or more clearinghouses. Research demonstrates that a pronounced inflation of returns can result if survivorship bias is not addressed. This bias is significantly larger for the TASS data set which includes more offshore funds than the Hedge Fund Research, Inc. data set, and it can be as much as 3% per annum.

The disappearance of funds from hedge fund data bases has been the topic of significant research. Findings indicate that disappearing funds close down and distribute their funds to their investors; they do not just stop reporting. Reasons for hedge fund exits are numerous, but the most common appear to be poor

performance, diminished economies of scale because of poor performance or withdrawals, and personal reasons, such as retirement of the managing partner(s).

While much has been said about the high failure rate of hedge funds compared to open-end funds, a word of caution is appropriate. It is common knowledge that open-end fund families seed a number of funds that follow different strategies and that employ different managers. The family tracks the performance of these non-public funds, sometimes for several years, before deciding to offer a fund publicly. Only the strongest performers are then marketed. Thus, while the failure rate of public open-end funds is relatively small, this rate fails to capture the impact of internally closed funds that never see the public.

Incentive Fee Structure and Risk Taking Behavior

The fact that most hedge funds can not collect an incentive fee unless the fund's NAV is at or above any previous close means that trading losses can significantly reduce the amount of fee income earned by the managing partners/investors. If post-loss returns are modest, the hedge managers may not collect incentive fees for several years.

Some researchers have been concerned that underwater (NAV below high-water mark) fund managers will engage in even riskier trading strategies in order to enhance the probability of receiving incentive fees in the future. However, empirical evidence does not support this concern, as managers do not appear to significantly shift their portfolio risk metrics after they are underwater. This may be due to the significant amount of personal wealth that the managers often have at risk in the fund.

Hedge Funds Contribution to a Larger Portfolio of Investments

While the ability to invest in hedge funds is limited to extremely large investors, these need not be private individuals. Increasingly, a number of organizations such as pension funds, not-for-profit corporations (like university endowment funds), and other corporations, are using hedge funds in conjunction with more traditional investments to meet their own objectives. While adjusting hedge fund returns for their risk has proven to be daunting, these funds do appear to make positive contributions to a larger portfolio of traditional securities.

Performance Persistence

Recent evidence suggests that hedge funds achieving abnormal positive performance are likely to continue to earn positive alphas in future periods.

Furthermore, hedge fund managers with hot hands are more likely to experience significant inflows of new monies than are managers with negative performance. These results are not particularly surprising, and they mirror results reported for open-end investment companies. The results suggest a two-edged sword: those who have the hot hand tend to grow more rapidly than their open-end colleagues, but they shrink faster than their open-end colleagues if their hand goes cold.

Trading Strategies and Contagion

Because hedge funds often adopt extremely aggressive strategies, they are frequently at the center of attention when there is a spike in securities prices, either up or down. Some reported successes involve hedge fund bets against a single currency or market after which the currency or market collapsed in value, leading to a very large profit for the hedge fund. This has led many individuals in government, in the press, and in academia to suggest that hedge funds create the crises from which they ultimately profit.

However, the academic evidence does not support the hypothesis that hedge funds can manipulate markets whereby they earn large returns at the expense of small investors. Admittedly, returns to individual hedge funds can at times be spectacular in a short period of time. Nonetheless, industry assets are small compared to the total market, and while their positions may be highly leveraged, there is no conclusive evidence that the tail is able to wag the dog for its own profit.

Appendix A

Investment Company Act of 1940: Selected Topics

Management Guidelines

Corporate Entity: The Act of 1940 requires that an investment company be a domestic corporation or a domestic entity taxed as a corporation. This provision rules out personal holding companies trying to qualify for the “favorable” tax treatment of income within the act. Further, the company must be registered at all times during the entire taxable year as a management company or a unit investment trust as defined by the act.

Management Contracts: The investment management franchise cannot be sold to another entity once the company has been chartered. Removal of the investment management contract from the sponsor is possible, provided the motion receives a favorable vote from the shareholders. The investment managers are strictly prohibited from any self-dealing with the firm. In essence, these provisions commit management to a “long-term” fiduciary obligation to the shareholders and reduce the possibility of fraud by the management team.

Board of Directors: At least 40% of the board of directors must be non-officers or advisors to the company. Investment brokers or the company’s regular brokers may not constitute a majority of the board. These provisions ensure that a majority of the board members are financially independent of the firm.

Investment Policy Guidelines

Income Sources: At least 90% of an investment company’s gross income must be in the form of dividends, interest, and gains from securities. For any taxable year, a maximum of 30% of its profits can be derived from sales of securities held for less than three months, without deducting for losses and including any gains from the short-sale of securities. These provisions ensure that an investment company’s non-investment activities do not significantly contribute to its revenues (although these activities could contribute significantly to its

profitability). The latter provision discourages companies from speculating on short-term fluctuations in security prices.

Portfolio Composition: The Act of 1940 requires that at the end of each quarter during the taxable year the company must: (a) have at least 50% of its assets in cash, cash items (including receivables), government securities, securities of other regulated investment companies, and other securities; (b) limit its investment in any single security to 5% or less of its total assets; (c) not have an investment in any single company that represents more than 10% of the outstanding voting securities of the issuer; (d) limit its investment in the securities (other than government securities or the securities of other regulated investment companies) of any one issuer to 25% or less of the company's total assets; and (e) limit its investment in the securities of two or more controlled companies (20% of the target's voting power constitutes "control") engaged in the same or similar line of business to 25% of the company's total assets. These restrictions prevent an investment company from becoming a vehicle for controlling other firms while retaining its investment company status. In addition, the provisions ensure that the company is primarily investing in financial rather than real assets. The Real Estate Investment Trust Act of 1960 provides guidelines for investment companies that wish to invest in real estate and real estate-based obligations, thus allowing the creation of REITs.

Investment Policy Statement: Upon the initial organization of a fund, or the effective date of the Act of 1940 for existing funds, investment companies must provide a statement of their investment policies. That statement addresses in general terms the kinds of financial assets the company will invest in, the kinds of risks that will be undertaken, the use of leverage, etc. Once in place, an investment policy cannot be changed unless voted on by the firm's shareholders. Clearly the major purpose of a policy statement is to help potential investors more accurately assess the kinds of risks they would encounter by investing in the firm's shares.

Capital Structure Guidelines

Minimum Equity Capital: If the firm desires to make a public offering of its common shares, it must have at least \$100,000 equity capital. Any public offering must be accompanied by a prospectus that discloses the information required by the Act of 1940.

Senior Security Limitations: An investment company's funded debt must be covered by at least three times total assets. Preferred stock issued by the company must be covered by at least two times total assets. A large margin of safety for senior security holders is thus created, should the investment company be forced into receivership or bankruptcy.

Tax Policies: Perhaps the most important section of the Investment Company Act of 1940 involves the treatment of taxable income. To retain

investment company status, the fund must distribute as taxable dividends no less than 90% of its net income, exclusive of capital gains. Under the 1950 amendments, dividends from one year may be paid in the following year but may not be declared later than the due day of the company's tax return or paid later than the first regular dividend date after declaration. If the company meets these provisions, its net income, exclusive of capital gains, is not taxed at the company level and thus, the company remains a passive "conduit" of investment income between the investors and the investments. Dividends received by the investor are treated as taxable income.

To remain untaxed at the company level, all (not 90%) capital gains must be distributed to shareholders in the same way as net interest and dividend income. Sub-chapter M of the Act of 1940 permits the company to retain recognized capital gains without losing investment company status. Electing to retain the capital gain, however, leads to a capital gain tax liability that is computed at the maximum rate. Although retention is rare, any tax paid by the company would be passed on to shareholders on a proportional basis as a tax credit. Clearly these provisions encourage, but do not require, that the company be a passive conduit of capital gains income to shareholders.

Appendix B

CEF Pricing Issues

Capital Gains and Dividends Factors

Unrealized Capital Appreciation: Many authors argue that investors acquire a built-in capital gains tax liability when they buy the shares of a CEF whose assets are characterized by unrealized capital appreciation. If the company were to realize these gains and distribute them to shareholders, the recipients would pay taxes on them. The higher the potential tax liability, the less an investor is willing to pay for the firm's shares; hence, as unrecognized capital gains rise, the discount of the share price rises relative to the company's NAV.

The following analysis adapted from Malkiel (1977) illustrates this tax-induced relationship. Let V equal the net asset value of the fund; B , the basis for taxing the fund's portfolio; t , the capital gains tax rate for the investor (assumed constant over time); n_z , the number of years over which gains are realized and distributed (assuming equal proportions annually); n the number of years until the shares are sold by the investor; r , the discount rate applied to future cash-flows; and D , the discount justified by the tax considerations.

We begin the example by assuming that the fund sells at a price equal to its net asset value (V). If the fund distributes unrealized appreciation ($V-B$) evenly over time, the present value of the tax payments (PV_{tax}) to be made by the investor is

$$PV_{tax} = t \sum_{i=1}^{n_z} \frac{(V-B)}{n_z(1+r)^i}$$

Assuming that the investor sells the fund shares after n years and the value of the fund's portfolio remains constant, the sales price will be B less any capital gains that are distributed between the present (t) and that date (n_t). The present value of the tax savings created by the capital loss that results from the fund's ex-distribution value at the time of sale being less than the investor's assumed purchase price (which was equal to B) will be

$$PV_{savings} = \frac{t(V-B)}{(1+r)^{n_x}}$$

To the extent that the sale of the shares occurs before the end of the capital gain distribution period (i.e., $n < n_t$), the investor will be faced with a “net” tax liability that should translate into a discount equal to

$$D = \frac{PV_{tax} - PV_{savings}}{V}$$

If the investor holds the shares until the entire capital gain is distributed ($n_x = n_z$), the shares can be sold and the gains will be offset by the ex-distribution decline in share value. In summary, the unrecognized capital gains tax liability argument suggests that closed-end fund discounts should increase as the unrecognized gain ($V-B$) rises, as the discount rate (r) falls, and as planned investor holding periods fall relative to distribution periods (n_x/n_z).

Capital Gain Realization and Distribution Policy: How a company realizes and distributes capital gains may affect the discounts on CEF share prices. Two separate forces concurrently affect the relative attractiveness of the CEF’s shares. First, if the unrealized gains increase discounts as hypothesized above, then a policy of frequently recognizing and distributing capital gains would minimize the unrealized capital gains and reduce the discount. Second, some investors (especially those with high income needs and low tax brackets) may prefer a fund that regularly recognizes and distributes capital gains.

The second argument is similar to arguments that were once made with respect to the desirability of dividend income. This line of thinking led to the pre-Miller and Modigliani belief that dividend policy, devoid of signaling connotations, could influence the value of a firm’s shares. Ignoring taxes, M&M and other financial theorists subsequently demonstrated that dividend policy is irrelevant in a perfect market. In the presence of brokerage costs (or other market frictions), however, cash distributions provide a higher cash-flow than the sale of shares. Thus, a policy of frequent capital gain realizations and distributions in a less-than-perfect market could lower CEF discounts.

Dividend Reception and Distribution Policy: If investors value cash distributions in a less-than-perfect market, the time lag between distribution of dividends and the investors’ receipt of dividends could contribute to a discount on CEF shares. Some CEFs pay out dividends four (or more) times per year; whereas other CEFs make an annual dividend payment. Since money has a time value, infrequent distributions are less valuable to investors, all other things equal. But for an infrequent distribution policy to increase the discount, the return on the “retained” dividends must be lower than either the investors’ potential return or their opportunity costs.

Cash-Flow Factors

Commissions: The commissions paid by the fund and the commissions paid, or avoided, by the investor in a closed-end fund can conceivably influence the size of the fund’s discount. The extent to which the commissions influence the

discount depends upon what party is paying or avoiding the commissions. To see the variations, consider the following arguments:

- (1) **Economies of Scale in Trading:** Owing to large dollar trades, funds should enjoy economies of scale in the form of lower transaction costs per dollar of invested funds than the typical (i.e., smaller) investor pays. Thus, small investors could avoid commission costs by allowing the fund to assemble a portfolio of securities rather than by trying to replicate the portfolio themselves. Therefore, economies of scale in trading costs at the fund level should reduce the discount. Comparing the cost of transactions in the fund's portfolio to the cost of identical, but smaller, transactions made by an individual investor would demonstrate the effect. Since the savings are a function of commission schedules, then it is only necessary to demonstrate that commission schedules lead to a lower cost per dollar of invested capital.
- (2) **Multiple Commissions:** If investors are to effectively purchase the assets that underlie the fund's shares, they essentially must pay commissions twice. The first commission occurs when the fund's shares are actually purchased; the second, when the fund invests in financial assets. Doubling commissions should result in the fund's shares selling at a discount to NAV.
- (3) **Commission Schedule Bias:** Most brokerage houses construct commission schedules that are regressive with respect to share price. Phrased differently, investors normally pay a higher commission per dollar of invested funds when purchasing low-priced securities. To the extent this bias is present in commission schedules, the lower the CEF share price, the larger the discount.

Management Fees: Fees are paid to the managers of closed- and open-end funds in return for services rendered. These fees typically range from 0.5 to 1.5% annually of the fund's total assets. The fees are generally assessed quarterly, at one-fourth of the stated annual rate. Because these expenses are a cost for the investor, the larger the management fee, the larger the discount should be. Although the fees are generally small relative to total assets, they can be quite large as a percentage of the fund's income.

Portfolio Turnover: Turnover refers to the level of trading activity in the fund's portfolio. According to portfolio theory, portfolio managers should acquire and hold a diversified portfolio consistent with the risk level desired by the fund's shareholders. Any trading beyond that necessary to maintain proper diversification and risk exposure would be a waste of shareholders' funds on unnecessary commissions. Thus, funds with larger turnover should sell at larger discounts than funds that engage in minimal turnover.

A word of caution is needed at this point. The asset composition of some funds, especially bond funds that hold significant short-term investments, can lead to relatively "high" turnover ratios. These turnover ratios may not be imprudent, but may instead represent a roll-over of short-term investments into other short-term investments. Thus, any assessment of turnover ratios must take into account the composition of the fund's portfolio.

Portfolio Characteristic Factors

Large Block Positions: Research in finance has demonstrated that selling large blocks of stock (10,000 shares or more) can lead to statistically significant price reductions. Investment companies establish the net asset value of their shares by taking the market value of their assets less their liabilities and dividing the net figure by the number of shares outstanding. If the market price of a stock overstates the value that the fund could obtain by selling the shares, the NAV figure is biased high. This relationship suggests that the size of the fund's discount should be positively related to its holding of large blocks of stock (as a percentage of total assets).

Restricted Asset Positions: Legal restrictions on the marketability of financial assets can significantly affect their value. Firms often issue securities that cannot be sold to the public until the restrictions are removed. After a minimum duration under the restriction, the holder may apply to the SEC to have the securities' restrictions removed. Simply passing the restriction date does not remove the restriction. Prior to the removal of the restriction, it generally is accepted practice to value the securities based on the market value of unrestricted securities. However, the liquidation value of the restricted securities is essentially zero. Thus, the NAV of a fund that invests in restricted securities may be biased upward, suggesting that as the percentage of assets invested in restricted securities rises, the discount on the fund should increase. Likewise, as the time remaining until the restrictions are removed diminishes, the discount should fall.

Foreign Asset Positions: Some CEFs invest a substantial portion of their assets in foreign securities that are traded on U.S. or foreign exchanges. These holdings potentially influence the discount of the fund in two ways. First, a significant body of literature suggests that foreign securities offer investors substantially more risk than similar investments in domestic firms. The threat of exchange controls, expropriation, limitation of payments to foreigners, higher tax rates or withholding rates on dividend or interest income, all make an investment in these securities more hazardous for foreign investors. These risk factors should act to increase the discount as the percentage of assets invested in foreign securities rises. However, it is important to recognize that not all foreign locales are of equal risk; thus, any measure of the foreign assets held by the fund should reflect the cross-sectional variation in these risks.

Second, research also suggests that returns on foreign securities are not highly correlated with returns on domestic securities and that the level of returns on foreign securities are often somewhat higher than on U.S. securities even after translation gains and losses. Thus, foreign securities can play an important role in a well diversified portfolio constructed by an American investor. However, the average investor has a limited opportunity to participate directly in foreign capital markets. To the extent that foreign diversification is valuable, investors may be willing to pay premiums for funds that invest in these securities.

Diversification: Modern portfolio theory suggests that rational investors should hold a well diversified portfolio. To the extent that the portfolio of a CEF is not well diversified, an investor would have to augment these holdings to obtain a position on the efficient frontier. Since purchasing additional assets leads to added commission charges, the discount should grow as diversification falls.

Perception Factors

Lack of Public Understanding: A much discussed, but unsubstantiated, factor in discounts is that CEFs are not well understood by private investors; so the demand for their shares and thus their price are likely to suffer. Clearly CEFs do not receive the same advertising as their open-end load fund competitors. But why should a lack of information or understanding about CEFs translate into a systematic underpricing of their shares?

Lack of Sales Effort: Stockbrokers actively sell, market, recommend, or “push” financial assets. Stockbrokers can obtain a much better commission by selling an open-end load fund than by selling an equal dollar amount of a CEF. Faced with this incentive structure, brokers are likely to steer clients interested in funds away from CEFs toward the load funds.

In addition to the incentives provided brokers, many open-end load funds can be sold by registered sales representatives and insurance agents. To the extent that these sales agents are employed by the fund or a related parent firm, they have no incentive to recommend investments in unrelated CEFs. Since CEFs are not engaged in a continuous direct offering of new shares, they have no sales staffs. However, the tenets of modern financial theory suggest that a persuasive salesperson or lack thereof should not influence the market’s assessment of the value of a financial asset.

Marketability of the Fund’s Shares: The marketability of a fund’s shares refers to the investor’s ability to sell his shares at the prevailing market price. Marketability is often measured by the annual trading volume, sometimes standardized by the number of shares outstanding. The argument holds that thinly traded securities cannot always be sold at market without depressing the price. If true, lightly traded CEFs should sell at larger discounts than actively traded CEFs. Some financial economists hypothesize that the market on which the fund’s shares trade (e.g., NYSE, ASE, or OTC) also influences the size of the discount. Because shares that trade on the large exchanges are likely to be more liquid than those trading on the OTC, the discount should be smaller.

Investment Performance: Discounts are hypothesized to be negatively related to the past investment performance of the fund. If true, past performance must provide an indication of future performance abilities, or investors must believe that there is strong relationship between past and future performance. If either is true, investors would be willing to pay a premium, or a smaller discount, for the shares of a fund that has performed exceedingly well in the recent past.

Investor Sentiment: If the level of the market is highly correlated with investor sentiment, then the market environment and the size of discounts on CEFs should be related inversely. In other words, if the market is “high” and investors are optimistic, discounts on CEFs should be relatively small. Conversely, if the market level is “low” and investors are pessimistic, the discounts on CEFs should be relatively large. Critical to this hypothesis is the linkage between market levels and investors’ expectations.

Market Inefficiency: The market inefficiency hypothesis rejects the premise that the current price of a financial asset fully reflects the public information set, maintaining instead that discounts on CEFs are a result of an inefficient market. Since investors can view the portfolio of the fund or its value on a regular basis, significant and systematic deviations between the fund’s share price and NAV are irrational or inefficient or both. Thus, if market inefficiencies lead to a systematic mispricing of securities, investors can profit from the mispricing only if it is corrected in some future period.

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