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The efficiency of international information flow: Evidence from the ETF and CEF prices

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ABSTRACT

While similar in their trading and organization, closed-end funds (CEFs) and exchange-traded funds (ETFs) differ in their liquidity and ease of arbitrage. We compare their price transmission dynamics using a sample of funds that invest in foreign securities and are most likely to show the deficiencies in the manner in which they process information. Our analysis shows that ETF returns are more closely related to their portfolio returns than are CEF returns. However, both fund types underreact to portfolio returns but overreact to domestic stock market returns. A simple trading strategy using these results is profitable with roundtrip trading costs less than 1.38% for CEFs and 0.71% for ETFs.

1. Introduction

As globalization advances, the flow of information across countries becomes increasingly important. This is particularly true in securities markets, and the process by which stocks incorporate this international information flow is complicated. Since the world's securities markets are not open at the same time, price changes in one market are not reflected in another market's trading until it opens. Furthermore, arbitrage, which aligns prices of similar goods in different markets, is difficult to conduct across countries and regulators.

Previous studies have analyzed the international flow of information in the market for American Depository Receipts (ADRs). Kato, Linn, and Schallheim (1991) find that the ADR market does not offer persistent arbitrage opportunities. In contrast, Kim, Szakmary, and Mathur (2000) find that ADRs overreact to changes in the U.S. stock market and underreact to changes in the underlying stock prices.

While these studies of ADRs offer insight into the international linkages of stock markets, several characteristics of these securities make them unique examples of how prices are transmitted across nations. First, large price differences in the ADR market can be arbitraged away by the creation or cancellation of these securities. This mechanism for the arbitrage of prices across countries does not exist for the vast majority of securities. Second, it is difficult to tell if investors are trading ADRs to profit from trends in the company or the country. Finally, institutional investors, who are generally considered to be relatively sophisticated, often engage in a substantial portion of the trading in these securities. Thus, the prices of ADRs may not be as sensitive to the sentiments of individual investors.

While prior studies have examined the price transmission dynamics of ADRs, little is known about how daily price changes from foreign markets affect the values of closed-end country funds (CEFs) and exchange-traded funds (ETFs), which have different characteristics than ADRs. Unlike ADRs, the shares of CEFs cannot be easily arbitraged. As these funds hold a diversified portfolio of assets, the trading activity in these funds is less likely to reflect company-specific information than the trading in ADRs. While previous studies on country funds have used weekly data on NAVs, this weekly data is not of sufficient frequency to provided insight into the short-term transmission of information across markets.

An ETF is another type of investment company that is commonly used for international diversification. Like CEFs, ETFs own a portfolio of securities and trade on an exchange like ADRs. However, ETFs can be arbitraged through the fund distributor using an in-kind process. This process may cause ETF prices to quickly reflect the returns in foreign markets.

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We add to the literature by analyzing the transmission of price changes between ETF and CEF markets and their respective underlying portfolios. Our first objective is to use a vector autoregression model (VAR) to examine the daily dynamics of how fund prices respond to changes in underlying values. The impulse response functions from the VAR model reveal that shocks to NAV affect ETF prices for only two days at most but influence over three-fourths of the CEF prices for at least three days. Our second objective is to determine the sensitivity of fund prices to daily domestic stock returns. We find that the vast majority of CEF and ETF returns have a negative relation with either the one-day or two-day lagged domestic return. Finally, we examine whether ETFs process information more efficiently than CEFs. Despite the relative ease with which ETFs can be arbitraged, their returns underreact to portfolio returns and overreact to domestic stock returns like CEF and ADR returns. We examine the profitability of a trading strategy using these relationships and find that trading costs in ETFs need to be about half the level of transaction costs for CEFs to eliminate profitability.

2. Literature review

Between 1990 and 2005, the market value of foreign equities owned by U.S. residents increased 16 times.[2] Many American investors gain exposure to foreign markets using ADRs. These are dollar-denominated receipts that trade in the local market but represent a claim to stock in a non-U.S. company. If ADR prices deviate from the value of the underlying foreign shares, the supply of ADR shares can be changed by issuance or cancellation through the depositary institution. While this process is typically reserved for institutional investors, it prevents large, persistent discounts or premiums on ADRs.

Research on ADRs offers conflicting results on how closely ADR prices reflect the underlying share values. Kato et al. (1991) fail to document arbitrage opportunities in the ADR market, which they conclude is consistent with the law of one price. Kim et al. (2000) examine the daily price transmission dynamics in the ADR market. While a significant portion of the price changes in foreign markets are quickly incorporated in ADR prices, some price shocks take days to be completely reflected in ADR prices. They also find that ADRs overreact to US markets and underreact to underlying prices.

Investors can also participate in foreign equity markets through investments in CEFs. The shares of these investment companies typically trade at prices that are substantially different than the per share values of their underlying portfolios. Unlike with ADRs, the supply of CEF shares is controlled by the management of the investment company, and CEFs do not typically provide full disclosure of their portfolio holdings. When CEF share prices fail to reflect price changes in foreign markets, arbitrageurs are unable to easily correct such divergences. Pontiff (1996) documents that arbitrage impediments explain about a quarter of the magnitude of CEF pricing discrepancies. In related research, Bailey and Lim (1992), Bodurtha, Kim, and Lee (1995), and Chang, Eun, and Kolodny (1995) conclude that closed-end country funds are sensitive to U.S. returns and provide fewer diversification benefits than direct investments.

Other researchers have found that certain events can trigger divergences between CEF share prices and underlying portfolio values. Klibanoff, Lamont, and Wizman (1998) investigate the reaction of the share price of closed-end country funds to news that affects fundamentals. Local investors overreact to news that receives major local coverage but underreact to other news about foreign fundamentals. Kramer and Smith (1998), Frankel and Schmukler (1996), and Levy-Yeyati and Ubide (2000) document the closed-end country fund puzzle, which is the tendency for closed-end country funds to trade at large premiums when the country is involved in an economic crisis. Bonser-Neal, Brauer, Neal and Wheatley (1990) examine changes in international investment restrictions to show that CEF share prices reflect the level of market segmentation.

ETFs are another type of investment company that facilitates international diversification. In contrast to CEFs, ETFs face few arbitrage impediments so changes in foreign market prices should be fully reflected in ETF share prices. If the share price deviates from the portfolio value, institutional investors can arbitrage the shares through a process of in-kind redemption/creation facilitated by the sponsoring fund company. ETF shares can be created or redeemed from the fund's distributor in large blocks called creation units. When creating ETF shares, the fund's distributor requires a payment of cash and securities that approximates the holdings of the fund. A list of these securities is made available prior to the start of the trading session on the U.S. stock exchange. ETF shares are normally redeemed in the form of creation units. In exchange for the fund shares, the redeeming investor receives a combination of cash and securities from the fund's portfolio.

Researchers disagree about whether ETF share prices quickly reflect price changes in their portfolio securities. Khorana, Nelling, and Tester (1998) examine a sample of ETFs representing an investment in individual MSCI country indexes. They find that ETF share prices closely track their respective index. Tse and Martinez (2007) also investigate the returns on international ETFs. They find that ETF share prices fully incorporate the value of the underlying stock prices and are primarily influenced by the information released during the underlying country's market trading hours. In contrast, Olienyk, Schwebach, and Zumwalt (1999) document characteristics of ETF prices that may be consistent with arbitrage opportunities. These include cointegration between CEF and ETF prices and causal relationships between international ETF prices. Mazumder, Chu, Miller, and Prather (2008) find that ETFs (iShares) exhibit day-of-the-week patterns. They show that these patterns can be exploited using a dynamic trading strategy. Pennathur, Delcoure, and Anderson (2002) find that while international ETFs offer limited diversification benefits, the fund shares are still sensitive to US market returns.

3. Research questions and data

Despite the popularity of CEFs and ETFs, little is known about how the daily prices of these funds process information from the foreign markets. Our study explores three related issues. First, we examine the daily dynamics of how CEF and ETF prices respond to changes in underlying values, which are represented by the NAV and exchange rate.

To understand how the flow of information is processed, we calculate the cointegrating relationships among the variables and estimate a vector autoregression (VAR) model. The impulse response functions from the VAR system show how price shocks are transmitted to the fund prices. As the trading in domestic and foreign stock markets is not contemporaneous, we also estimate a regression model of the fund share prices using lagged variables. The final part of our study examines the profitability of a simple trading strategy involving the relationships uncovered in our analysis.

The second issue examined in this study is whether fund prices are sensitive to domestic and foreign stock market returns. Previous research documents that CEFs with portfolios of foreign securities are sensitive to domestic stock market returns. This lowers the diversification benefits associated with using these investment companies to get international equity exposure. Therefore, the analysis described above includes the Standard & Poor's 500 Index and the MSCI country indexes. The final goal of our study is to examine whether ETFs process information more efficiently than CEFs. As CEFs are less liquid and more difficult to arbitrage than ETFs, we expect to find differences in their price transmission dynamics.

[2] Federal Reserve, Flow of Funds Accounts of United States.