The Closed-End Funds Puzzle: A Survey Review

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■ **ABSTRACT**

The main objective of this paper is to explore the most salient research aimed at explaining the closed-end fund puzzle from both the traditional and behavioral finance perspectives. It provides a better understanding of closed-end fund behavior and motivates further research of closed-end funds, market efficiency, asset pricing and the traditional and behavioral finance paradigms. So far, none of the possible explanations from either traditional finance or behavioral finance have been able to fully account for the occurrence of the puzzle. It continues to be an important issue in the long standing debate between traditional finance and behavioral finance.

Keywords: closed-end funds, closed-end fund puzzle, traditional finance, behavioral finance

■ **RESUMEN**

El objetivo principal de esta investigación es explorar la literatura más importante dirigida explicar el enigma de los fondos mutuos cerrados o de capital fijo desde las perspectivas tradicionales y del comportamiento de las finanzas. Proporciona una mejor comprensión del comportamiento del fondo de capital fijo y motiva la investigación adicional de los mismos, de la eficiencia del mercado, de la valoración de activos y de los paradigmas tradicionales y del comportamiento de las finanzas. Hasta ahora, ningunas de las explicaciones posibles de finanzas tradicionales o de finanzas del comportamiento han podido explicar completamente la ocurrencia del enigma. Continúa siendo una discusión importante en el debate entre las finanzas tradicionales y las finanzas del comportamiento.

Palabras clave: fondos mutuos de capital fijo o cerrados, finanzas tradicionales, finanzas del comportamiento

INTRODUCTION

A closed-end fund (CEF) is an investment company that holds or bundles other publicly traded securities. They operate in a way similar to any business corporation, but their corporate business consists largely of investing funds in the securities of other corporations and managing these investment holdings for income and profit. In contrast to an open-end mutual fund that issues and redeems shares directly with investors at net asset value (NAV), a CEF is usually listed on a national exchange, where its shares are purchased and sold in transactions with other investors, not with the fund itself. This means that CEF capitalization is fixed, or closed, and the market value of the shares of a fund is a function of market supply and demand. Therefore, an important characteristic that makes closed-end funds unique is that they provide contemporaneous and observable market-based prices and rates of return for the fund's stocks which can then be compared with the underlying asset portfolios.

Closed-end funds specialize in either stocks or fixed income securities, and usually follow consistently the stated objective, such as current income or capital appreciation. Funds can also be highly specialized, investing in a specific type of security or in a particular region or country like the closed-end country funds. They can also issue major securities such as preferred stock or debentures, and borrow money to leverage their investment positions (Closed-end fund Association, 2009). As of October 2009, the Closed-end Fund Association (CEFA) has 673 funds registered where 64% are bond funds (exempt and taxable), 29% equity funds and 7% global funds.

It has been observed over the years, that CEF shares typically sell at prices that are found not to be equal to the per share market value of the assets the funds hold. This observation is considered a puzzle or anomaly because it seems to challenge the traditional finance paradigm in the sense that two assets, which appear to offer a claim to the same risk-return distribution, the fund's underlying assets and the fund's shares, are trading at different prices at the same time, which appears to contradict the no-arbitrage implication of an efficient market. Also, the fact that the act of bundling the assets (creation of

the fund itself) could add or subtract value (selling at discounts or premiums), goes against Modigliani and Miller's (MM) proposition of value additivity, which states that the value of the whole (group or bundle of assets) should equal the sum of the values of its parts, under perfect market conditions (Dimson and Minio-Koserski, 1999).

Possible explanations of the closed-end fund puzzle look into several factors taken from the efficient market hypothesis of the traditional finance paradigm and the investor sentiment hypothesis from behavioral finance. Research has provided mixed results. So far, the puzzle continues to intrigue financial researchers who have not been able to provide explanations that can account for all the pieces of the so-called CEF puzzle.

The main objective of this paper is to explore the most salient research aimed at explaining the closed-end fund puzzle from both the traditional and behavioral finance perspectives. From traditional finance explanations it will look into the miscalculation of the NAV, agency problems, tax timing issues, market segmentation, and dividend yield among others. From behavioral finance it will look into the investor sentiment hypothesis. This paper will provide a better understanding of closed-end fund behavior and motivate further research of closed-end funds, market efficiency, asset pricing and the traditional and behavioral finance paradigms.

DESCRIBING THE CLOSED-END FUND PUZZLE

The closed-end fund puzzle consists of the empirical finding that closed-end fund shares sell at prices that are not equal to the per share market value of the assets the fund holds. Although some funds sell at premia, discounts of 10% to 20% have been the norm (Rosenfeldt and Tuttle, 1973).

Lee, Shleifer and Thaler's (1991) describe the closed-end fund puzzle as consisting of four parts, which are called the closed-end fund puzzle life cycle. The four parts of the cycle are:

1. Closed-end funds start at a premium of almost 10%. The premium usually is derived from start-up costs and underwriting costs which are removed from the proceeds, reducing the NAV

compared to the stock price. It has been observed that investors are willing to pay a premium for new funds when existing ones trade at a discount.

2. Within 120 days of beginning trading, the fund moves to an average discount of 10%. Thereafter discounts become the norm. Those that sell at a premium are usually funds specializing in investments in foreign countries.

3. Discounts are subject to wide variations over time and across funds. The fluctuations appear to be mean reverting and highly correlated.

4. When merger, liquidation, or conversion to open-end fund terminates a closed-end fund, prices tend to converge to reported NAVs and discounts shrink. Positive returns to shareholders are seen to accrue when discounts narrow around termination announcement. A small discount persists until final termination.

The existence of the closed-end fund puzzle raises empirical questions for both, proponents of market efficiency and the traditional finance paradigm and for proponents of behavioral finance, namely why do discounts/premiums occur, what determines them, and if a satisfactory explanation for the existence of closed-end discounts can be provided by traditional finance, behavioral finance or both.

TRADITIONAL FINANCE EXPLANATIONS FOR THE CLOSED-END FUNDS PUZZLE

When anomalies or puzzles concerning financial markets start to emerge, traditional finance proponents look into the market efficiency framework and consider typical market frictions like taxes, expenses, and liquidity, among others. Specifically for closed-end funds, the various possible hypotheses that attempt to explain the discount of CEF include the miscalculation of the NAV, agency problems, tax timing issues, market segmentation, and dividend yield.

MISCALCULATION OF NET ASSET VALUE

The miscalculation of the closed-end fund's net asset value addresses the issue that possibly, the NAV could be overestimated mainly

due to the accumulation of unrealized capital gains and the existence of illiquid assets in the fund's portfolio.

Malkiel (1977, 1995) studies the funds' unrealized appreciation and their investments in restricted or illiquid stock. He argues that funds with high unrealized capital appreciation should sell at discounts from NAV because the holder of such a fund would be assuming a potential tax liability. He also hypothesizes that the use of restricted or letter stock could make funds highly illiquid since the restrictions usually indicate the funds must hold the restricted shares for a long period of time, and could imply that their market prices might not be a fair indication of their value upon liquidation. He finds a positive relationship between discounts and unrealized appreciation and restricted stocks.

Datar (2001) studies the impact of liquidity on CEF discounts. He suggests that illiquid assets in the fund may be priced at discounts to the fundamental value in order to provide higher expected returns. Size, turnover rate, and volume of trade are used as proxies for liquidity and funds are segregated by objective, bond funds versus equity funds. He concludes that funds with higher liquidity measured by proxies of trading activity, have higher premiums or lower discounts than funds with lower liquidity, and although with a difference in magnitude, his findings are consistent for both bond and equity funds samples. The results are also statistically significant for all proxies including size, turnover ratio, and trading volume.

On the other hand, Lee et al. (1991) examine the composition of closed-end funds portfolios and show that restricted holdings could not explain the discount since most of the funds they examine did not invest in restricted stock and were still selling at a discount.

Chan, Jain and Xia (2008) study illiquidity in segmented markets. Evidence from U.S.-traded single-country closed-end funds shows a strong negative association between the fund premium and the share market illiquidity, and the relation is stronger for funds investing in segmented markets. Their results suggest that market illiquidity plays a significant role in explaining both time series and cross-sectional variation in closed-end country fund premia.

Cherkes, Sagi, and Stanton (2009) reexamine the importance of liquidity in closed-end funds. Rather than focusing on possible mispricing, they develop a model in which the discount is determined

by investors' tradeoff between fees paid and liquidity benefits that accrue through holding the closed-end fund, rather than holding the underlying assets directly.

The research on the miscalculation of NAV as a possible explanation of CEF discount, although having some positive results could not fully account for the CEF puzzle.

Agency Costs

The agency costs hypothesis addresses the theory that discounts could reflect excessive management fees or poor management performance. Management fees are considered deadweight costs imposed on the shareholders of CEF while the managerial performance hypothesis posits that funds could be experiencing costs that are larger than the value provided by the manager's expertise. Also to be considered are agency problems that might arise with the existence of conflict of interests between agents and principals.

Malkiel (1995) studies the structure of closed-end funds discounts. He considers unrealized appreciation, payout policy, and turnover, expense ratio, fund size, percent of insider ownership, and the preceding five year returns. In his analysis of insider ownership, Malkiel posits that large insider ownership might lead to large discounts, since investors of funds selling at large discounts would receive windfall gains if the funds are immediately liquidated at net asset value. Finally, a high expense ratio should lead to large discounts since management fees could be considered a deadweight loss and discounts could represent the capitalized value of these fees. Malkiel finds that restricted stock, turnover ratio and unrealized appreciation could explain the discounts, but not insider ownership, payout, or expenses.

Barclay, Holderness, and Pontiff (1993) research the agency problem by looking at the relationship between discounts and block ownership. They find that there is a stable and significant cross-sectional relationship between discounts and the concentration of ownership. The greater the managerial stock ownership in the closed-end fund, the larger the discounts to NAV.

Chay and Trzcinka (1999) find that discounts and premiums of CEF reflect the market's assessment of anticipated future performance.

Their evidence suggest that stock fund premium as a market-based variable, contains information about future investment performance.

Ferguson and Leistikow (2004), and Berk and Stanton (2007), also attribute discounts to market's assessment of anticipated future performance in terms of managerial ability, while Ross (2004) posits that managerial fees could explain the discount.

Arora, Ju, and Ou-Yang (2003) show that under certain conditions, closed-end funds will be issued at a premium and, with certainty, will fall into discount. They use a model with an agency conflict and a market friction. The conflict involves the manager not wanting to return money even if he runs out of good investment opportunities because his compensation is proportional to the total assets under management. The market friction is a fund policy restriction on the manager's trading strategies so that he may have to make suboptimal non-informational trades.

TAXES

Malkiel (1995) argues that funds with high unrealized capital appreciation should sell at discounts from NAV because the holder of such a fund would be assuming a potential tax liability that depends on the holding period of the investor. He finds a positive relationship between discounts unrealized capital appreciation.

Brickley, Manaster, and Schallheim (1991) suggest that CEF discounts are partly driven by the fact that, as a result of holding shares in a closed-end fund, investors lose valuable tax-trading opportunities associated with the movements of the individual portfolio constituents. They find that discounts are positively correlated with the average variance of the constituent assets in the fund.

Another interesting factor about taxes occurs when U.S. funds are compared to British funds. Dimson and Minio Korzerski (1999) acknowledge that British closed-end funds are not allowed to distribute any capital gains, and shareholders are not liable for any capital gains tax, unless they sell their holdings in the fund. Yet British funds behave very much like U.S. funds suggesting that the discount cannot be explained by tax factors that are specific to a single country.

Market Segmentation

Closed-end funds exhibit various forms of segmentation, specifically, U.S. or domestic funds can invest in either stock or bonds, and the country funds are usually treated as another different segment subject to other influences such as exchange rates, market integration, and influences from both the country where the underlying asset originates and the country where the fund's shares are sold.

Woan and Kline (2003) investigate whether municipal closed-end bond funds behave differently from other types of funds. In their study, they use expense ratio, turnover ratio, historical performance, diversification, unrealized capital gain, fund size, variance of the securities in the fund portfolio, average maturity, exposure to market risk, and leverage. They conclude that municipal bond funds did not behave differently from other types of funds, specifically equity and non-municipal bond funds.

Datar (2001), studying the impact of liquidity on discounts of closed-end funds, observes that bond and equity funds exhibit different discounts on average. He posits that the average trading costs for equity assets are likely to be different from bond assets because these costs relate to different types of assets that are traded in different trading structures. He argues that the main distinction between the two groups of funds is in respect to the portfolio assets and differential liquidity of the underlying portfolio assets that may result in different average discounts or premiums across different types of funds. Datar results provide evidence that discounts could be found in equity funds more frequently than in bond funds.

The segmentation hypothesis as applied to closed-end country funds looks into the impact of having the shares of the closed-end country funds traded in one market, while underlying assets belong and are traded in the markets of a different country.

Country funds, invest exclusively in foreign securities. The existence of restrictions on direct foreign investment was suggested as a possible explanation for their trading, at certain times, at a premium. Bonser-Neal, Brauer, Neal, and Wheatley (1990) test whether a relationship exists between announcements of changes in investment restrictions and changes in the ratio of price to NAV. They find that four out of five

country funds experience a significant decrease in the ratios following the announcement of a liberalization of investment restrictions.

Another factor that could be used to explain premiums and discounts on country funds is the extent of "integration" between country funds and the market where they trade. Chang, Eun, and Kolodny (1995) investigate the possibility that closed-end country funds provide international diversification. They show that funds exhibit significant exposure to the U.S. market and behave more like U.S. securities than do their underlying assets.

Levy-Yeyati and Ubide (2000) analyze the behavior of country funds during periods of crisis like the Mexican and East Asian crisis and find that discounts (premiums) tend to decrease (increase). They conclude that international investors were less sensitive to changes in the country's local markets than domestic investors. The behavior of international investors can help to contain the crisis in the local market, but also tends to amplify the contagion to non-crisis countries.

The segmentation hypothesis, although fairly consistent so far, cannot really explain CEF discounts. It has been mainly directed at contrasting the level of discounts occurring in the different segments of closed-end funds, namely U.S. versus country funds, and bond versus equity funds.

DIVIDEND YIELD HYPOTHESIS

The dividend yield preference hypothesis is introduced by Lee and Moore (2003). They state that closed-end bond funds are primarily held by individual investors. They hypothesize that short-term individual investors who seek a high current yield, prefer closed-end bond funds to their equity counterparts because (1) closed-end bond funds are less volatile in price than equity funds; (2) closed-end bond funds pay monthly dividends, while equity funds pay annual dividends. They conclude that individual investors who seek a high current yield look to closed-end bond funds as a monthly income vehicle. In addition, closed-end funds allow individual investors with a short investment horizon to easily get in and out of the funds. As a result, closed-end bond funds are an ideal investment vehicle to those investors who switch from one fund to another, looking for a high current yield.

For these reasons they hypothesize that a high dividend yield is the primary factor that drives the demand for closed-end bond funds. Their results show a very strong negative relationship between dividend yield and discounts even in the presence of the other explanatory variables.

OTHER EXPLANATIONS

Grullon and Wang (2001) use a multi-asset trading model to examine the closed-end fund discount. Their model shows that the discount can arise if the quality of private information in the underlying assets is better than in the fund. Their model also indicates that a discount or premium can arise if the excessive volatility of the fund dominates the fund's diversification benefit.

Pontiff (1997) compares the volatility of closed-end funds returns to that of their underlying portfolio returns. He demonstrates that closed-end funds are more volatile than was implied by efficient financial markets, being an average of 64% more volatile than its assets, and only 15% of the volatility could be explained by market risk, small firm risk, book-to-market risk, or risk associated with the discounts of other closed-end funds. His results seem to provide some evidence of the disparity between the behavior of closed-end fund shares and that of their underlying assets.

Pontiff (1996) finds that the discount or premium in CEF can arise for funds with portfolios difficult to replicate, funds that pay smaller dividends, funds with lower market values, and when the interest rates are high.

Pontiff (1995) shows that fund premia has an economically strong ability to predict returns, which is related to premium mean reversion.

Russel(2005) and Russel and Malhotra (2008) revisit traditional closed-end fund explanations like expense ratio, turnover, fund's family, age and assets. Although they find prices of closed-end funds are affected by the expense ratio of the fund, size of fund, and fund family membership, they conclude that none of the theories individually or collectively can explain the CEF discount.

BEHAVIORAL FINANCE THEORY AND EXPLANATIONS FOR THE CLOSED-END FUNDS PUZZLE

Behavioral finance explanations to the closed-end fund puzzle center on the existence of noise traders whose presence can create an additional risk for rational investors. Research in this area tries to determine if this risk, noise trader risk, is priced and could be a plausible explanation for the discounts. It also argues that a difference in clientele between closed-end funds and their underlying assets could be a significant aspect in explaining CEF discounts.

Barberis, Shleifer, and Vishny (1998) derive a model with two kinds of investors, rational traders who invest based on fundamentals, have unbiased expectations, and form rational expectations about asset returns, and noise traders who base their investment decisions on some irrational factors and make systematic forecasting errors. Their expectations about asset returns are subject to the influence of sentiment, causing overestimation and underestimation of expected returns as their sentiment shifts over time.

Lee, et al. (1991) associate the investor sentiment with the closed-end funds puzzle. They propose that there is a higher concentration of noise traders in the ownership of closed-end funds than in the ownership of funds' underlying assets. When these noise traders become pessimistic about the future, they tend to drive down the price of the closed-end fund below NAV, so rational investors do not buy the funds at discount prices because of the risks they bear even when buying a closed-end fund at discount.

In order to prove the investor sentiment theory, Lee et al. (1991), construct a value-weighted index of discounts for annual as well as monthly data. They find a strong correlation between the discounts of individual funds. They also find evidence that discounts on closed-end funds narrow when small stocks do well, the correlation being stronger the smaller the stock. They conclude that closed-end funds are a measure of the sentiment of individual investors.

Swaminathan (1996) studies the time series relationship between closed-end funds discounts and time varying expected excess returns on small firms, and the implications for the economic behavior of individual investors. He argues that the results obtained by Lee et al. (1991)

suggesting a common variation between small firm and closed-end fund prices do not explain if that variation is due to economic fundamentals or investor sentiment. Swaminathan finds that closed-end fund discount is the only variable that forecasts future excess returns on small firms. The forecasting power of discount is robust even in the presence of other variables like the dividend yield, default spread, and term spread. He also finds that discounts could explain CEF excess returns. The tests performed also indicate that the information in discounts is related to expectations of future earnings growth and future inflation and that the relationship between discounts and small firm expected returns occurs due to a positive covariance between discounts and small firm factor risk premium. He concludes that the results obtained are consistent with the investor sentiment hypothesis.

Further research on the existence of investor sentiment and noise trader hypothesis has yielded mixed results. Bodurtha, Kim, and Lee (1995) test the noise-trader hypothesis for country funds and provide evidence suggesting that the mean-reverting sentiment is an important component of the price of country funds. Their findings suggest that international equity prices are affected by local risk. They show that country fund premium movements reflect a U.S.-specific risk, which may be interpreted as U.S. market sentiment.

On the other hand, Elton, Gruber and Busse (1998), testing Lee et al. (1991) proposition that discounts are a measure of investor sentiment, find that the change in discount of CEF used as a proxy for investor sentiment did not enter the return-generating process of a sample of utility stocks, passive and active open-ended mutual fund stock portfolios, or an individual sample of 586 NYSE stocks. They conclude that their findings do not support small investor sentiment as a priced factor in any of their samples.

Brown (1999) studies the relationship of volatility, sentiment and noise trading. He argues that if noise traders affect prices, the noisy signal could be sentiment, and the risk they cause is volatility, so sentiment should be correlated to volatility. Using a direct measure of investor sentiment taken from the American Association of Individual Investors Sentiment Survey, he finds that unusual levels of individual investor's sentiment are associated with greater volatility in CEF. His results seem to provide support for the investor sentiment theory.

Abraham, Elan and Marcus (1993) study investor sentiment in a sample of closed-end funds bonds. To measure the systematic risk of fund discounts or premia, they estimate a regression equation, which relates changes in the discounts on stock and bond funds to the returns on the NYSE index. While comparing bonds and stocks, they report two findings that they believe are at odds with the sentiment hypothesis. First, despite the fact that bond funds hold assets whose values are far less subject to waves of optimism or pessimism than stock funds, discounts on bond funds exhibit systematic risk which is essentially as large as that of stock funds for their sample period from 1985-1990. They believe this is inconsistent with the notion that discounts are driven by the changes in pessimism and optimism of noise traders. Second, despite the roughly comparable level of systematic risk in the discounts of stock and bond funds, bond funds on average do not trade at discounts. They conclude that at the least, their results suggest that the closed-end puzzle still had some missing pieces.

Simpson and Ramchander (2002) use a novel approach to re-examine the sentiment hypothesis for the First Australia country-closed end fund. They employ measures of consumer sentiment data for the U.S. from the University of Michigan's well known Survey of Consumers and corresponding data for Australia from the University of Melbourne's consumer survey. These measures are used to capture the differential investor sentiment. Their study finds that, after controlling for foreign and domestic stock market movements, as well as the exchange rate, changes in the ratio of domestic to foreign consumer sentiment, as measured by like indexes, are statistically significant in explaining the change in the premia on the First Australia closed-end equity fund. They argue that their results are consistent with the investor sentiment theory.

Halkos and Krintas (2006) using factor analysis find that discounts/premiums are related to a sentiment factor in Greek closed-end funds. The sentiment factor consists of the change in number of equity mutual funds shares outstanding, the change in inflows/outflows in equity mutual funds, the change in total assets equity mutual funds and the monthly change of the Athens Stock Exchange General Index, which is called the behavioral factor. On the other hand Doukas and Milonas (2004) using out of sample change in discount/premium

of Greek CEF did not find any evidence that sentiment entered the return generating process of different passive and active portfolios constructed from indices in the Athens Stock Exchange, industrial stocks and other corporations stocks.

Fujiwara (2006) finds evidence of investor sentiment in Japanese CEF. He finds a correlation between the changes in the discount rates and the small capital stock index.

Flynn (2003) argues that discounts of CEF vary over time because of changes in differential sentiment which measures how much actively managed portfolios returns will exceed those of passively managed portfolios. Investors allocate their funds based on their perceptions of managers' ability to beat the market. He develops a differential sentiment index that incorporates management fees, dividend payments and expected managerial return. The index is positively correlated with aggregate capital flows into actively managed open-end mutual funds and negatively correlated with capital flow into passively managed exchange traded index funds.

Lin, Raman, and Yung (2008) study real estate closed-end funds. They confirm the significance of investor sentiment on REIT returns. When investors are optimistic (pessimistic), REIT returns become higher (lower). Their results are robust when conventional control variables are considered.

Conclusions

This paper provides an overview of the most salient research aimed at explaining one of the finance puzzles that continues to intrigue researchers, the closed-end fund puzzle. It looked into the traditional finance explanations namely miscalculation of net asset value, agency costs, taxes, market segmentation, the dividend yield hypothesis, and from behavioral finance it looked into the investor sentiment hypothesis. The miscalculation of net asset value addresses the issue that NAV could be overestimated mainly due to the accumulation of unrealized capital gains and the existence of illiquid assets in the fund's portfolio. The agency costs explanation addresses the theory that discounts could reflect excessive management fees or poor management performance. Taxes, as a possible explanation of

the discount, looks into the theory that funds with high unrealized capital appreciation should sell at discounts from NAV because the holder of such a fund would be assuming a potential tax liability. The market segmentation theory aims at finding differences in the behavior of closed-end fund segments like bond, equity, and country funds. The dividend yield hypothesis looks into short term individual investors who seek a high current yield from bond closed-end funds and thus drive the demand for such funds. The investor sentiment hypothesis looks into the concentration of noise traders in the ownership of closed-end funds and how their sentiment influences the pricing of the funds. So far, none of these hypotheses have been able to fully account for the occurrence of the puzzle. It continues to be an important issue in the long standing debate between traditional finance and behavioral finance.

Taking into consideration the literature so far presented, future closed-end fund research could be directed toward the selection of adequate proxies for the multivariate models. For example there seems to be some discrepancy in how to measure funds expenses (Woan, 2003), and also as to whether to use dividend yield or dividend payout ratio to measure the effect of dividends in the discount (Lee and Moore, 2003). From a behavioral finance standpoint, flow of funds is considered a proxy for investor sentiment (Frazzini and Lamont, 2005), CEF IPO activity is also used as a sentiment measure (Qiu and Welch, 2004), while others are looking into sentiment measures provided by consumer and investor confidence surveys like the ones carried out by the University of Michigan (http://www.umich.edu). It would be interesting to do a comparative analysis of the different proxies and see how they behave for closed-end fund segments and other assets.

Besides trying to explain the closed-end fund puzzle, further research could look into the return generating process of closed-end funds. It has been extensively researched for open-ended mutual funds but not so for closed-end funds.

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