

Emerging Market Focused ETFs and International Diversification

An Assessment

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Abstract:

The current study provides a preliminary analysis for a relatively new segment of the ETF market. Emerging market focused ETFs have proliferated in a short span of time, and are expected to continue to grow as this particular asset class has increasing investor interest and attention. Our analyses indicate that on average emerging market focused ETFs have performed well both in absolute and relative terms for the period analyses conducted. However, the variation in our results and positive bias towards recently introduced ETFs suggest that frequently staged performance story should be interpreted with some caution. While we present evidence of high return performance, we emphasize that the return enhancement comes at a steep price. We also document that emerging market ETFs offer limited benefits for international diversification as their exposure to US market factor is significant. The findings reported in this study suggest that enhanced returns can only be achieved by taking progressively higher risks. In this regard, ETFs appear to have questionable value from portfolio diversification perspective.

I. Introduction

The remarkable pace of innovation in financial markets has expanded the investment products available to individual and institutional investors. The vast array of investment products allow investors to gain exposure to virtually any segment of the global economy across regions, countries, industries and business segments.

Index mutual funds introduced in early 1970s was an early step in this innovation cycle. In an article published in the Financial Analyst Journal, Feldstein and Renshaw (1960) indicated that only 11 of the 89 diversified funds had returns higher than those of the Dow Jones Industrial Average and proposed the creation of an index fund. Although the initial reaction to the proposal was skeptical, the emergence efficient markets theory provided a strong intellectual support for the idea, as practitioners and academics increasingly emphasized the difficulty and costs of outperforming broad based market indices. First of many index mutual funds was introduced by The Vanguard Group in 1976 (Statman, 2005).

The underlying portfolio management strategies of index mutual funds are referred to as “passive equity portfolio management strategy”. A passive equity portfolio management style attempts to design a portfolio to replicate the performance of a specific index. The fund manager typically accomplishes this by replicating the composition of an index exactly, meaning that he/she will buy the exact securities comprising the index in their exact weights and alter these positions anytime the composition of the index itself is changed (Brown and Reilly, 2006). Since the changes to most indices do not occur frequently, portfolio configuration also does not change frequently. This feature of the index funds leads to low portfolio turnover and low management expense ratios. The success of a passive portfolio manager is judged by the accuracy of tracking the specified equity index which is referred to as the benchmark index. As passive investing has grown in popularity, money managers have created an index fund for virtually every segment of the financial markets (Fernholz, Garvy and Hannon, 1998). As of year end 2006, 342 index funds managed total assets of \$749bn. The demand of index funds remained robust since 2000 attracting \$25bn to \$40bn in net new cash flows (ICI Factbook, 2006).

The major advantage of index funds is that they offer an inexpensive route for investors for both diversification and exposure to a particular market or industry segment. However, index mutual funds, as any other mutual fund products, can only be liquidated at the net asset value of the fund determined at the close of the markets.

In other words, while investors can buy and sell mutual funds at any time throughout the day, all investors receive the same transaction price which is the net asset value of the fund. Index fund holder may also be burdened by tax consequences as fund redemptions may require liquidation of fund assets leading to capital gains taxes.

Until the arrival of exchange traded funds (ETFs) in 1993, diversified investment vehicles were exclusively offered by mutual funds to the investment community. The ETFs not only did terminate the monopoly of mutual funds, but also created a formidable challenge in highly profitable segment of the index mutual funds. While ETFs are close substitutes for index mutual funds, they have also distinct characteristics. Exchange Traded Funds (ETFs) are essentially certificates representing a share of a portfolio of stocks, commodities or bonds. As in an index mutual fund, the underlying portfolio of stocks typically tracks a well known index, such as Standard and Poor's 500 (S&P500) and Morgan Stanley Capital International (MSCI). ETFs allow investors to trade passive investments in indices in the same way they would trade any other stock. This allows investors to time their entries and exits from the market with great precision. It also allows short selling, that is impossible with a conventional open-ended index fund. The most significant attribute of the ETFs from an individual investor's perspective is that they empower the investors to make their own asset allocation and market timing calls, and allow them to make sectoral bets.

The ETF industry has experienced a meteoric growth from a mere \$58bn in 1993, to an estimated \$700bn in 2007. Morgan Stanley projects ETF assets under management to hit \$2tr by 2011. Although ETFs have grown rapidly in the span of a few years, it is still an instrument dominantly used by professional investors. Boston based research firm Advisor Perspectives, which tracks the wealth management industry, indicates that hedge funds are the most active investors in ETFs (Arthurs, Nov 5, 2007, p.1).

The appeal of ETFs for individual investors is likely to increase, since these products facilitate cost effective allocations to under weighted asset classes such as international equities. A particularly valuable opportunity is the ability to diversify into emerging market equities through a range of country focused, regional and diversified emerging market funds. There are 217 emerging markets focused ETFs

only in US and the number of these funds is increasing. In 2007, 73 new emerging market focused funds were introduced in the US market alone¹.

While the various attributes of index mutual funds have been extensively analyzed in the finance literature, the studies focusing on exchange traded funds are just beginning to surface. In this study, the objective is to explore the risk and return characteristics of a narrow segment of ETFs, namely emerging market focused ETFs, and to evaluate these instruments from international diversification perspective. Intuitively, emerging market focused ETFs are expected to offer low cost international diversification opportunities for individual investors. However, like American Depository Receipts (ADRs), international ETFs are also likely to be exposed to US idiosyncratic risks. The extent of exposure to US risk factor may undermine the effectiveness of ETFs as diversification tools. The analysis of diversification potential particularly focuses on this prospect following the methodologies used in the assessment of international diversification benefits of closed-end country funds (e.g. Chang, Eun and Kolodny, 1995)

The paper unfolds in the following order. The section two offers a detailed description and the mechanics of ETFs, and provides a short survey of the development of the market for this product. The section three revisits the motivation for international investments and particularly investments in emerging markets and reviews diversification opportunities created by ETFs for individual investors. The section four introduces the methodology and section five presents the empirical findings. Section six concludes the paper with final remarks.

II. An Overview of ETFs

A Brief History

The index fund idea was motivated by the increasing attention on the “Efficient Market Hypothesis” and widespread intellectual support afforded to it in the early 1970s. The idea also soon caught on the investment practitioners. Burton Malkiel’s call for an index mutual fund articulated in his infamous “*A Random Walk Down Wall Street*” published in 1973, found an enthusiastic response from Vanguard by the end of 1975. Vanguard had created its first low-cost-indexed mutual fund tracking the S&P500. The considerable success of the index mutual-fund model allowed fund managers such as Vanguard to build their names around the strategy of

¹ The numbers quoted above are based on a search in Bloomberg ETF database on November 5th 2007.

low-fee, passive management funds. However, the structure limited the flexibility of large institutional investors seeking large intra-day trading opportunities. The emergence of some index futures allowed investors to buy and manage stocks replicating the indices, but investors continually sought more liquid, accessible ways to trade on sectors and to hedge their portfolio positions. Also, as it was argued by Gastineau (2001) futures contracts were relatively large in notional size and the varied margin requirements for carrying futures contracts were cumbersome and expensive for small investors. The demand for a SEC regulated portfolio product led to the development of index participation shares (IPS). Index Participation Shares, one of the first products introduced, were a relatively simple, synthetic proxy for the S&P 500 index. While other indexes were also available, S&P 500. IPS began trading on the American Stock Exchange and the Philadelphia Stock Exchange in 1989 and gained instant popularity among investors. A lawsuit by the Chicago Mercantile Exchange (CME) and the Commodity Futures Trading Commission (CFTC) charged that IPSs were essentially future contracts which led to the demise of the product. A federal court ruling in Chicago forced stock exchanges to close down IPS trading (Reference ___)

The efforts to find replacement products for IPS led to an innovative introduction in Toronto Stock Exchange. The Toronto Stock Exchange Index Participations (TIPs) were a warehouse receipt-based instrument designed to track the TSE-35 and TS-100 indices. These products were traded actively and attracted substantial investment from Canadians as well as international investors. TIPs were unique in their expense ratio. The ability of the trustee to lend out the stock in the TIPs portfolio and frequent demand for stock loans on shares of large companies in Canada led to what was in effect a negative expense ratio at times. However, the TIPs proved costly for the Exchange and for some of its members were unable to recover their costs from investors. Early in 2000, the Toronto Stock Exchange decided to get out of the portfolio share business, and TIPs positions were mostly liquidated (Gastineau, 2001).

Another replacement effort emerged with “Supershares”. These complex products nesting a trust and mutual fund one inside each other launched by Leland, O’Brian, Rubenstein (LOR) Associates, but proved to be costly for the investors. The complexity of the product also prevented its widespread use and they were liquidated soon after they were created. Supershares never enjoyed the active trading attained by TIPs.

The introduction of Standard and Poor's depository receipts (SPDR) was the first successful U.S. attempt by AMEX towards an index product. SPDRs are relatively simple unit trusts with an S&P 500 portfolio, which can be adjusted as index changes. The unit trust structure was preferred by the AMEX to attain low costs. Because of the uncertainty about the demand, AMEX wanted to avoid the costly infrastructure of mutual funds, which are much more expensive to manage due to the costs associated with the board of directors. SPDRs were an immediate hit and attracted substantial and steady fund flows. SPDRs are considered as the first successful U.S. ETFs, marking the emergence of a new financial product.

US investors were introduced to foreign index funds through World Equity Benchmark Shares (WEBS) by Barclays Global Investors. WEBS, now called iShares, are the first funds holding non-US stocks and they have emerged as a popular alternative to closed-end country funds for international diversification. As unit investment trusts, iShares are listed on the American Stock Exchange (AMEX) as traded securities. Each iShare is constructed as an optimized portfolio that tracks the underlying Morgan Stanley Capital International (MSCI) index in a foreign country.

While ETFs focused on international equities gained popularity since mid 1990s, more recent trend is the introduction of ETFs that invest in particular market sectors or industries. Fund companies introduced 67 sector/industry ETFs in 2006, and total net assets of these sector-specific ETFs amounted to a little more than \$58 billion (ICI Factbook, 2006). About one-third of the increase in assets of sector/industry ETFs during the past couple years is attributable to the ETFs that track commodities. Assets of these nonregistered ETFs have grown substantially, from slightly more than \$1 billion in 2004 to nearly \$15 billion in 2006. In 2006, approximately 70 percent of non-registered ETF assets tracked the price of gold through the spot and futures markets. ETFs that follow highly specialized indexes also are a very recent innovation. These ETFs accounted for approximately 10 percent of total net issuance of ETFs in 2006 and less than 3 percent of total assets at year-end.

In U.S. ETFs registered under the Investment Company Act of 1940 increased from 1 in 1993 to 359 in 2006 (ICI Factbook, 2007). Assets of ETFs have also grown rapidly with new issuances which amounted to \$334bn during the eight years spanning from 1998 to 2006. Deborah Fuhr of Morgan Stanley estimates the total number of ETFs worldwide at around 732 with \$573bn assets under management (Tassel, Jan 22, 2007, p.12). Barclay Global Investors dominates the industry, composed of 64 managers with its iShares brand. BGI, with \$284bn of ETF assets under management, is followed by State Street Global Advisors (SSGA) and Bank of

New York. Smaller managers such as Amvescap, Wisdomtree and Claymore have also been actively introducing funds since 2006 (Tassel, Jan 22, 2007, p.12)

Table-1: US ETFs by investment focus

Year	Total	Domestic Equity	Global/ International Equity	Commodities ¹	Bond
<i>Assets</i> <i>(millions of dollars, end of year)</i>					
1993	\$464	\$464	–	–	–
1994	424	424	–	–	–
1995	1,052	1,052	–	–	–
1996	2,411	2,159	\$252	–	–
1997	6,707	6,200	506	–	–
1998	15,568	14,542	1,026	–	–
1999	33,873	31,881	1,992	–	–
2000	65,585	63,544	2,041	–	–
2001	82,993	79,977	3,016	–	–
2002	102,143	92,904	5,324	–	\$3,915
2003	150,983	132,332	13,984	–	4,667
2004	227,540	184,045	33,644	\$1,335	8,516
2005	300,820	215,807	65,210	4,798	15,004
2006	422,550	276,142	111,194	14,699	20,514

Source: Investment Company Institute ETF Annual Statistics 2006.

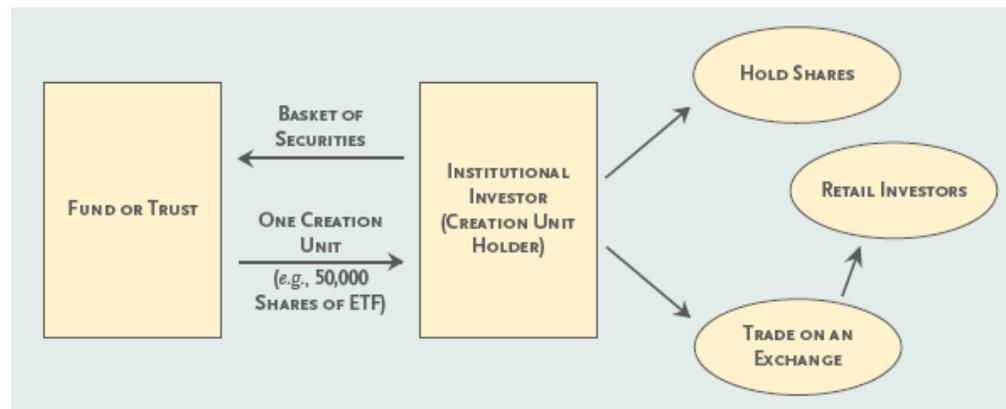
Structure and Mechanics

There are two common legal structures used in ETF design: open-end mutual fund structure and unit investment trusts (UITs) structure. Despite the reliance on unit investment trusts at the inception of SPDRs, most of the currently traded ETFs are structured as open-end funds. These ETFs are registered under the Investment Company Act of 1940 and operate with SEC exemptions. ETFs structured as open-ended funds can technically employ optimization and sampling techniques rather than full replication. In other words, these ETFs can exclude certain securities and deviate from their benchmark constituent weightings. The open-end structure also allows funds to hold other financial securities such as cash equivalents and futures, and allows for share lending which may generate extra income. Dividends are typically reinvested in the fund on the day of receipt and are paid quarterly or semiannually. A tradeoff for the inherent flexibility of the open-ended structure is the tracking errors. Since the benchmark is not fully replicated, tracking errors are common in these ETFs. In contrast, the Unit Trust structure requires full replication of the holdings of the underlying index, and stock lending is not allowed. Dividends paid on the underlying stocks are usually held as cash and paid out quarterly. Some of the most popular ETFs such as SPDRs, and Nasdaq-100 are structured as unit investment trusts. As of 2006, nearly 97 percent of total ETF assets were registered with the SEC under the Investment Company Act of 1940 (ICI Yearbook, 2007). The

remaining 3 percent of ETF assets, which are commodity-based, are not registered with or regulated by the SEC under the Investment Company Act of 1940. While the commodity-based ETFs are regulated by the Commodity Futures Trading Commission (CFTC), those that invest solely in physical commodities are not regulated by the CFTC.

An ETF is initiated by a sponsor, who chooses the ETF’s target index, determines which securities will be included in the “basket” of securities, and decides how many ETF shares will be offered to investors. ETF shares are created when an institutional investor deposits with the ETF fund or trust a pre-specified basket of securities, identical or nearly identical in composition to the securities in the ETF’s target index (see Figure 1).

Figure-1: Initiation of an ETF



Source: ICI Factbook 2007

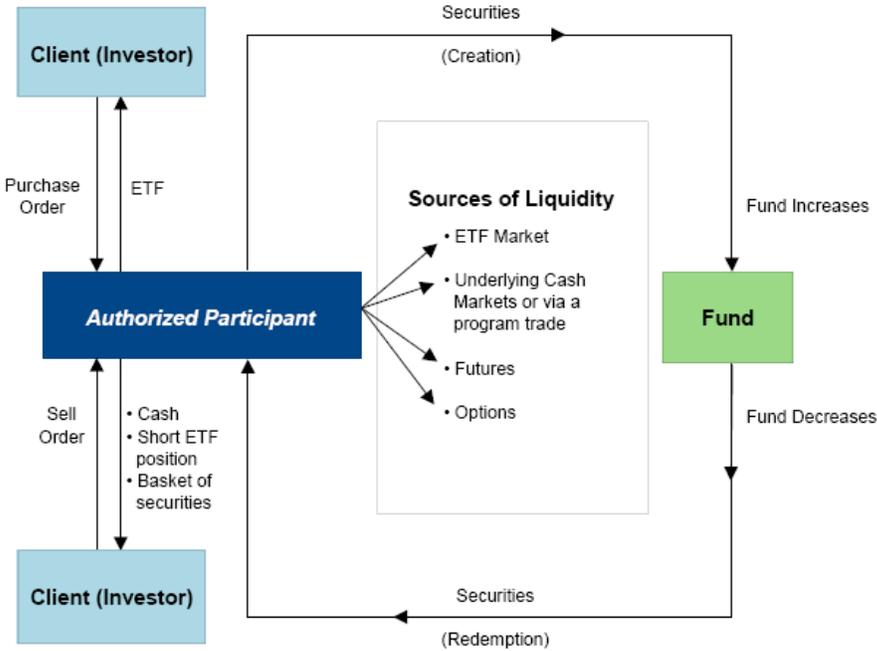
In return for this basket of securities, the ETF issues to the institutional investor “creation units” that each one consist of a specified number of ETF shares². The institutional investor who holds the creation units can either keep the ETF shares that make up the creation units or sell them on a stock exchange. ETF shares are listed on a number of stock exchanges, where investors can purchase them like any other publicly listed and traded equity. A creation unit is liquidated when an institutional investor returns to the ETF the specified number of shares in the creation unit; in return, the institutional investor receives a basket of securities reflecting the current composition of the ETF.

The net asset value (NAV) of an ETF is defined as the value of the underlying securities net of accrued dividends and management fees. Unlike index mutual

² The number of shares specified in the creation units is usually multiples of 50,000 ETF shares.

funds, ETFs are traded at a price that might differ from the NAV³. For investors, deviations from NAV may have costly implications, particularly when ETFs are used for hedging purposes. However, the creation and redemption process outlined in figure-2 introduces a simple arbitrage opportunity that is expected to eliminate any significant deviation from the NAV. For each traded ETF, an estimated NAV which is also called “the indicative Optimized Portfolio Value (IOPV)” is reported every 15 seconds. This transparent process, revealing price-NAV deviations on an intra-day basis, is expected to lead to quick corrections of the significant deviations. For instance, if the price of an ETF trades above NAV, authorized participants⁴ (APs) or market makers sell the ETF shares to investors and buy the underlying securities in the market to create new shares. As it is described in Figure-2, authorized participants can create shares by delivering the portfolio of securities in the index

Figure-2: Creation and Redemption Process of ETF shares



Source: Morgan Stanley Quarterly ETF Review, 20XX, p.xx

that makes up a creation unit to the trustee. The APs execute the arbitrage in two steps: First an AP short sells ETF shares to the investors. Simultaneously, the AP buys the shares making up the ETF portfolio, typically in block size that makes up at

³ Index mutual funds are traded at NAV determined at the end of the day. Regardless of the time of trading, each investor pays or receives the NAV determined by the fund at the end of the trading day. In contrast, the investor receives or pays the market price for the ETFs at the time of trading.

⁴ Authorized participants are essentially market makers in ETFs. They directly transact with fund trustee in the creation or redemption of ETF shares.

least one creation unit which is typically multiples of 50,000 ETF shares. The AP delivers these shares to the ETF trustee in exchange for ETF shares. Similarly, if an ETF is selling at a discount an AP can buy the ETF shares, sell short the underlying securities, and then redeem the shares underlying the ETF from the trustee to cover the short position.

ETF shares can only be redeemed in creation units, mainly “in-kind” for a portfolio of stocks held by the fund. A critical advantage of the “in kind” distribution of securities is that it does not create a tax event. In other words, even if the redeemed shares have a composite value higher than their acquisition cost, redemption does not result in a taxable capital gain, in which the opposite will occur if the fund sells securities and delivers cash. This is an advantage of ETFs versus an open-end indexed mutual fund, in which an investor would typically have to sell securities to meet cash redemptions. However, for certain emerging market focused ETFs, cash is used in lieu of securities in the creation/redemption process, which may undermine the inherent tax advantage of ETFs.

A study by McNeally and Emmanuel (2001) shows that NAV lies between bid and ask prices 92% of the time. It is important to note that there are substantial transaction costs involved in the arbitrage process described above. These costs are likely to be significantly higher for the emerging market focused ETFs compared to other ETFs. Therefore, it is intuitive to expect larger premiums or discounts for the emerging market focused ETFs.

Another important impediment for the arbitrage is the government imposed restrictions which may hinder the effectiveness of the creation and redemption process. Huguen (2003) discusses the implications of government imposed capital flow restrictions on arbitrage activities in the context of Malaysia. According to Huguen (2003), Malaysian iShares traded within a modest premium-discount range of (-0.37% -2.35%) in the period preceding the Asian crisis. However, The capital flow restrictions imposed by the Malaysian government in the aftermath of Asian crisis escalated the premium-discount range to a much wider (-23.84%,+19.81%) band.

ETF Trading & Liquidity

ETFs are highly liquid securities and can be traded easily. In US, ETFs are traded in Amex, NYSE and NASDAQ. Although Amex has about 482 ETFs listed, 20 ETFs listed in NASDAQ account for 47.1% of the trading volume (FT, Jan 22, 2007). NYSE accounts for 48% of the total trading volume with 162 listed ETFs (Tassel, Jan 22, 2007, p.12)

ETFs are bought and sold through any broker. While ETFs are marketed as low expense ratio products, transaction costs associated with ETF trading may be steep. Initial fees and exit fees typically range between 2% to 5% (Bernstein, 2002).

ETFs can be purchased in odd and round lots. All ETFs can be purchased on margin, generally subject to the same constraints that apply to the common stocks. As other stocks, ETFs can be sold short, but they are not subject to the short selling constraints imposed on common stocks that require shares to be sold short only on an uptick⁵.

The liquidity of ETF shares depends on the liquidity of the underlying securities. Although in US exchanges largest ETFs are listed among the highest volume equities⁶, this does not guarantee liquidity of ETFs. In the sample analyzed in this study, the average daily trading volume for emerging market ETFs ranged from 16,990 to 3.7 million shares. Low trading volume may lead to large transaction as well as large and persistent ETF premiums or discounts. While this study does not address the issue of transaction costs, it offers an analysis of premiums and discounts.

Tracking Errors

While ETFs are marketed as products offering the returns of the underlying index, the index returns and ETF returns may diverge from each other. The deviation from the underlying index returns is referred as tracking error. A number of factors contributes to the tracking errors. The most obvious factor is the management fees or expense ratios. This usually varies depending on the liquidity of the underlying index, but it is generally low compared to actively managed funds. For ETFs anything over 1% is considered high and usual range starts with 15 basis points (Financial Times, “Special Report on ETFs”, Nov 5, 2007). Other factors contributing to the tracking errors are less obvious and include cash drags, replication errors and implementation charges.

The ETFs could carry excess cash from dividend distributions that had to be either reinvested or distributed back to investors. While Indices were assumed to immediately reinvest the cash, ETFs may not be able to reinvest dividends. Dividend reinvestment problem is likely to be more severe for ETFs structured as unit trusts. However, since ETFs do not have to maintain a cash balances to meet redemption needs, cash drag is not as severe problem as in the case of index mutual funds.

⁵ ETFs are exempt from Rule 10(a)-1 downtick which provides flexibility for institutional investors and hedge funds.

⁶ The three most heavily traded securities on US exchanges are the world’s three biggest ETFs tracking the S&P500, The NASDAQ 100 and Russel 2000 index (Financial Times, Special Report on ETFs November 5th,2007)

The regulatory restrictions imposed on fund composition may lead to replication errors particularly for some specific groups of ETFs. According to ICA of 1940, funds cannot invest more than 25% of total assets into a single security, and “non-diversified” portfolios are prohibited from investing more than 50% of their funds in companies that comprise over 5% of the portfolio. This is particularly an issue for sector ETFs, and potentially for some emerging market ETFs with high concentration ratios. ETFs can avoid these regulation issues through portfolio construction techniques based on correlation and optimization, where they invest a portion of the fund attributable to one company into a basket of other securities, emulating the company and violating the ICA rules. However, such restrictions, limiting the full replication of the benchmark index, are likely to cause some differences between ETF and the benchmark index returns.

The majority of index funds review their portfolios on an annual basis to make adjustments for the changes in the underlying index which are typically triggered by corporate restructuring and changes in company size. A natural outcome of these reviews is the rebalancing of the portfolio which may take place in a highly speculative environment, where prices are distorted. Although, most sophisticated funds employ complex optimization techniques to mitigate rebalancing problems, tracking errors often cannot be eliminated.

Despite the fact that the majority of the ETF providers report some measure of tracking error, there is no standard methodology to measure the tracking errors, and reported errors are not always comparable. A simple measurement of the difference between the ETF returns and the underlying index returns may not be necessarily useful as the variation during this period is also significant. A relatively sound method used to measure the tracking error is the standard error of the difference between the ETF and Index returns. Alternatively, a measure of relative volatility of the ETF and the index also captures the tracking error better than mere return differences.

III. International Diversification, Investment in Emerging Markets and ETFs

The economists have convincingly argued that U.S. investors can benefit from international diversification (Lee, 2001). The proponents of the argument established that investors holding both US and foreign stocks may achieve a better combination of risk-return in comparison to investors holding purely domestic portfolio (Hirsch and Mussavian, 2002). This insight gained growing acceptance among investment professionals as international investments outperformed US investments for most of

the 1960s, 1970s and 1980s (Bullen et.al Viewpoint, 2002). Despite considerable difficulties and additional costs, institutional investors tapped international investment opportunities to enhance portfolio performances. However, the idea has been met with considerable resistance by individual investors primarily due to the lack of products to help access international markets, and misconceptions about overseas investing. The individual investors' skepticism grew further as US equities enjoyed a spectacular run in the 1990s. By the end of 2001, individual investors in US defined contribution plans had only 3% allocation to international equities. In contrast, international equity allocations of corporate pension plans were about 16%. According to a report from Greenwich Associates, US pension and endowment funds raised their exposure to foreign equities by nearly \$440 billion over 2003-05 (Morgan Stanley Global Economic Forum, Stephen Jen and Charles St-Arnaud, November 14, 2006).

Despite the stark contrast between the behavior of individual and institutional investors, it is safe to argue that overall US investors exhibit a strong home bias. In other words, US investors tend to shy away from international assets and overweight home assets in their portfolios leading to forgone diversification benefits. A study by Cooper and Kaplanis (1995) emphasized the extent of domestic entrenchment of the US investors. Their study reports that the average correlation of 16 national stock market indices with the US market was 0.55 during 1986-1994 time frame. This estimate suggested that a 60% allocation to index funds from these 16 countries could reduce the standard deviation of the returns by 50% for US investors without sacrificing expected returns. However, the same study reported that as of 1993, an examination of institutional investor portfolios revealed a 95% allocation to US equities as compared to 42% share of the US market capitalization in the global equity portfolio. The difference between 95% and 42% is a measure of home bias exhibited by the US portfolios at that time. While home bias has declined over time, both for US and other country investors, it still remains to be considerably high. For instance, a recent study by Sorensen et.al (2007) indicates a marginal increase in the share of foreign investments in US portfolios from 9.91% to 11.18% from 1997 to 2001.

An frequently cited reason for home bias is the increasing correlations among capital markets which lead to the argument that the benefits of international diversification are overstated. While the concerns about the increasing correlations were verified by some empirical studies (e.g. Longin and Solnik (1995), Goetzmann, Li and Rowenhurst (2001)), the case for international diversification still find its

proponents suggesting the strong influence of country factors (Solnik, 2006; Estrada et.al 2006).

The preceding debate about increasing correlations is one of many factors that can explain the recent surge in interest in the emerging markets. Emerging markets are also positively correlated with markets in developed countries, but the correlations are more moderate. For instance, the average correlation between S&P IFC Emerging Market index and MSCI world index is reported to be 0.62 during the years between 1992 and 2002(Solnik, 2006). Other factors fueling the interest in emerging markets can be broken down to structural and cyclical components. The economic reform and restructuring efforts undertaken by a number of emerging market economies since early 1990s have increased productivity, improved physical and institutional infrastructure and established the foundation for sustainable economic growth. It is also important to note that there have been considerable improvements in macroeconomic landscape revealed by low inflation, fiscal surpluses and reduced volatility in growth rates. High economic growth and increasingly conducive business environment inevitably increase wealth, producing new groups of consumers that both new and existing firms can tap to generate higher earnings as seen in India, China and Brazil. Additionally, maturing institutional infrastructure, exemplified in better functioning financial markets and governance systems, is likely to improve quality and reliability of corporate finance and reduce asymmetric information problem leading to a decline in perceived risks of emerging market firms. These structural factors combined with an almost five year commodity price boom and to some extent low returns in developed markets explain the proliferation of emerging market focused exchange traded funds.

Theoretically emerging market focused ETFs should provide convenient and cost effective diversification and return enhancement opportunities for US centric investors. Exponential increase in the number of ETFs focusing on emerging markets suggests that investors are perceptive of these theoretical predictions. However, investors should also be cognizant of the potential risks that may undermine the diversification and return enhancement objectives. A case in point is the spectacular performance of emerging market indices since 2002. The current performance of emerging market economies cannot be fully explained by structural improvements. The largest emerging markets such as Russia and Brazil as well as scores of commodity exporting emerging market economies have been enjoying a commodity market boom overlapping the same period. A reversal in commodity prices triggered by a slowdown in global economy is likely to have a significant negative impact on the five year bull market. This prospect is only one of many risk

factors that should be recognized by the investors. Apart from the possibility of a reversal, there are well known attributes of the emerging markets such as high volatility and illiquidity that deserve investor attention. For example, despite the recent surge in its value, one has to be cognizant that iShares Brazil lost more than 60% of its value between the beginning of 2001 and September of 2002. One reason for emerging markets' volatility has to do with their changing nature. Although we argued above that the emerging market landscape has been fundamentally changing, one has to keep in mind that these countries still have a long way to establish robust financial or political systems, and insulate themselves from occasional external shocks. Last decade were full of episodes of financial crises, which set off chain reactions engulfing a region and sending several markets plummeted by eye popping percentages.

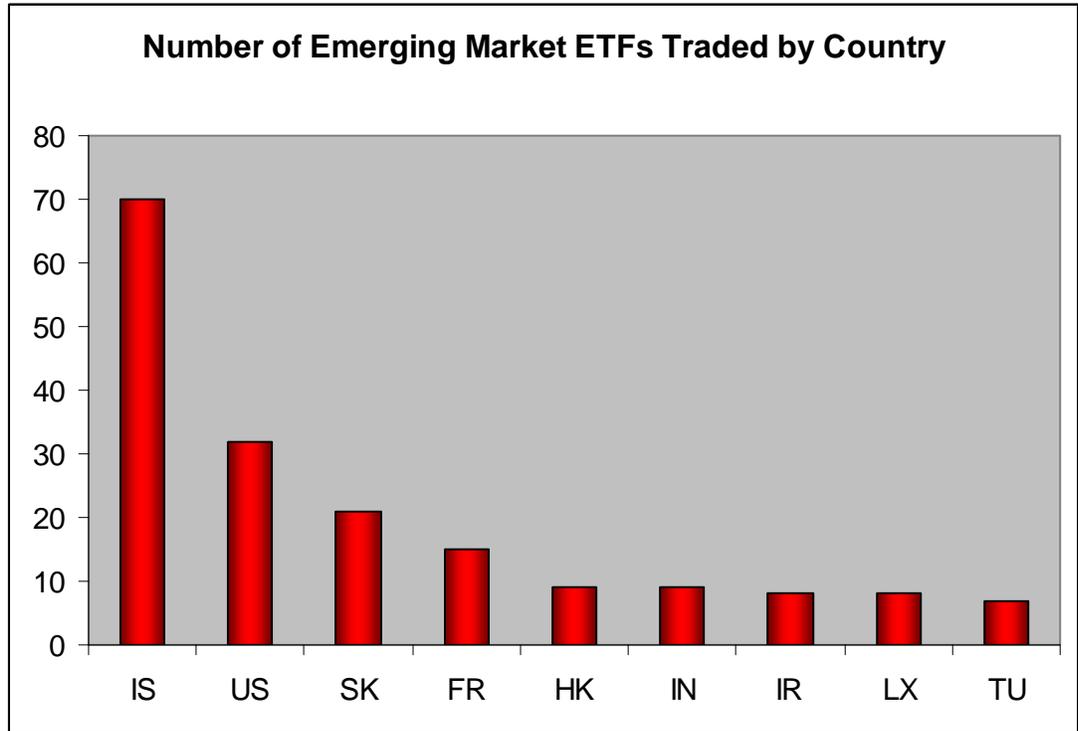
Other risks factors are directly linked to the structure of ETFs portfolios. One often voiced concern is the linkage between index compositions and the diversification benefits. A case in point is the iShares MSCI Emerging Market Index which emphasizes the largest exchanges and stocks in emerging markets. This creates an inevitable overlap with diversified international fund holdings. In fact, companies like Samsung which makes up about 8.2% of iShares Emerging Market Index is also a top holding of many international funds. Along the same lines, it is argued that increasing correlations between the equity markets of the countries like Taiwan, Mexico and South Korea and US dampens the diversification benefits of emerging market ETFs since these countries often make up 50% or more of the key emerging market indices. Since many leading companies in emerging markets are becoming increasingly involved in the global supply chain, their performance are increasingly linked to the performances of U.S. companies and US economy. Consequently, this raises questions about the diversification value of the broad emerging market indexes. Another key concern is the domination of the indices by a handful of companies in just one or two industries and huge sectoral exposures. For example, 25% of the iShares South Africa is allocated to materials stocks mostly in the mining industry; iShares Taiwan held almost 60% of assets in technology; MSCI Mexico held roughly 40% of its portfolio in telecommunications services. Such concentration brings a great deal of sector-related risk.

Overall, the benefits and risks associated with emerging market focused ETFs should be carefully assessed by investors. In section IV, we describe the methods employed to gain further insights on a number of issues raised in the preceeding review, and in section V we present descriptive and empirical findings.

IV. Data and Methodology

The sample is composed of 24 ETFs issued by various fund managers including Barclays, State Street and Vanguard. At the time of the sample compilation 217 emerging market focused ETFs were traded around the globe. These ETFs were identified through a search in Bloomberg ETF database. About 32 of these ETFs were traded in the US, and 73 of the 217 ETFs were introduced in 2007. While the largest number of Emerging Market focused ETFs are traded in Israel, the second ranked US market has the largest amount of funds under management or the largest amount of market capitalization.

Figure-3: The Numbers of Emerging Market Focused ETFs by Country



Source: Bloomberg

The availability of a sufficiently long time series limited the sample size and we included only 24 ETFs in the sample. For each fund we compiled daily price, net asset value (NAV) and volume from the inception date through November 27th 2007. About half of the ETFs in the sample were introduced in 2006 and 2007 and naturally we have a relatively short time series for analysis. While the short time series undermines the credibility of the estimates developed in the analysis, these

ETFs were included to have a tentative look at a larger group of funds. Some analyses were only confined to funds with sufficiently long time series.

In Table 2 some basic information about the ETFs including name, ticker symbol, country, geographic focus and the inception date is reported. The market capitalization of the funds in the sample ranges from \$0.03bn to \$28bn with an average fund capitalization of \$4.15bn. The median fund capitalization is \$1.05bn.

Methodology

We first start with an overview of the descriptive characteristics of the daily ETF returns and then turn our attention to the annualized risk-return and performance analysis. We calculate two widely used performance indicators in fund performance analysis: the Sharpe Ratio and Treynor Measure. Sharp ratio (Sharpe, 1966) is a simple reward-risk ratio which favors portfolios with high reward to risk ratios. While the reward is the return generated by the portfolio in excess of risk-free rate of return, risk is construed as the total risk of the portfolio. We calculate the excess returns by utilizing annualized mean portfolio returns and average 3 months US Treasury bill yields for the sample period.

$$SR_p = \frac{R_p - R_f}{\sigma_p} \quad (1)$$

The “Treynor Ratio” introduces a risk metric consistent with the Capital Asset Pricing Model. Since the model suggests that investors should expect to be compensated only for systematic risk of the portfolio, Treynor argued that portfolio performance should also be based on the systematic risk of the portfolio rather than the total risk.

$$TR_p = \frac{R_p - R_f}{\beta_p} \quad (2)$$

The TR regards portfolio systematic risk as the relevant risk metric, and calibrates portfolio excess returns with respect to portfolio beta.

In addition to these widely used performance indicators we use a relatively new performance metric suggested by Roberts and Sortino (1991). Sortino ratio is based

on downside risk and is motivated by the widely reported empirical results that the portfolio returns are not normally distributed. Sortino ratio is given as follows:

$$\text{Sortino Ratio}_p(\theta, B) = \frac{R_p - B}{\sqrt{\text{LPM}_\theta(B, r_p)}} \quad (3)$$

Where θ is a measure of investor risk tolerance and B is the benchmark return. While $\theta=1$ captures risk neutrality, $\theta>1$ implies risk aversion. A common choice to define risk averse investor's preferences is $\theta=2$. A general form of Lower Partial Moments (LMP), which describes downside risk, is given as (Bawa et.al, 1977 and Kuo and Mateus, 2006):

$$\text{LPM}(\theta, B) = \frac{1}{N} \sum_{t=1}^N \text{Max} \left[0, (B - r_p)^{\theta} \right] \quad (4)$$

A large Sortino ratio implies low risk of large losses occurring. Therefore, a higher Sortino Ratio implies higher performance. The Sortino Ratios and semi deviations (LPM) reported in Table-3 use risk tolerance level of 2 and benchmark returns set at risk free rate.

The second part of the analysis focuses on ETF premiums and discounts. The discussion in section 2 emphasized that unlike closed-end funds, ETFs are created or redeemed at will and therefore are not expected to experience large premium and discount fluctuations akin to closed-end country funds. This has gained particular importance as many investors in closed-end funds found out that the market price of the fund remains below the value of its underlying asset base. In contrast, the NAVs of the international ETFs fluctuate according to changes in the market value of the underlying index series' security holdings and changes in the exchange rate(s) between the U.S. dollar and the subject foreign currency/currencies. Market prices of ETFs also fluctuate because of the changes in NAV and supply and demand on the particular exchange that the ETF is traded. Therefore it is natural to expect ETFs to trade slightly above or below NAV. However, as ETFs can be created and redeemed in Creation Unit aggregations, large premiums or discounts to NAVs in ETFs should not be sustained. Since ETFs can be created and redeemed every business day, large institutional investors are expected to arbitrage away any significant discounts or premiums to NAV. For instance, if an ETF trades at a discount, institutional owners will buy blocks of the ETF at the lower price and redeem them for the underlying shares to arbitrage the price discrepancy. Thus we expect market prices and NAVs of

ETFs to stay within a narrow band. On this backdrop, we expect ETF premiums and discounts to be insignificant. We gain some intuition on the size and significance of the ETF premiums and discounts by analyzing distributional characteristics of the premiums and discounts. The significance is judged by a t-statistic in the form of,

$$t = \frac{\sum_{t=1}^N |PM_t|}{(\sigma \sqrt{N})} \quad (5)$$

where $|PM|_t$ and σ are the absolute value of premiums and their standard deviation, respectively, and N is the number of observations.

The third and final part of the analysis is focused on the emerging market ETFs' diversification capacity. The main question addressed in this part of the analysis is whether the ETF prices quoted on the US exchanges closely mimic the corresponding foreign index. The underlying concern is whether ETFs provide US investors with full exposure to a non-US index or that ETFs contain a substantial component of US specific risk. Accordingly, significant exposure to US specific risk implies diminishing diversification benefits.

In order to address the question, a regression framework motivated by international asset pricing models is used (Yang and Zhong, 2005). These models (e.g. Harvey, 1991 and Beakert and Harvey, 1997) allow for exposure to both home market factor and the US market factor under the mild segmentation assumption. More specifically the model

$$E(R_{i,t}) = \alpha_i + \beta_i^{US} R_t^{US} + \sum_{j=-1}^{+1} \beta_{ij}^H R_{i,t+j}^H + \sum_{j=-1}^{+1} \beta_{ij}^{FX} FX_{i,t+j} \quad (6)$$

where $E(R_{i,t})$ is the i -th ETF's expected return, defined as the first difference of log prices per share at time t ; $R_{US,t}$ is the US market return; $R_{i,t}^H$ is i th ETF's home-country stock market index return; $FX_{i,t}$ is the component of the first difference of log bilateral exchange rate in terms of the i th ETF's home country currency per US dollar that is orthogonal to R_t^{US} and $R_{i,t}^H$. R^{US} , R^H , and FX are parameters representing the sensitivities of an ETF to the US market return, home-country market return, and changes in the exchange rates.

The model in equation (6) is based on the existing literature on ETFs and closed-end country funds (e.g., Chang, Eun and Kolodny, 1995; and Hong and Lee, 2002; Yang and Zhong, 2005). The international nature of ETFs presents a slight complication in

terms of synchronicity of the prices used in the model. While the ETF prices and the US market returns are both recorded at the US market closing time of the day in New York, the home-country indices and exchange rates are recorded at different times in the day because of different time zones involved. Therefore, the lead and lag terms of the home-country MSCI index return and the exchange rate changes on the right hand side of equation (6) are used to account for the possible non-synchronicity of different markets.

Yang and Zhong (2005) suggest orthogonalization of the US and Home market indices to attain better interpretations of the parameters in the model. In the spirit of Yang and Zhong (2005) but in a slightly different manner, US and Home market indices are orthogonalized to obtain pure US and pure home country factors. In other words, the US risk factor used in the model is derived from residuals obtained by regressing US market factor on home market index and exchange rate changes. Similarly, home market index returns are regressed on the US market index returns and exchange rate changes, and residuals from this regression are used to represent home market risk factor.

If an ETF facilitates effective diversification, we expect its return to exhibit significant exposure to the home-country specific market risk, and no exposure to the orthogonalized US market risk. If an ETF does not provide any diversification benefit, we expect it to have significant exposure to only the US market risk but not the home-country market risk. A significant exposure to idiosyncratic US risk factor may imply the presence of a non-fundamental component of ETF prices that can be attributed to the limits of international arbitrage. The expected signs of both US and home market betas are positive as ETF returns move in tandem with market index returns.

The sign of the beta on the exchange rate return may be either negative or positive. For example, an appreciation of the US dollar relative to an ETF's home-country currency may cause a decrease in the expected dividend distributions in US dollar from the underlying securities of the ETF to US investors. This results in adverse stock price effect for US investors. On the other hand, the appreciation of the US dollar may have a positive affect on the ETF returns either through cash flows (for instance through increasing export revenues) or through a "valuation effect" where US investors may find the ETF to be relatively 'undervalued' in US dollar. In both cases the market demand for ETF may go up, causing a positive impact on the price.

Therefore there is no clear theoretical direction in the relationship and the net effect of the exchange rate factor on the ETF returns should be empirically determined.

V. Empirical Results

Risk and Return Characteristics:

In Table-3 we summarize descriptive characteristics of daily ETF returns. Average daily returns range from 0.29% to -0.1%. Only 2 ETFs in the sample have negative returns for the sample period. Maximum and minimum daily returns reported in our sample are 10.53 and -13.25% respectively. The daily volatility of the ETF returns range from 2.83% to 1.47%. In contrast, daily volatility of S&P500 is 1.09% with a min-max range of -6% to 5.57%.

The null hypothesis of normally distributed daily returns cannot be rejected for only 4 of the ETF return series in our sample. In other words, for the majority of the ETF returns in the sample we are not able to verify normality of return distributions. The returns are negatively skewed and exhibit fat tails, typical of emerging market equities.

In Table-4, we report annualized risk, return and performance indicators in panels a and b. The average annual returns of the sample ETFs range from 0.41% to 108.96%. Annualized volatilities of ETFs are in the range of 23.28% to 44.72%. The performance of the sample ETFs relative to S&P 500 are reported in the column five of the table. All emerging market ETFs out-perform S&P 500 with a wide margin with one exception, Taiwan. The out performance is less pronounced for the longer horizons including 2000-2002 period in which emerging market equities in general produced negative returns. The ETF returns spanning post 2002 period are substantially higher. The results shown in Table-4a suggest that emerging market ETFs are substantially riskier than S&P 500. The volatility multiples range from 1.35 to 2.58 times. These observations indicate that higher returns in emerging market ETFs are associated with high risks. In order to gain further insights to the risk and risk-return trade-off several other risk and performance measures were calculated and reported in the Table-4b.

The first alternative risk indicator is the downside risk or semi-deviation. In contrast to symmetrical consideration in volatility (standard deviation of returns), semi deviation or downside risk is a measure of exposure to losses only. A quick review of total volatility and downside risk measures of sample ETFs reveal that on average

72% of the total risk is on the downside. For the iShares Emerging Market ETF tracking MSCI Emerging Market index, 91% of the risk is on the downside.

In column 4 and 5 of Table-4b we report beta and downside beta with respect to US market portfolio. In general ETFs tend to exhibit considerable sensitivity to US index movements. Interestingly, low beta ETFs tend to have significantly larger downside betas suggesting that these ETFs are vulnerable to declines in the US index.

Finally, in Table-4b we report Sharp and Sortino performance indicators. As we briefly described in section 4, Sharp ratio measures the returns per unit of total risk. While Sharp Ratio ranges from -0.13 to 2.45, the corresponding range for the Sortino Ratio is -0.25 to 2.10. The average Sharp and Sortino Ratios for the sample ETFs are 0.79 and 1.1 respectively. The results indicate that emerging market ETFs offer higher returns per unit of downside risk.

ETF Premiums and Discounts

A frequently cited advantage of the ETFs over index funds is the close alignment of ETF prices and the Net Asset Values. The expected parity is owed to a built in arbitrage mechanism described earlier in section II of the paper. This mechanism allows institutional investors to buy the underlying shares and to create ETFs when ETF prices run higher than NAV of the fund. By selling the ETFs short and creating the ETFs for delivery, institutional investors generate arbitrage profits and in the process the divergence between ETF prices and NAVs disappear. Similarly, when ETF price is lower than the NAV of the fund, institutional investors (or authorized participants in ETF jargon) purchase ETF and redeem the underlying shares from the fund to sell in the market. In theory this process is expected to keep the ETF prices and NAVs barring the transaction costs.

We report distributional characteristics of the premiums in Table-5. Our analysis of the sample ETFs suggest that daily average ETF premium and discounts range from -0.2% to 0.56%. The maximum daily premium is 26.03% in contrast to maximum discount of -37.5%. The median daily premium and discount ranges from -0.02% to 1.10%. To gain further insights to the distribution of the premiums and discounts we report the first and third quartile figures in columns 7 and 8. The ranges in the first and third quartiles are -0.85% to -0.11% and 0.30% to 1.65%. Our t-test of the significance of the premiums and discounts suggest that all ETF discounts and premiums are statistically significant.

The results reported in table 5 are not entirely consistent with the general perception of low and insignificant deviations from the NAV. As the results in table suggest, the

deviations can run fairly large. We have not studied the persistence of the premiums and discounts in the context of this study. However, given the potential illiquidity of the underlying assets, and relatively large transaction costs, it would not be a surprise to find out the persistence of moderate deviations. The largest deviations have been observed in iShares S&P Latin America 40 ETF followed by iShares Brazil. The results reported here suggest that investors should not take comfort in the built-in arbitrage mechanism, and should pay attention to ETFs characteristics particularly if they are using the ETFs for hedging purposes.

International Diversification Potential

In order to explore the international diversification potential of the ETFs we use the specification described in equation (6). As we described in section IV, The model's parameters represent the sensitivities of an ETF to the US market return, home-country market return, and changes in the exchange rates. After the orthogonalization process, we expect effective diversification tools (ETFs in this case) to have insignificant exposure to idiosyncratic US risk factor.

The analysis described above was conducted for 9 emerging market ETFs. The results reported in table-6 suggest that ETFs have significant exposure to their home market as well as the US idiosyncratic risk factor. US risk factor is significant at 1% significance level for all ETFs analyzed. On average a percentage change in the US market index, is expected to increase ETF returns from 0.32% to 1.71%. All ETFs have positive exposure to the US market. The significant sensitivity to the US market risk factor undermines ETFs' value as diversification tools for US investors.

VI. Concluding Remarks

The study provides a preliminary analysis for a relatively new segment of the ETF market. Emerging market focused ETFs have proliferated in a short span of time, and are expected to continue to grow as the asset class has increasing investor interest and attention.

Our analyses indicate that on average emerging market focused ETFs have performed well both in absolute and relative terms for the period analyses conducted. However, the variation in our results and positive bias towards recently introduced ETFs suggest that frequently staged performance story should be interpreted with some caution. While we present evidence of high return performance, we emphasize that the return enhancement comes at a steep price. Overall, emerging market ETFs are highly risky investment propositions with significant downside risks. Our

performance indicators present a less rosy picture than the nominal or relative returns suggest.

In addition to the performance analysis, we also explored the myth of price/NAV parity for emerging market ETFs. Our results suggest that for this group of ETFs, premiums and discounts are significant. Although we did not conduct a persistence analysis, we developed the intuition that moderate premiums or discounts would not disappear quickly. However, this claim demands empirical verification.

Finally, we documented that emerging market ETFs offer limited benefits for international diversification as their exposure to US market factor is significant. This finding has significant implications on the manner that investors can use emerging market ETFs. Although investors may enhance portfolio returns by gaining exposure to fast growing emerging markets, this exposure does not come with risk moderation. The findings reported in this study suggest that enhanced returns can only be achieved by taking progressively higher risks. In this regard, ETFs appear to have questionable value from portfolio diversification perspective.

An important caveat to the findings summarized above is the relatively small number of ETFs analyzed in this study and the short times series available for some of the ETFs. Because of the limited time series data employed to analyze some of the ETFs in the sample, parameter estimates may not be accurate. Also small number of ETFs used in the analysis suggests that one should exercise caution not to over extrapolate the findings. However, these limitations are natural outcomes of the relative novelty of the products analyzed here. As these products mature and longer time series data become available, opportunities for more rigorous analyses will emerge.

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Table-2: Emerging Market ETFs Traded in the US

	Name	Ticker	Country	Geographic Focus	Inception Date
1	ISHARES MSCI HONG KONG INDEX	EWH	US	Hong Kong	3/18/1996
2	ISHARES MSCI MALAYSIA	EWM	US	Malaysia	3/18/1996
3	ISHARES MSCI MEXICO	EWV	US	Mexico	3/18/1996
4	ISHARES MSCI SOUTH KOREA IND	EWY	US	South Korea	5/10/2000
5	ISHARES MSCI TAIWAN INDEX FD	EWT	US	Taiwan	6/20/2000
6	ISHARES MSCI BRAZIL	EWZ	US	Brazil	7/14/2000
7	ISHARES S&P LATIN AMERICA 40	ILF	US	LA	10/26/2001
8	ISHARES MSCI SOUTH AFRICA IN	EZA	US	South Africa	2/7/2003
9	ISHARES MSCI EMERGING MKT IN	EEM	US	Diversified EM	4/11/2003
10	ISHARES FTSE/XINHUA CHINA 25	FXI	US	China	10/8/2004
11	POWERSHARES GLD DRG H USX CH	PGJ	US	China	12/9/2004
12	VANGUARD EMERGING MARK. ETF	VWO	US	Diversified EM	3/10/2005
13	CURRENCYSHARES MEXICAN PESO	FXM	US	Mexico	6/20/2006
14	CLAYMORE/BNY BRIC ETF	EEB	US	BRIC	9/21/2006
15	IPATH MSCI INDIA INDEX ETN	INP	US	India	12/19/2006
16	SPDR S&P CHINA ETF	GXC	US	China	3/19/2007
17	SPDR S&P EMERGING LATIN AMER	GML	US	LA	3/19/2007
18	SPDR S&P EMG MARKETS ETF	GMM	US	Brazil	3/19/2007
19	SPDR S&P EMERGING MIDDLE EAST	GAF	US	Middle East	3/19/2007
20	MARKET VECTORS RUSSIA ETF	RSX	US	Russia	4/26/2007
21	FIRST TRUST ISE CHINDIA INDE	FNI	US	APEC ex Japan	5/11/2007
22	SPDR S&P BRIC 40 ETF	BIK	US	BRIC	6/22/2007
23	WISDOMTREE EMG MKTS H/Y EQUI	DEM	US	Brazil	7/13/2007
24	POWERSHARES FTSE RAFI EMRGIN	PXH	US	Brazil	9/27/2007

Source: Bloomberg

Table-3: Descriptive Characteristics of Daily ETF returns

	Mean	Median	Maximum	Minimum	Std. Dev.	Skewness	Kurtosis	Jarque- Bera	Probability	Observations
BIK	0.0021	0.0045	0.0903	-0.0903	0.0283	-0.25	3.79	4.09	0.1296	112
DEM	0.0000	0.0000	0.0586	-0.0471	0.0222	-0.11	2.76	0.44	0.8009	97
EEM	0.0012	0.0013	0.0683	-0.0848	0.0149	-0.37	5.38	312.62	0.0000	1207
EWH	0.0002	0.0000	0.0645	-0.0953	0.0167	-0.15	5.14	401.95	0.0000	2060
EWM	0.0003	0.0000	0.0649	-0.1185	0.0147	-0.46	7.89	2122.26	0.0000	2060
EWT	-0.0001	0.0000	0.1030	-0.1236	0.0215	-0.30	5.88	697.28	0.0000	1937
EWV	0.0006	0.0004	0.0943	-0.1325	0.0178	-0.25	6.64	1159.74	0.0000	2060
EWY	0.0006	0.0007	0.1053	-0.1801	0.0223	-0.43	6.96	1345.25	0.0000	1967
EWZ	0.0007	0.0004	0.1029	-0.1473	0.0235	-0.32	5.08	380.83	0.0000	1922
EZA	0.0010	0.0010	0.0663	-0.0931	0.0171	-0.44	5.45	353.85	0.0000	1252
FNI	0.0017	0.0031	0.0765	-0.0658	0.0242	-0.10	3.62	2.52	0.2831	142
GAF	0.0007	0.0007	0.0455	-0.0513	0.0162	-0.31	3.44	4.30	0.1167	177
GML	0.0014	0.0037	0.0696	-0.0755	0.0223	-0.44	4.01	13.30	0.0013	177
GXC	0.0029	0.0035	0.0966	-0.0852	0.0269	-0.17	4.87	26.67	0.0000	177
ILF	0.0011	0.0009	0.0758	-0.0876	0.0167	-0.40	5.87	585.55	0.0000	1587
PGJ	0.0010	0.0012	0.0796	-0.1011	0.0164	-0.38	7.76	749.10	0.0000	773
VOW	-0.0010	-0.0014	0.0757	-0.0657	0.0160	0.40	5.29	173.89	0.0000	708
SPX	0.0000	0.0000	0.0557	-0.0600	0.0109	0.07	5.79	670.58	0.0000	2060

Table-4a: Annualized Risk, Return and Performance Metrics

Ticker	Calculation Period	Mean	US Index Returns [*]	Risk Free Rate ^{**}	Relative Performance ^{***}	Fund Volatility	Relative Volatility
BIK	06/25/07-11/27/2007	69.93%	-12.92%	4.17%	82.85%	44.72%	2.37
DEM	07/16/07-11/27/2007	-0.41%	-21.71%	4.16%	21.30%	35.04%	1.78
EEM	03/14/07-11/27/2007	36.24%	5.99%	4.16%	30.25%	23.57%	1.96
EWH	01/05/00-11/27/2007	5.37%	0.12%	4.15%	5.25%	26.54%	1.53
EWM	01/05/00-11/27/2007	8.08%	0.12%	4.14%	7.96%	23.28%	1.35
EWT	06/26/00-11/27/2007	-3.06%	-0.26%	4.14%	-2.80%	34.07%	2.03
EWV	01/05/00-11/27/2007	15.44%	0.12%	4.13%	15.32%	28.17%	1.63
EWY	10/02/00-11/27/2007	16.37%	-0.22%	4.12%	16.59%	35.35%	2.09
EWZ	07/17/00-11/27/2007	19.70%	-0.87%	4.12%	20.57%	37.24%	2.22
EZA	02/10/03-11/27/2007	28.00%	11.31%	4.11%	16.68%	27.16%	2.16
FNI	05/15/07-11/27/2007	53.26%	-10.47%	4.10%	63.74%	38.41%	2.17
GAF	03/26/07-11/27/2007	19.17%	-3.36%	4.09%	22.53%	25.58%	1.55
GML	03/26/07-11/27/2008	43.70%	-3.36%	4.08%	47.06%	35.36%	2.14
GXC	03/26/07-11/27/2009	108.96%	-3.36%	4.07%	112.32%	42.62%	2.58
ILF	10/29/01-11/27/2007	31.34%	3.99%	4.07%	27.35%	26.47%	1.68
PGJ	12/10/04-11/27/2007	28.65%	5.78%	4.06%	22.87%	25.99%	2.20
VOW	03/11/05-11/27/2007	29.24%	5.70%	4.05%	23.54%	25.39%	2.11

* US index returns were calculated by using S&P500 Composite index for the corresponding period.

** Risk Free rate is the annualized 3 month US Treasury Bill yield

*** Relative performance and relative volatility was calculated with respect to average S&P 500 returns and volatility.

Table-4b: Annualized Risk, Return and Performance Metrics

Fund Name	Ticker	Mean Return	ETF Volatility	Downside Risk	Beta	Downside Beta	Sharp Ratio	Sortino Ratio
SPDR S&P BRIC 40 ETF	BIK	69.93%	44.72%	31.24%	1.88	1.69	1.47	2.10
WISDOMTREE EMG MKTS H/Y EQUI	DEM	-0.41%	35.04%	25.39%	1.61	1.51	-0.13	-0.18
ISHARES MSCI EMERGING MKT IN	EEM	36.24%	23.57%	21.47%	1.51	1.55	1.35	1.49
ISHARES MSCI HONG KONG INDEX	EWH	5.37%	26.54%	18.83%	0.98	1.27	0.08	0.11
ISHARES MSCI MALAYSIA	EWM	8.08%	23.28%	16.69%	0.47	1.07	0.21	0.29
ISHARES MSCI TAIWAN	EWT	-3.06%	34.07%	24.88%	1.06	1.50	-0.18	-0.25
ISHARES MSCI MEXICO	EWV	15.44%	28.17%	19.88%	0.99	1.42	0.43	0.61
ISHARES MSCI SOUTH KOREA IND	EWY	16.37%	35.35%	25.47%	1.13	1.33	0.37	0.52
ISHARES MSCI BRAZIL	EWZ	19.70%	37.24%	26.80%	1.09	1.38	0.45	0.62
ISHARES MSCI SOUTH AFRICA IN	EZA	28.00%	27.16%	19.46%	1.14	1.36	0.92	1.28
FIRST TRUST ISE CHINDIA INDE	FNI	53.26%	38.41%	26.40%	1.60	1.48	1.28	1.86
SPDR S&P EMERGING MIDDLE EAS	GAF	19.17%	25.58%	18.28%	1.36	1.34	0.57	0.80
SPDR S&P EMERGING LATIN AMER	GML	43.70%	35.36%	25.56%	1.87	1.79	1.11	1.54
SPDR S&P CHINA ETF	GXC	108.96%	42.62%	28.66%	1.86	1.76	2.45	3.65
ISHARES S&P LATIN AMERICA 40	ILF	31.34%	26.47%	18.81%	0.90	1.04	1.08	1.52
POWERSHARES GLD DRG H USX CH	PGJ	28.65%	25.99%	18.24%	1.44	1.52	0.94	1.34
VANGUARD EMERGING MARKET ETF	VOW	29.24%	25.39%	18.02%	1.76	1.74	0.99	1.39
S&P	SPX	0.12%	17.30%	12.25%	1.00	1.00		

Table-5: Descriptive Characteristics of Daily Premium and Discounts

ETF Name	Ticker	Mean [†]	t-value	Median	Maximum	Minimum	1st Quartile	3rd Quartile	Std. Dev.
SPDR S&P BRIC 40 ETF	BIK	0.56%	9.36	0.79%	4.27%	-5.15%	-0.39%	1.28%	1.37%
WISDOMTREE EMG MKTS H/Y EQUI	DEM	0.80%	9.62	1.10%	4.56%	-3.68%	-0.23%	1.65%	1.47%
ISHARES MSCI EMERGING MKT IN	EEM	0.18%	27.68	0.25%	2.86%	-3.72%	-0.19%	0.62%	0.74%
ISHARES MSCI HONG KONG INDEX	EWH	0.07%	29.61	0.15%	4.88%	-5.90%	-0.46%	0.72%	1.12%
ISHARES MSCI MALAYSIA	EWM	-0.20%	29.44	0.00%	7.35%	-7.66%	-0.94%	0.75%	1.50%
ISHARES MSCI TAIWAN	EWT	0.28%	30.28	0.26%	6.71%	-8.50%	-0.62%	1.17%	1.62%
ISHARES MSCI MEXICO	EWV	-0.07%	27.88	0.00%	6.02%	-6.09%	-0.47%	0.37%	0.84%
ISHARES MSCI SOUTH KOREA IND	EWY	0.18%	30.45	0.28%	6.17%	-5.71%	-0.54%	0.93%	1.35%
ISHARES MSCI BRAZIL	EWZ	0.00%	24.20	0.08%	15.03%	-7.53%	-0.34%	0.46%	1.22%
ISHARES MSCI SOUTH AFRICA IN	EZA	0.18%	25.32	0.21%	4.53%	-5.92%	-0.25%	0.70%	1.00%
FIRST TRUST ISE CHINDIA INDE	FNI	0.04%	7.12	0.04%	1.87%	-0.94%	-0.05%	0.13%	0.24%
SPDR S&P EMERGING MIDDLE EAS	GAF	0.33%	11.43	0.47%	2.78%	-2.50%	-0.11%	0.79%	0.92%
SPDR S&P EMERGING LATIN AMER	GML	0.02%	9.87	-0.02%	1.82%	-1.33%	-0.27%	0.27%	0.50%
SPDR S&P CHINA ETF	GXC	0.04%	9.87	0.29%	6.60%	-5.52%	-0.85%	0.96%	1.86%
ISHARES S&P LATIN AMERICA 40	ILF	1.24%	17.47	0.29%	26.03%	-37.45%	-0.10%	1.28%	4.05%
POWERSHARES GLD DRG H USX CH	PGJ	0.18%	20.47	0.16%	3.97%	-1.87%	0.00%	0.30%	0.36%
VANGUARD EMERGING MARKET ETF	VOW	0.42%		0.48%	2.40%	-2.74%			0.59%

- The null hypothesis that premium and discounts are normally distributed was rejected for all ETF premium/discounts with the exception of Wisdomtree Emerging Markets High Yield Equity. The p-values of the Jacques Berra test was not reported in the table.

Table-6: International Diversification Regressions

$$E(R_{i,t}) = \alpha_i + \beta_i^{US} R_t^{US} + \sum_{j=-1}^{+1} \beta_{ij}^H R_{i,t+j}^H + \sum_{j=-1}^{+1} \beta_{ij}^{FX} FX_{i,t+j}$$

where $E(R_{i,t})$ is the i th ETF's expected return, defined as the first difference of log prices per share at time t ; $R_{US,t}$ is the US market return; $R_{i,t}^H$ is i th ETF's home-country stock market index return; $FX_{i,t}$ is the component of the first difference of log bilateral exchange rate in terms of the i th ETF's home country currency per US dollar that is orthogonal to $R_{US,t}$ and $R_{i,t}^H$. R^{US} , R^H , and FX are parameters representing the sensitivities of an ETF to the US market return, home-country market return, and changes in the exchange rates. The coefficients are reported in the first row for each ETF followed by t-statistics and p-values in the second and third rows respectively.

ETF	US Market	Local Market (-1)	Local Market	Local Market(+1)	Exchange Rate	R-Square
EWH	0.862252	-0.038536	0.670775	0.084069	-1.81718	60.75%
	(26.48)	(-1.58)	(21.39)	(3.32)	(-3.46)	
	0.0000	0.1145	0.0000	0.0009	0.0005	
EWM	0.442438	0.075988	0.699391	0.140976	-0.377354	38.35%
	13.34	2.08	17.83	3.50	-2.83	
	0.0000	0.0373	0.0000	0.0005	0.0047	
EWT	0.965284	-0.005021	0.766698	0.031097	-1.293629	56.62%
	20.85	-0.17	27.68	1.07	-8.79	
	0.0000	0.8668	0.0000	0.2857	0.0000	
EWV	0.324098	0.049134	0.906283	0.057341	-0.996302	70.72%
	8.50	2.71	41.85	3.26	-17.72	
	0.0000	0.0068	0.0000	0.0011	0.0000	
EWY	0.965334	0.0038	0.729276	0.031965	-1.123557	65.34%
	19.34	0.18	26.96	1.31	-13.76	
	0.0000	0.8538	0.0000	0.1887	0.0000	
EWZ	0.477793	0.052856	0.939081	0.042176	-1.181074	64.17%
	4.42	1.82	25.09	1.63	-19.67	
	0.0000	0.0689	0.0000	0.1028	0.0000	
EZA	0.779984	0.025822	0.660562	0.100256	-0.770731	67.54%
	15.05	1.15	25.65	3.93	-24.18	
	0.0000	0.2522	0.0000	0.0001	0.0000	
FNI	1.434261	-0.044877	0.476971	0.109257	2.467136	71.82%
	9.960663	-0.863405	6.954537	1.549628	2.560026	
	0.0000	0.3894	0.0000	0.1236	0.0116	
GXC	1.71415	-0.027364	0.601402	0.108356	1.215164	68.67%
	11.09325	-0.438883	7.560455	1.48073	1.134386	
	0.0000	0.6613	0.0000	0.1405	0.2582	