Premiums on Exchange-Traded Funds: Should Traders Be Concerned?

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Mutual fund trades are typically executed only once a day at a price equal to net asset value (NAV). Investors who want additional trading opportunities often use exchange-traded funds (ETFs), which combine the diversification benefits of mutual funds with the liquidity of listed stocks. Unlike mutual funds, ETFs may trade at any price. They are different from closed-end funds, which usually trade at deep discounts, in that ETFs are designed to minimize premiums.

If the price of an ETF deviates from NAV, institutional investors can arbitrage the shares through a process of in-kind redemption or creation facilitated by the sponsoring fund company. The ability of this arbitrage process to minimize deviations between price and NAV has been questioned.[1]

An article in *The Wall Street Journal* expresses these concerns about ETF premiums thus:

> Investors who buy ETFs without understanding the premium/discount issue are "taking on a risk that they didn't contemplate," says Mr. Bullard, formerly assistant chief counsel of the Division of Investment Management at the Securities and Exchange Commission and founder of a new investor-advocacy firm called Fund Democracy LLC. He says the premium/discount risk is greatest on international-stock ETFs and is "being misrepresented" in materials from ETF sponsors and the American Stock Exchange (Damato and Lucchetti [2000, p. C1]).

I examine the size and persistence of ETF premiums by analyzing international funds, which are more susceptible to premiums than other ETFs. Because of greater market frictions associated with international investments, arbitrage of these securities should be less effective in reducing premiums. I also investigate how the process of arbitraging ETF shares affects their premiums.

ARBITRAGE

Institutional investors can reduce ETF premiums by arbitrage that involves the creation or redemption of shares. The sponsoring fund company facilitates this arbitrage only in large blocks of shares called *creation units*. When shares trade at a price above NAV, institutional investors can implement an arbitrage by buying the securities held by the fund and exchanging them for new shares in the ETF. Since the fund sells for a premium, these shares may be sold for a profit, and this selling pressure reduces the premium.[2]

An arbitrage can also be implemented that minimizes a discount on shares in an ETF. The first part of such a transaction involves an institutional investor purchasing enough shares to constitute a creation unit. Through the sponsoring fund company, these shares can be exchanged for securities in the fund's portfo-

lio. These securities will be worth the NAV of a share times the number of shares involved in the redemption. The securities received from the fund may be sold for more money than it cost to purchase the fund shares. Under certain circumstances, creation units may even be redeemed in cash.

The sponsoring fund company assesses a transaction fee for each creation unit purchased or sold. At the end of the sample period used in this study, the mean transaction fee for the ETFs analyzed in this study was 0.27% of the value of a creation unit.

To examine the efficacy of arbitrage in ETFs, this study tests two hypotheses.

Hypothesis 1: ETF shares trade at prices close to NAV, and any large premiums are ephemeral.

If large premiums are few and fleeting, the data will be consistent with the effectiveness of the in-kind redemption/creation feature of ETFs. There are many possible reasons why arbitrage will not eliminate premiums, and the presence of premiums does not necessarily imply pricing is inefficient.

The non-synchronous trading of ETFs and their underlying assets causes premiums to be calculated using stale prices. Consistent with efficient markets, ETF prices will diverge from NAVs to reflect relevant information that is released while the domestic market is open and the foreign market is closed. In addition, the transaction costs of arbitrage prevent institutional investors from eliminating small premiums or discounts. These costs include brokerage commissions and bid-ask spreads. Also, an entire arbitrage transaction may take days to implement.

It is possible that features other than arbitrage prevent ETFs from experiencing the large discounts often observed in closed-end funds. Some of the advantages of ETFs over closed-end funds include lower fees, less turnover, greater portfolio transparency, and enhanced tax-efficiency. If arbitrage is responsible for relatively low premiums on ETFs, the data will support the second hypothesis:

Hypothesis 2: Premiums (discounts) increase before shares are created (redeemed) and decline afterward.

DATA

I use data on the 17 members of the iShares MSCI Index Fund Series, which started trading in 1996. Exhibit 1

EXHIBIT 1
Summary Statistics on ETF Premiums

iShares MSCI Series Member	Minimum	10th Percentile	50th Percentile	90th Percentile	Maximum
Australia	–4.43	–0.43	0.53	1.60	7.43
Austria	–4.27	–0.64	0.29	1.36	3.98
Belgium	–2.93	–0.64	0.30	0.90	2.15
Canada	–3.45	–0.60	0.22	0.98	3.13
France	–3.52	–0.53	0.12	0.80	3.67
Germany	–4.75	–0.61	0.27	1.11	5.48
Hong Kong	–13.72	–1.19	0.48	2.33	27.44
Italy	–11.37	–0.59	0.14	0.81	2.84
Japan	–5.54	–0.76	0.35	1.53	6.81
Malaysia*	–9.05	–0.73	1.10	4.63	27.47
Malaysia*	–38.74	–1.73	1.10	5.78	27.47
Mexico	–6.37	–1.52	0.05	1.20	6.23
Netherlands	–4.29	–0.28	0.28	0.79	4.08
Singapore	–7.04	–0.53	1.05	3.42	18.24
Spain	–4.64	–0.49	0.20	0.81	4.21
Sweden	–3.19	–0.46	0.31	0.84	9.88
Switzerland	–4.02	–0.31	0.46	1.24	3.31
U.K.	–6.17	–0.50	0.32	1.18	3.73
Mean	–5.81	–0.64	0.38	1.50	8.24

Statistics calculated using data on daily premiums March 18, 1996–December 31, 1998, and shown in percent.

**Two sets of information on the iShares MSCI Malaysia Index Fund. First row describes premiums before creation of new shares was suspended on September 2, 1998. Second row is calculated using data from September 2, 1998–December 31, 1998.*

provides summary statistics. Each member attempts to match the return on a Morgan Stanley Capital International (MSCI) Index for a particular country. The single-country MSCI indexes are value-weighted and designed to represent approximately 60% of the stock market capitalization for each country. These funds are listed on the American Stock Exchange.[3]

The NAVs of these funds are based on the last quoted price for the securities in the fund's portfolio as determined at the end of the trading day on the New York Stock Exchange. The iShares Malaysia Fund is an exception; its NAV is established at the start of trading on the New York Stock Exchange.

The NAV is expressed in dollars using the same exchange rates that MSCI uses to compute its country indexes. These are the prevailing rates as of 4:00 P.M. London time for all currencies except the peso, which is valued at 3:00 P.M. New York City time. To minimize the effects of bid-ask bounce on the analysis of premium size, the bid-ask midpoint is used to calculate the premium.

CDA/Weisenberger provides the daily NAVs of the funds over the sample period (March 18, 1996, through December 31, 1998). The number of creation units redeemed or created daily is provided by Funds Distributor, Inc.

As of the end of the sample period, the size of a creation unit varied among the members of the iShares MSCI Index Fund Series; the minimum is 40,000 shares for the iShares Belgium Fund, and the maximum is 600,000 shares for the iShares Japan Fund. The value of a creation unit ranges from $290,625 (iShares Malaysia Fund) to $6,750,000 (iShares Germany Fund). Bid and ask quotes are obtained from the TAQ database, which is compiled by the New York Stock Exchange.

RESULTS

The mean daily premium on the iShares MSCI Fund series over the period is small (0.38%), but the minimum and maximum premiums for each fund are surprisingly large (*Exhibit 1*). The minimum premium for the average member is –5.81%, and the maximum 8.24%. Non-synchronous trading likely contributes to the size of these extreme observations.

The percentiles indicate the presence of significant cross-sectional variation in the magnitude of the ETF premiums. In particular, the prices of the iShares Malaysia, Hong Kong, and Singapore Funds deviate from NAV relatively more than the iShares France, Italy, and the Netherlands Funds. For example, the premium on the iShares Singapore Fund exceeds 3.42% on 10% of the days in the sample period, but the 90th percentile premium for the iShares Netherlands Fund is only 0.79%. This result should not be surprising, since the 17 countries represented in this fund series have vast differences in their markets.

While Exhibit 1 shows that large premiums occur, these premiums may be too transient to represent real arbitrage opportunities. Price deviations are more likely to be profitable when they persist for several consecutive trading days.

Exhibit 2 presents evidence on the persistence of sizable fund premiums over the sample period. It shows the number of times the closing price of a particular ETF exceeds its NAV by a specified percentage for a certain number of consecutive trading days.

Panel A describes the persistence of positive premiums. On 42 occasions, the premium on a particular fund

EXHIBIT 2
Persistence of Premiums

Panel A. Persistence of Premiums

Magnitude of Premium	Duration (Number of Consecutive Trading Days) 3	4	5	6
>1%	730	554	447	376
>2%	225	172	136	113
>3%	92	67	51	39
>4%	42	29	22	15
>5%	20	13	8	4
>6%	13	8	5	2

Panel B. Persistence of Discounts

Magnitude of Discount	Duration (Number of Consecutive Trading Days) 3	4	5	6
<–1%	102	63	44	35
<–2%	46	29	20	14
<–3%	13	7	4	2
<–4%	8	5	3	2
<–5%	5	3	1	0
<–6%	2	1	0	0

Measured over April 1, 1996–December 31, 1998. Analysis does not reflect data on the iShares MSCI Malaysia Index Fund after creation/redemption was suspended on September 3, 1998, due to capital controls imposed by the Malaysian government.

exceeds 4% for three consecutive trading days. Only 36% of these premiums persist for more than a week, however: a premium greater than 4% lasts for six or more days only 15 times.

Small premiums that last at least a week are common. There are 136 instances when the premium exceeds 2% for five consecutive trading days. The majority of the premiums that persist for at least three days occur in the iShares Australia, Hong Kong, Malaysia, and Singapore Funds.

Panel B presents statistics on the persistence of negative premiums (discounts). On 13 instances, a particular fund's premium is less than –3% for three consecutive trading days, but discounts of this magnitude persist for six consecutive days on only two occasions. Large discounts rarely last more than a couple of days; for example, a discount that is lower than -5% for three consecutive trading days occurs only five times. Most of these persistent discounts occur in the iShares Hong Kong, Malaysia, Singapore, and Mexico Funds.

During the sample period, new shares are issued via in-kind creation on 400 occasions; this activity increases the total float by 110,280,000 shares. With the exceptions of the iShares Belgium, Hong Kong, and Malaysia Funds, the majority of creations take place at the minimum number of shares (defined as the size of a creation unit). This finding is consistent with the idea that the number of shares per creation unit is a barrier to additional arbitrage. Cutting the value of a creation unit might reduce the volatility and average level of premiums.

Over 40% (164 of the 400) of the share creations occur within three trading days of another creation of shares in the same member of the iShares MSCI Index Fund Series. This finding suggests that repeated share creations may be necessary to reduce premiums to levels where arbitrage is unprofitable.

On 99 occasions during the sample period, shares are redeemed for the underlying securities in the fund. As with the share creations, most of the share redemptions occur at the minimum number of shares. This is the case for all the members of the iShares Index Series except the iShares Belgium, Malaysia, Netherlands, and Singapore Funds.

I also examine how the creation or redemption of shares affects premiums. I do this by computing the average premiums for a four-day period before and after changes in the number of shares outstanding. For the 400 share creations in the sample, the average premium peaks at 2.14% the day before shares are created and declines monotonically for the next four days by 0.83% on an absolute scale. For the 99 share redemptions in the sample, the average premium reaches a bottom of –0.53% two days before the redemption of shares. After the redemption of shares, the average premium reaches –0.1% two days after the redemption.

Share creations and redemptions are executed when premiums are still fairly low. This suggests that the ETF structure is remarkably successful in reducing premiums. The arbitrage also has a quick impact on premiums. In addition, creations/redemptions are not executed at many of the extreme premium observations—this is consistent with the conclusion that many of these premiums are transient and a result of non-synchronous trading.

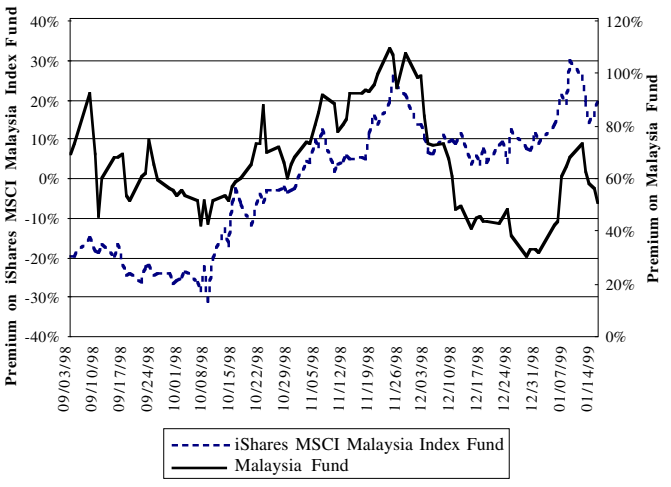
EFFECTS OF ARBITRAGE SUSPENSION

The financial reforms in Malaysia following the 1998 Asian financial crisis provide an opportunity to examine how premiums on ETFs are affected by the suspension of fund-facilitated arbitrage. On September 1, 1998, the Malaysian central bank imposed capital controls that allowed foreigners to convert ringgit-denominated securities into foreign currency only if the securities had been held for more than a year. The Malaysian officials hoped these capital controls would allow them to lower interest rates and to stimulate the economy without setting off a severe devaluation of the currency.

With the currency controls, the managers of the iShares Malaysia Index Fund suspended the creation of

EXHIBIT 3

Premiums on iShares MSCI Malaysia Index Fund and Malaysia Fund—Daily Data 9/3/98–1/15/99



new shares and expressed doubts about the feasibility of creation unit redemptions. In the absence of arbitrage, ETF premiums appear to become as volatile as the premiums on closed-end country funds.

Exhibit 3 supports this assertion with a plot of the premium on the iShares Malaysia Index Fund and the premium on the Malaysia Fund, the only closed-end fund that invests exclusively in this country. After the suspension of share creation in the iShares Malaysia Index Fund, the fund price quickly moved to a discount of over 30% and later traded at a premium of 37%.

While the premiums on the closed-end country fund were higher than the ETF premiums, the premiums often moved in the same direction and followed a similar trend. The data on the iShares Malaysia Index Fund are consistent with an assumption that the fund-facilitated arbitrage feature of ETFs prevents the extreme premium fluctuations associated with closed-end country funds.

CONCLUSIONS

The high turnover of ETF shares indicates that many short-term traders find this investment vehicle attractive. Are these investors trading fund shares at prices that reflect the value of the fund holdings?

My findings indicate that the structure of ETFs causes prices to closely track net asset values. The mean premium in the sample is 0.38%, and 80% of the daily premiums are within the range of –0.64% to 1.50%. In addition, high premiums are rarely persistent, although there is cross-sectional variation in ETF premium size among members of the iShares MSCI Index Fund Series. The prices of the iShares Belgium, Canada, and France Funds rarely deviate from NAV, but the iShares Hong Kong, Malaysia, and Singapore Funds occasionally trade at high premiums for several consecutive trading days.

These results suggest that arbitrage is highly effective in reducing fund premiums. When the creation or redemption of iShares does occur, the price, on average, quickly moves closer to NAV. Three trading days after the creation (redemption) of shares, the average premium (discount) narrows by 39% (64%). The high premiums observed on the iShares Malaysia Fund after the imposition of capital controls provide further substantiation of the ability of fund-facilitated arbitrage to minimize deviations from NAV.

The success of the fund-facilitated arbitrage of ETFs suggests a solution for the persistent discounts that plague some closed-end funds. Institutional investors in a closed-end fund could be allowed to return a minimum percentage of the fund's outstanding shares (say, 5%) to the fund company. The fund company would provide the investor with securities worth the net asset value of the fund's shares. The buying pressure associated with this in-kind redemption process would greatly reduce the discount.

ENDNOTES

The author is grateful to Christopher Shae of Funds Distributors, Inc., for providing data used in this research project.

[1]The net asset value is calculated each trading day after the stock market closes. It is equal to the market value of the securities in the fund's portfolio divided by the number of shares outstanding. A fund trades at a premium when its price exceeds its NAV. The premium is calculated as the natural logarithm of the price divided by the NAV. A negative premium is called a discount.

[2]When creating new shares, the fund's sponsor requires a payment with two components, deposit securities and cash. The WEBS Index Fund prospectus [1998] describes the deposit securities as a "designated portfolio of equity securities constituting an optimized representation of the corresponding MSCI Index." The number of shares of each security in this portfolio is made available prior to the start of the trading day on the American Stock Exchange. The cash portion of the portfolio component reflects accrued dividends and any difference between the value of the deposit securities and the NAV of the iShares.

[3]The exchange-traded funds analyzed were originally called World Equity Benchmark Shares (WEBS). After the end of the sample period, Barclays Global Investors changed their names to iShares, but their underlying structure remains the same. To reflect their current names, I refer to these securities as iShares.

REFERENCES

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