CAMBRIDGE ASSOCIATES LLC

GLOBAL MARKET COMMENTARY

IS ETF TRADING CAUSING WIDER RIPPLES?

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Sean McLaughlin
Kijana Mack

Is ETF Trading Causing Wider Ripples?

The exchange-traded fund (ETF) business has pulled quite a stunt: continuing to grow assets robustly, even as global capital markets endured their worst shakeout in 75 years. Global assets of ETFs were $40 billion ten years ago, $310 billion five years ago, and $862 billion in July of this year. In fact, ETF assets have *grown* by 8%, or $65 billion, since the end of 2007, even as assets in traditional U.S.-registered mutual funds have shrunk by 23%, or $2.1 trillion.[1] Deloitte estimates the ETF asset base will grow to reach $1 trillion by 2011.

ETFs have proven very popular with hedge funds, and trading volume has developed alongside the growth in assets. In fact, the volume of daily U.S. ETF trading averaged a stunning $64 billion during the first half of 2009, compared to combined Nasdaq and NYSE daily trading volume of $91 billion (Table A). The growth of alternative stock-trading venues has been phenomenal, and Nasdaq and NYSE volume now represents less than half of total equity trading volume, but in any case, it is clear that ETFs have become an important force in the marketplace.[2] The growth of ETFs and the volume of ETF shares being traded raise questions about any secondary impacts that the products' popularity may have on trading activity within individual equities and on correlations between securities and asset classes. These questions cannot yet be answered definitively, but this brief report aims to highlight areas that should be watched for potential distortions. Some of those potential distortions could offer opportunities to active managers, while others may diminish the diversification effect traditionally provided by holding a variety of industry sectors, geographical markets, and individual securities.

What Has Put the Shine on ETFs?

The reasons that ETFs have become popular are likely quite clear to many investors, but we will briefly review them.[3] For hedge funds, which are thought to account for the majority of ETF trading volume, ETFs have a number of appealing features. They can be shorted easily, allowing funds to adjust net exposure quickly and with low trading costs.[4] They also offer convenient long or short exposure to a variety of

[1] The asset figures for U.S. mutual funds refer to long-term mutual funds (equity, bond, and balanced funds) and do not include the $3.6 trillion asset base of money market mutual funds. Long-term mutual funds saw a small net positive cash inflow of $9.3 billion during the period, which was offset by declining equity prices, while ETFs drew $230.6 billion in net positive inflows during the period.

[2] Alternative exchanges and "dark pools," many with names unfamiliar to those that do not sit on a trading desk, have moved very quickly to capture some 65% of total U.S. equity market volume as of April 2009, according to TABB Group data. If that estimate is correct, ETF dollar trading volume as a percentage of *total* market dollar volume is likely closer to 25% than to the 71% level implied by Table A. *Share volume* of ETFs is a smaller percentage of total trading (18% as of June, according to Goldman Sachs); the reason for this is that ETF dollar prices tend to be higher than those of individual stocks. The trading volume of the ETFs themselves is included in the exchange trading volumes discussed above.

[3] For more details on the mechanics of ETFs and an assessment of their benefits and limitations for institutional investors, please see our November 2006 Market Commentary *Should ETFs Be Part of Your Toolbox?*

[4] Cambridge Associates generally prefers that long/short equity hedge funds use ETFs in their short book judiciously, if at all; talented hedge fund managers can use the short book to add value rather than simply to moderate risk, but this is clearly not possible when broad ETF shorts are used.

industrial sectors, capitalization slices, and regions, as well as to non-equity asset classes. The lion's share of the ETF industry's assets and trading volume are concentrated in a relatively small number of products (Table B), while hundreds of new products are launched each year, many trying to appeal to individual investors and the financial planners that serve them. Many of these products are gimmicky and expensive (these generally are quite small and do not trade in any volume), while a few are reasonably cheap and quite useful (and therefore have captured substantial asset bases and trading volume). For individual investors that have been frustrated by often-lackluster performance of expensive retail mutual funds, ETFs are an appealing alternative, with annual expenses of 7 basis points (bps) to 35 bps in many cases, versus 144 bps or more for many retail mutual funds.[5] Greater tax efficiency than most actively managed funds is another appeal for many investors (ETFs only rarely distribute capital gains at year-end, whereas this is commonplace for actively managed funds, sometimes even during down years). Because ETFs sometimes have a more niche focus than traditional index funds, and because they can be traded actively, ETFs also have considerably more appeal for investors that want the surety of a low-cost passive approach but the control offered by intraday trading. In past downturns, underperforming managers might have been replaced by index funds, which have fees comparable to the least expensive ETFs, but today ETFs are often the beneficiaries of those terminations. A significant portion of ETF asset gains during the market downturn likely came from investors that redeemed their actively managed funds and retained passive exposure by purchasing an ETF; traditional equity mutual funds have seen *outflows* totaling about $225 billion since the end of 2007, even as equity ETFs garnered *inflows* that totaled roughly $147 billion. A further appeal for individual investors is that ETFs allow them to obtain exposure to asset classes that were not easily tradeable by retail investors previously (this includes commodity futures, standalone currencies, and leveraged or short equity exposure within retirement accounts).[6]

It is possible, however, that the features that have drawn investors to ETFs (the ease, speed, and low cost with which exposure to hundreds of securities can be traded; and the ability of investors to access additional asset types that had previously been tradeable only over the counter) have also permitted some distortions to develop within the broader securities markets.

Unity—Not Always a Good Thing

It is well known that correlations across asset classes and sub–asset classes have been rising in recent years. During 2008, correlations of nearly all risk assets spiked, as is always the case during crises. However, 2008 was merely the peak in a long uptrend for correlations. The uptrend coincides with the introduction and popularization of ETFs. ETFs should certainly not take the sole blame for the rise in correlations, but when two risk assets become easily tradable by a wide variety of investors, it stands to reason that investors

[5] A large *number* of ETFs have higher expenses than the range given above, but with a few exceptions such as the very popular iShares MSCI Emerging Markets ETF (with an expense ratio of 72 bps), these high-fee ETFs have generally not gathered significant assets or trading activity.

[6] Individual investors have long been able to open individual forex or futures accounts, of course, but the complexity and the perceived risk of these products has kept most investors away. Pre-packaged ETFs offer similar exposures with less complexity (often fully collateralized), and the ETF can be purchased within an individual retirement account.

seeking to add risk to their portfolio, or to dampen that risk, will tend to cause short-term moves in the prices of those assets that may be more correlated than the movements of the assets' underlying economic exposures. Table C shows the rolling correlation between two indices representing South Korean and Taiwanese equities, respectively. U.S.-traded ETFs for those indices were introduced in mid-2000, and correlations have been marching steadily upward since then, from 30% when the ETFs launched to 59% today, with some correlation spikes during the early 1990s' emerging markets boom and during periods of crisis. The correlation exhibits a general upward trend during the entire period shown (though it went nowhere from 1992 to 2000), so other factors in addition to the ETF introductions are likely at work as well, such as increasing economic integration between the countries, currency management (the correlations are measured using US$-based indices for both markets), and wider adoption of traditional index funds covering the emerging markets.[7] The ETF introduction is not the sole source of declining diversification, but it likely played a part.

In addition to the increase in correlations across markets and asset classes, the correlations of individual securities have increased as well. When investors trade an ETF that covers an entire equity sector or an entire region, this will impact all of the ETF's underlying securities simultaneously. This is not a problem unique to ETFs of course; traditional index funds and futures have much the same effect. But given that equity ETFs are generating more than $50 billion in daily volume, the impact on the correlation of individual securities with one another is becoming a force to be reckoned with. In Table D, we examine the correlation of the largest 20 stocks in the Russell 3000® broad-market equity index with one another, and the smallest 20 stocks in the index with one another. The median cross-sectional correlation of both the mega-cap and the smaller stocks has risen fairly substantially over the period studied (2000–09). The median correlation of the largest 20 stocks with one another rose from 15% in 2000 to 43% today (after peaking above 60% last year). The median correlation of the smallest 20 stocks has risen steadily from 2% in 2000 (when equity ETF trading volume totaled perhaps $5 billion or less per day) to 16% today (now that equity ETF trading has increased roughly ten-fold). This pattern is not limited to U.S. equity ETFs. The largest 20 components of the MSCI Emerging Markets Index similarly show rising correlation with one another over the past decade (also shown on Table D), from 10% to 33%.[8] An examination of the correlations of six commodities with one another finds that those correlations have increased over time as well, with a portion of the increase likely due to the growth in popularity of indexed commodity investment products including ETFs (Table E). Every ETF or commodity index product inflow (outflow) will generate a simultaneous

[7] Index funds that cross more than one market (such as an emerging markets index fund) should increase the correlations between the funds' underlying markets, because when investors buy or sell the index funds, the fund managers will simultaneously buy or sell all of the fund's underlying securities (and thus markets). ETFs that cover multiple markets, such as the iShares MSCI EAFE Index ETF, will have a similar effect.

[8] The correlation pattern is more ambiguous for the smallest 20 emerging markets index components, also shown in the table (the median correlation has risen significantly since 2000, but dropped sharply in 2007 despite strong trading volume in emerging markets ETFs. This is not wholly surprising, because the iShares MSCI Emerging Markets ETF, the 800-pound gorilla of emerging markets ETFs, only includes 372 of the index's 751 component stocks. A sampling methodology is used to increase the liquidity of the ETFs' trading basket by excluding many of the smallest and least-liquid components of the index. Sampling is commonly used for U.S.-listed ETFs tracking indices of the following types of securities: bonds, U.S. micro-cap stocks, and non-U.S. equities.

purchase (sale) of a basket of commodities, some of which have little or no relationship with the rest of the basket.[9]

Typically, a portfolio containing shares of firms that seemed to have little relationship with one another, such as publisher The New York Times Company and semiconductor tester Teradyne Inc., would be expected to behave quite differently, offering an element of diversification and perhaps moderating the market's overall risk. This also offered concentrated active managers the freedom to build large positions in companies they knew well, provided their underlying businesses were different from one another. Table F shows the rolling three-year correlation of daily share price changes for New York Times and Teradyne, firms that were randomly chosen from among the S&P 500 index's smallest firms by market capitalization. The New York Times and Teradyne stocks exhibited a rolling three-year correlation that never exceeded 15% until 2002 (right when equities bottomed during the last cyclical bear market). From 2002 to the present, correlations have never looked back. They fell from 32% in July 2005 (the three-year measurement period for this date includes both the 2002 bear market bottom *and* the 2003 rally) to 22% in 2007. But even at the intermediate *trough* level reached in 2007, which covered three years that could hardly be described as a period of market crisis, correlations were half again as much as their peak level from 1990 to 2002. It seems doubtful that the underlying economic fundamentals of these firms became more enmeshed during this decade than during prior decades; it is more likely that as investors increasingly traded the S&P 500 (via ETFs, futures, index funds, and other instruments), these shares, with their modest liquidity, were whipsawed by the heavy volume of such trading.

What would be the impact of higher correlations of unrelated stocks with one another should they remain elevated as the participation of index-oriented investors such as ETF shareholders increases, rather than declining sharply as correlations generally have after pre-2001 crises? Stronger correlations have the potential to increase the volatility of concentrated, actively managed portfolios. (See Table G.) When volatility began rising in 2007 and 2008, the increase in the Russell 3000® Index's volatility was greater than the increase in its median component stocks. From second quarter 2007 (which featured very low volatility) to the incredibly turbulent fourth quarter of last year, the standard deviation of the Russell 3000® Index increased five-fold. The median standard deviation of its component stocks, meanwhile, only increased three-fold.[10] The correlations of individual stocks within broad indices are very likely to decrease from current levels, as they nearly always do following crises. At some point in the next year, it is likely that fundamentals of individual securities will begin reasserting themselves. But if correlations only decline moderately, then the volatility of indices and of concentrated portfolios may remain elevated for some time.

[9] ETF trades in the secondary market (one investor buying shares from another investor, rather than a dealer creating or redeeming shares in the primary market to fulfill a large trade order) will not result in a trade for each underlying security. However, if secondary ETF trades are sufficient to move the price of the ETF, and if the prices of the underlying securities do not move concurrently, that will eventually create an arbitrage opportunity that will be exploited by going long the temporarily undervalued asset and going short the temporarily overvalued asset.

[10] Some observers might point out that if the largest stocks in the index become more volatile, this would increase the index volatility more than the median stock's volatility, but in this case we also looked at four indices representing capitalization slices within the Russell 3000® Index and found that all four saw their standard deviation increase five-fold or six-fold.

Meaningless Correlation May Create Meaningful Opportunity

High correlations across securities, markets, and asset classes are detrimental to diversification and risk control. But they have a flip side that can be positive. If two securities or asset classes move in lockstep, yet their underlying fundamentals do not, that can present or exacerbate a fundamental valuation difference between the two securities or asset classes. Junky securities can ride the coattails of firms that are seeing real improvements in their operations, and babies can be thrown out with the bathwater. This trend may supply traps for below-average managers and opportunities for highly skilled managers. At the same time, the dispersion of returns tends to be low when correlations increase, so managers and their clients or limited partners may need to be exceedingly patient as they wait for the underlying economics to assert themselves on the relative pricing of various securities. Table H illustrates that when equity returns are not highly dispersed, manager returns tend to be fairly tightly clustered (the best managers tend to perform much better when equity returns are all over the map, and the unskilled or unlucky managers do much worse).

The degree to which ETF trading may temporarily distort the pricing of individual securities probably varies, depending in part on the trading volume of the relevant ETFs compared to the trading volume of the underlying securities. As Table I illustrates, North American equity ETFs (ETFs listed in any part of the world, but with underlying stocks of companies headquartered in the United States or Canada) have more than $350 billion in assets, which is about 3% of the market capitalization of North American equities.[11] Emerging markets ETFs total a more modest $130 billion in assets, but that is equivalent to roughly 5% of the market capitalization of the asset class. The U.S.-listed emerging markets ETFs total roughly $40 billion in assets (1.5% of the MSCI Emerging Markets Index's total market capitalization), and the iShares emerging markets ETF (commonly referred to by its ticker symbol, EEM) trades $2.1 billion worth of shares each day, vacuuming up nearly all of the available liquidity of its underlying shares.[12] Fixed income ETFs are $83 billion, well under 1% of the U.S. bond market. Interestingly, however, last fall bond ETFs were often trading at a notable discount or premium to their net asset value (NAV), an outcome that was generally thought to be very rare and unsustainable (due to the products' inherent arbitrage mechanisms). The lack of leverage available throughout the securities markets and the pulling of capital from bank proprietary trading desks likely played a role in the sustained divergence of bond ETF prices from their NAVs, but some in the ETF industry believe that the bond ETFs, which were still trading quite readily last fall, may have reflected more accurate pricing than the cash bonds themselves, which trade over the counter and were trading only in fits and starts during some periods.[13]

[11] In reality, these are U.S. and Canadian equities and their associated ETFs. Products focused on or including Mexico would generally be classified under emerging markets.
[12] Goldman Sachs estimates that if EEM traded $2.4 billion worth of shares each day (12% more than its current volume), it would equal the capitalization-weighted daily volume of its 372 underlying stocks.
[13] Corporate bonds traded $12.2 billion per day on average during September 2008, down from a post-2001 average of about $16.8 billion. Much of the trading last fall was also concentrated in the highest-quality securities.

Fund Business Is Being Forced to Adapt—Watch for Collateral Damage

Another consideration for active managers is that of competition for retail investor assets (indirectly, this may also be a concern for the institutions that hire them to actively manage assets, as detailed below). In 1999, ETFs in the United States had gathered less than 1% (0.7%) the asset base of traditional stock and bond mutual funds. By 2004, U.S. ETFs had grown nearly seven-fold from a small base and had 3.8% the assets of traditional funds. By August of this year, U.S. ETFs had more than doubled in size since 2004 to $657 billion, while traditional mutual funds had grown by just 14% to $7.1 trillion (in other words, ETFs now have almost 10% the asset base of traditional funds). From 1990 through 2007, traditional mutual funds only had two years during which net inflows totaled less than $100 billion, and the average net inflow over that time was $178 billion per year. A significant exception to that long-term trend was 2008, when traditional U.S.-based funds saw a $228 billion net *outflow*. U.S. ETFs, on the other hand, took in a net *inflow* of $177 billion. For the first eight months of 2009, the picture has improved somewhat for traditional funds, which have seen $226 billion in inflows, compared to just $53 billion for ETFs; however, this reversal is primarily because 97% of mutual fund net inflows so far this year have gone to bond funds (fixed income ETFs have doubled in size since the beginning of 2008 and investors are rapidly becoming more comfortable with them, but at less than $100 billion in assets they are still a bit player in the bond world, compared to the nearly $2 trillion bond fund universe). Table J illustrates the cumulative net flows for both types of products (U.S.-listed ETFs and U.S.-registered stock and bond mutual funds) for 2008 and the first eight months of this year.

If retail investors fall out of love with traditional actively managed equity mutual funds, that has important consequences for institutional investors. These funds tend to be highly profitable for their managers. Expense ratios are often double the management fee paid by institutional purchasers (the cost of servicing hundreds of thousands of small accounts is larger than serving large institutional accounts as well, of course). The business's relatively consistent cash flows and high profitability have translated into much better historical returns for the shares of the fund *managers* than for the *funds* they manage. An index compiled by Lipper of publicly traded asset management firms has returned 97.4% over the past decade, compared to -4.2% for the S&P 500. If ETFs continue to take industry market share from actively managed retail mutual funds, this could eventually prove destabilizing for institutional-quality managers whose firms are dependent on revenues from retail mutual funds.

What could mitigate this concern? First, traditional active asset managers are increasingly moving into the ETF field. BlackRock is purchasing the iShares ETF business from Barclays Global Investors. Invesco purchased the PowerShares ETF business. PIMCO this summer launched a fleet of inflation-indexed bond ETFs that will undoubtedly pave the way for more PIMCO ETFs.

A second trend that could shore up traditional asset management divisions and standalone firms over the long term, but could be destabilizing in the near term, is industry consolidation. Bank of America is selling its Columbia Management division, and Invesco is reportedly weighing a purchase of Morgan Stanley's Van Eck division. Other transactions in the next year or two appear likely. Institutional investors looking to steer clear of this potential destabilization may wish to consider firms that rely more on

institutional than retail revenues from their actively managed products, or firms that already have or are developing an ETF business to complement their active management business.

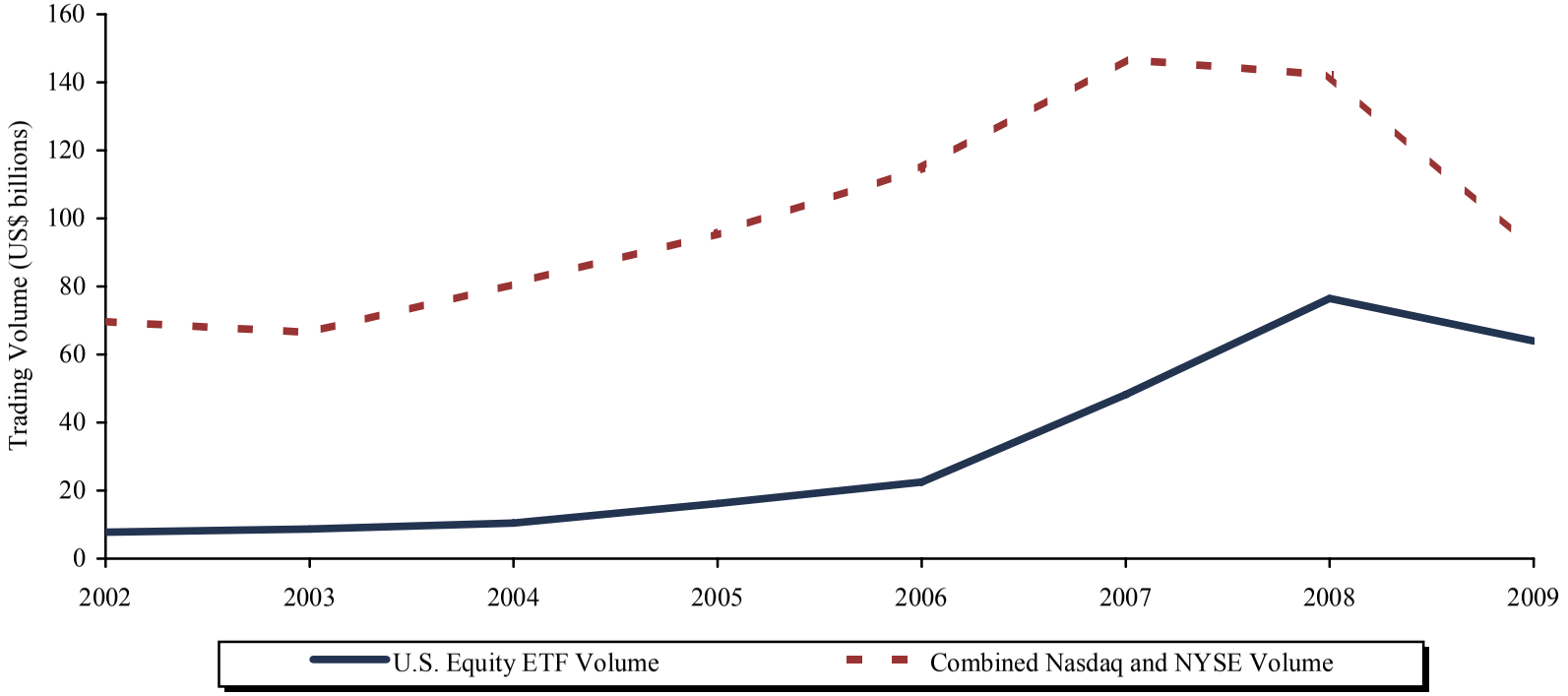
Conclusion

The launch of ETFs in the early 1990s generated a fair amount of buzz, but the mainstreaming of these products is now having a real impact on equity markets and on the asset management business. Investors should be aware that an increasing use of index-linked products such as ETFs and futures may cause correlations of individual securities, markets, and asset classes to increase. It may also increase the volatility of a concentrated portfolio of stocks, by secularly increasing the correlations of unrelated stocks to one another. The flip side of this is that skilled active managers may find that these temporary distortions present opportunities. Finally, institutional investors should be cognizant of whether ETFs' increasing popularity increases the organizational risk for the active managers that they have hired.

Table A

U.S.-LISTED EXCHANGE-TRADED FUNDS DAILY TRADING VOLUME AND U.S. EXCHANGE DAILY EQUITY TRADING VOLUME

2002–09



Sources: Goldman, Sachs & Co. and SIFMA.

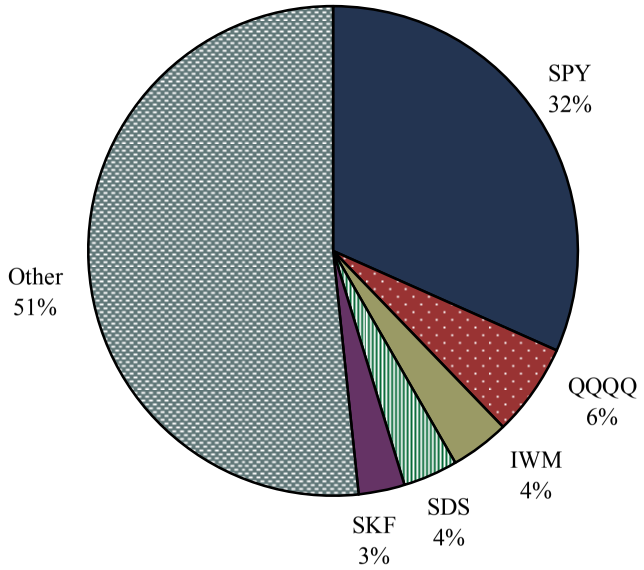
Notes: Graph includes volume for U.S.-listed exchange-traded funds (ETFs) that track broad U.S. equity indices, U.S. sector equity indices, and international equities. Levered and inverse ETFs, however, are not included. Data for 2009 are through June 30. The combined dollar trading volume of the Nasdaq and NYSE now only represents an estimated 35% of U.S. equity trading volume, with alternative trading networks and "dark pools" composing the rest, so a portion of the decline in exchange volume shown here represents a decline in the exchanges' market share. Daily ETF trading volume is estimated from Goldman Sachs Sales and Trading materials.

Table B

CONCENTRATION OF TRADING VOLUME AND ASSETS IN U.S.-LISTED EXCHANGE-TRADED FUNDS

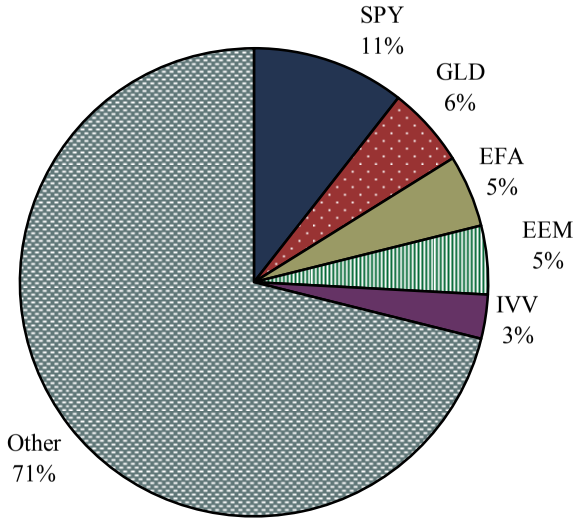
As of June 30, 2009

Trading Volume



SPY - S&P 500 SPDR
QQQQ - Nasdaq 100
IWM - Russell 2000® iShares
SDS - UltraShort S&P 500 Proshares
SKF - Ultrashort Financial Proshares

Total Assets



SPY - S&P 500 SPDR
GLD - Gold Trust SPDR
EFA - MSCI EAFE iShares
EEM - MSCI Emg Mkts iShares
IVV - S&P 500 iShares

Source: Goldman, Sachs & Co.

Notes: Left chart compares the dollar trading volume of each of the five most heavily traded U.S.-listed exchange-traded funds (ETFs) as of June 30, 2009, with the total dollar trading volume of all such ETFs. Right chart compares the asset totals of each of the five largest U.S.-listed ETFs as of June 30, 2009, with the total assets of all such ETFs.

Table C

ROLLING 36-MONTH CORRELATION OF TAIWAN STOCK EXCHANGE COMPOSITE AND KOREA KOSPI INDEX

December 31, 1987 – September 30, 2009

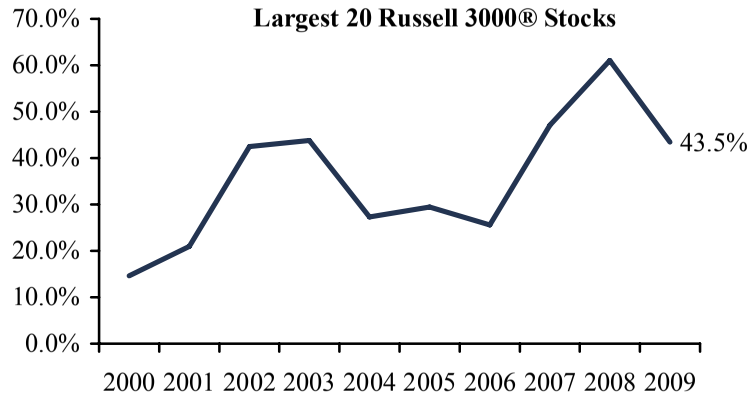
Source: Thomson Datastream.

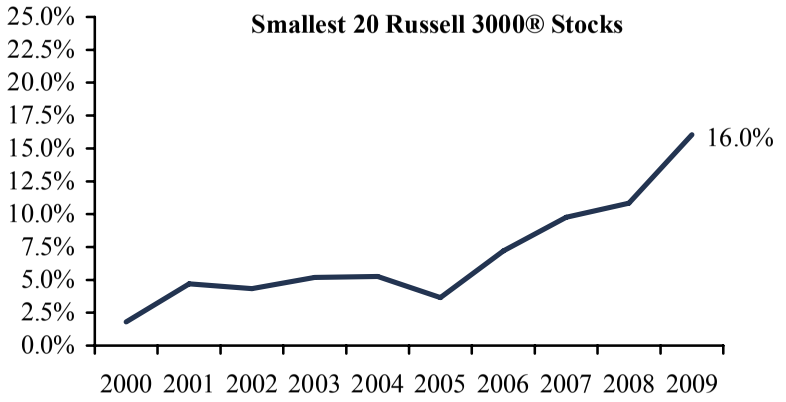
Note: Barclays Global Investors launched iShares the MSCI Korea and MSCI Taiwan exchange-traded funds in May 2000 and June 2000, respectively.

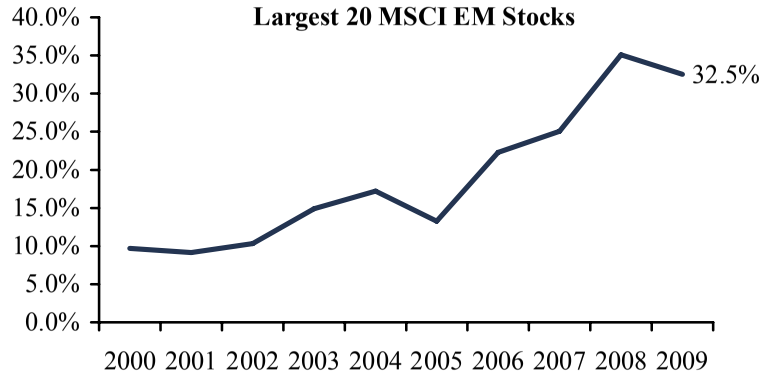
Table D

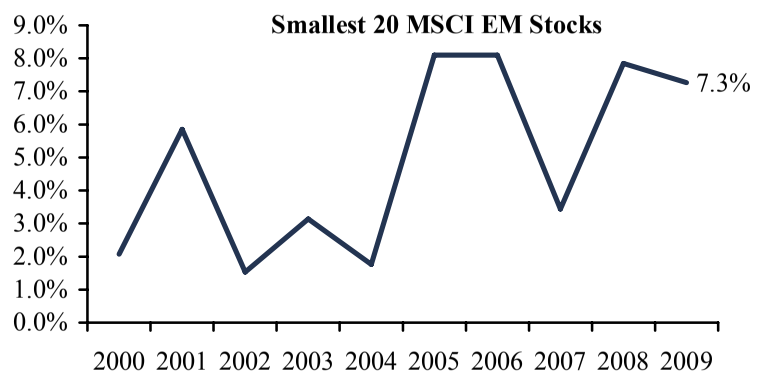
MEDIAN DAILY CORRELATION OF LARGEST 20 AND SMALLEST 20 U.S. AND EMERGING MARKETS STOCKS

2000–09









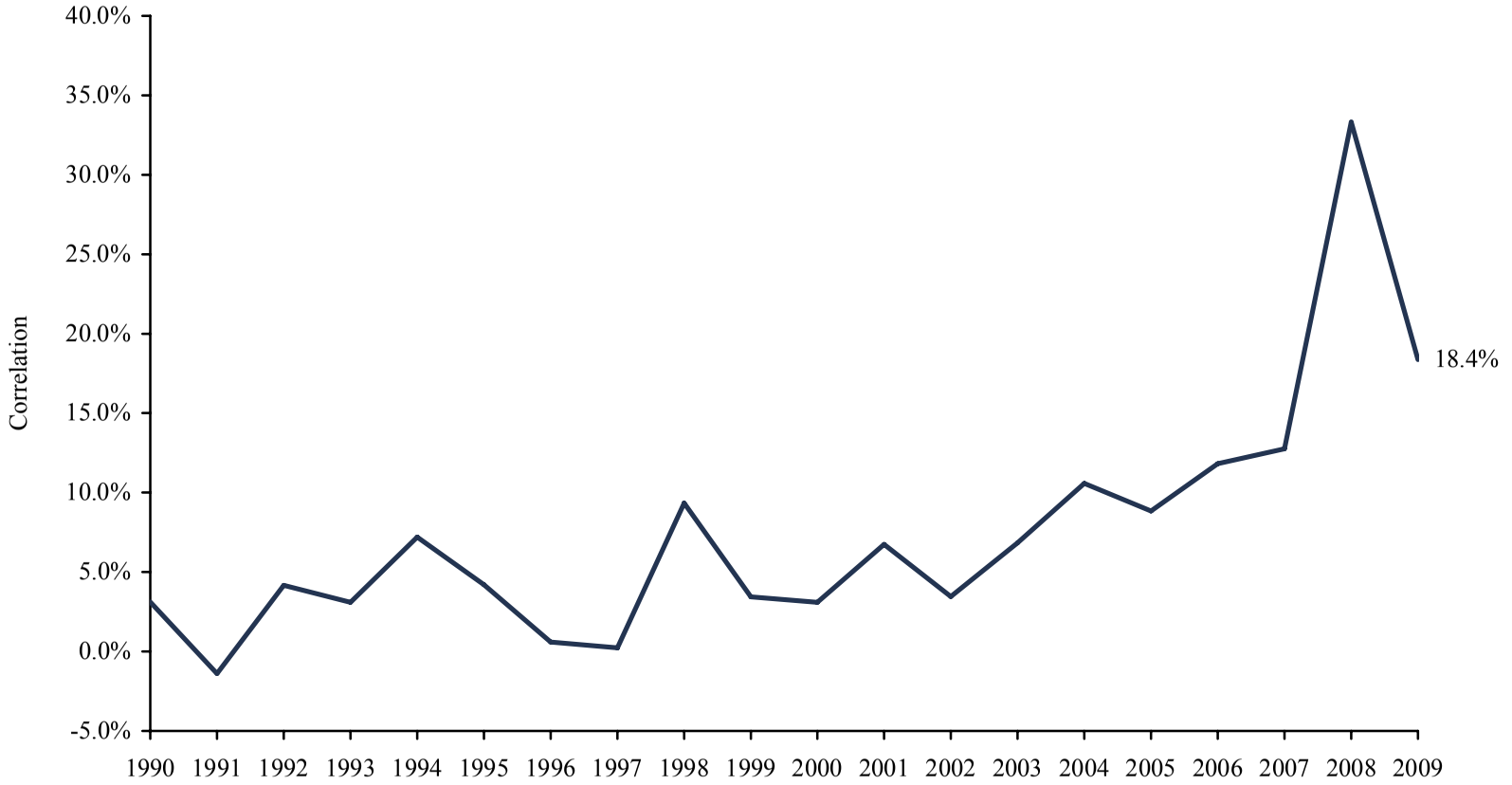
Sources: FactSet Research Systems, Frank Russell Company, and MSCI Inc. MSCI data provided "as is" without any express or implied warranties.

Notes: Exhibit graphs the median value of each year's daily price correlation of each of the index's 20 largest stocks to one another, and the median value of each year's daily price correlation of each of the index's 20 smallest stocks to one another. Data for 2009 are through August 31.

Table E

MEDIAN CORRELATIONS OF DAILY PRICE CHANGE FOR SIX COMMODITIES

1990–2009

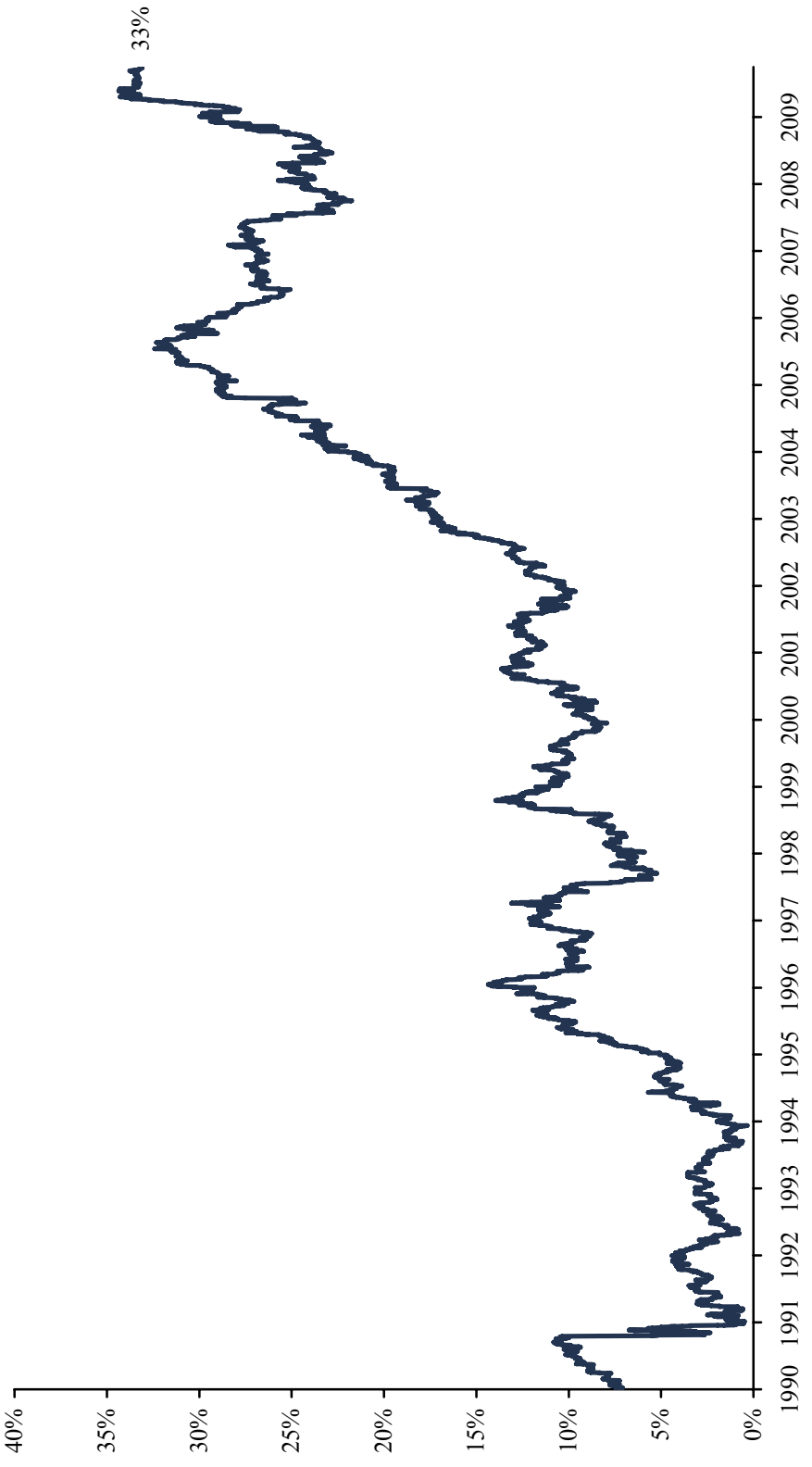


Source: Bloomberg L.P.

Notes: Data shown are the median value of the correlation of daily percentage change in front-month futures prices across six commodities: copper, corn, crude oil, gold, live cattle, and natural gas, for each calendar year. Data for 1990 begin on March 31 and 2009 data are through September 30.

Table F

ROLLING THREE-YEAR CORRELATION OF DAILY SHARE PRICE CHANGES FOR THE NEW YORK TIMES COMPANY AND TERADYNE, INC.

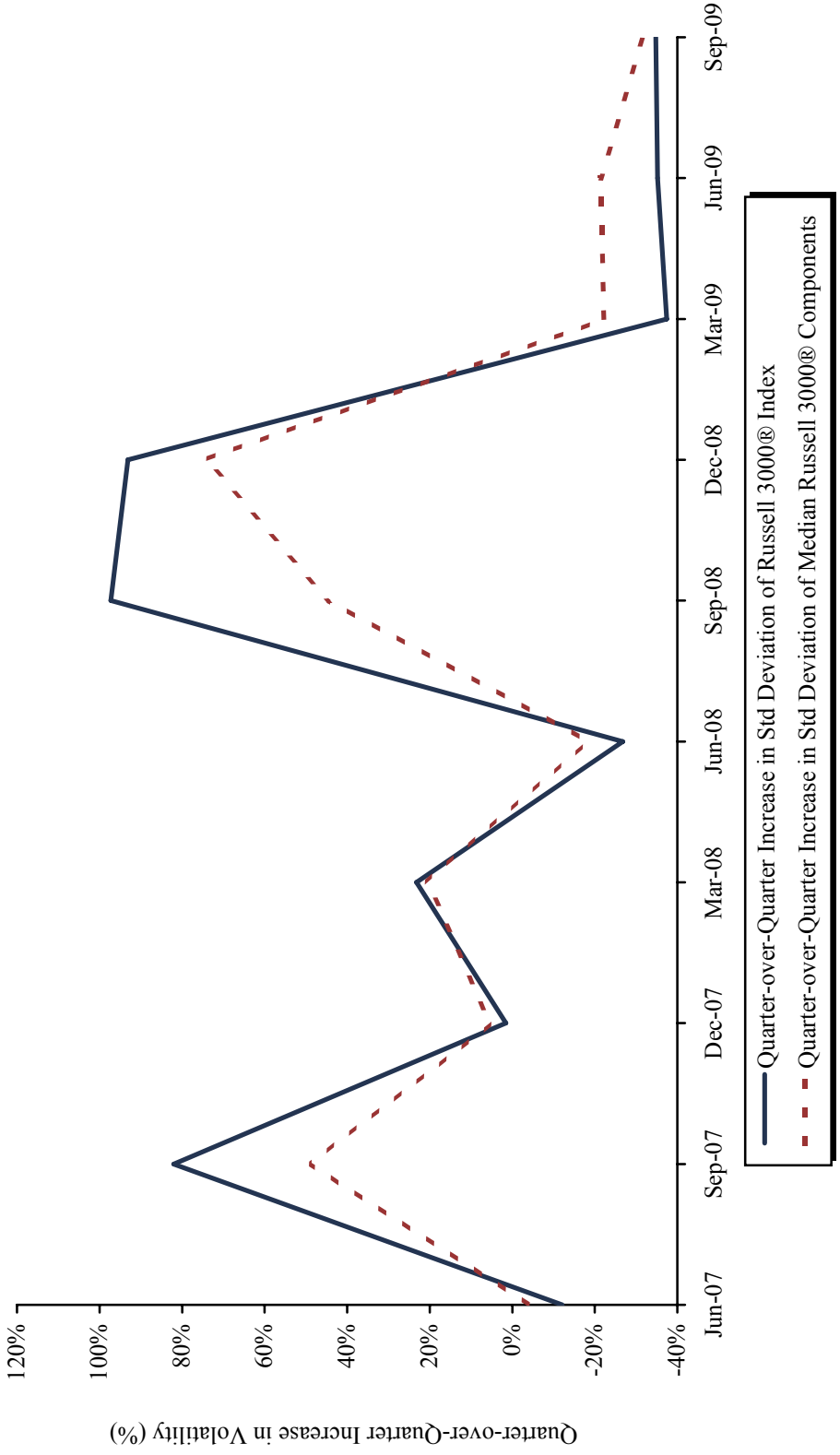


Source: Bloomberg L.P.

Table G

VOLATILITY INCREASE IN RUSSELL 3000® INDIVIDUAL CONSTITUENTS VERSUS THE OVERALL INDEX

June 30, 2007 – September 30, 2009

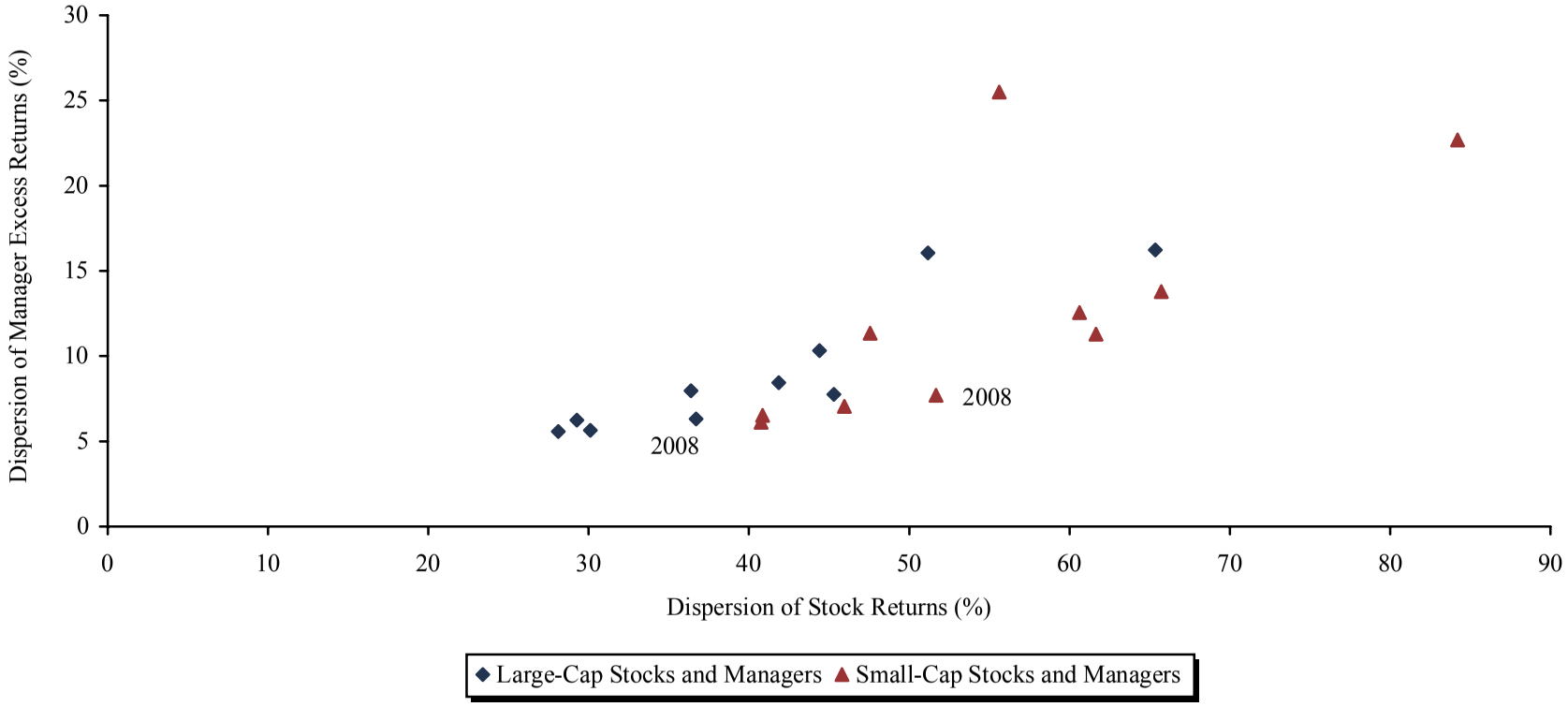


Sources: FactSet Research Systems and Frank Russell Company.

Table H

ANNUAL DISPERSION OF INDIVIDUAL U.S. STOCK RETURNS AND EXCESS RETURNS FOR U.S. EQUITY MANAGERS

1999–2008



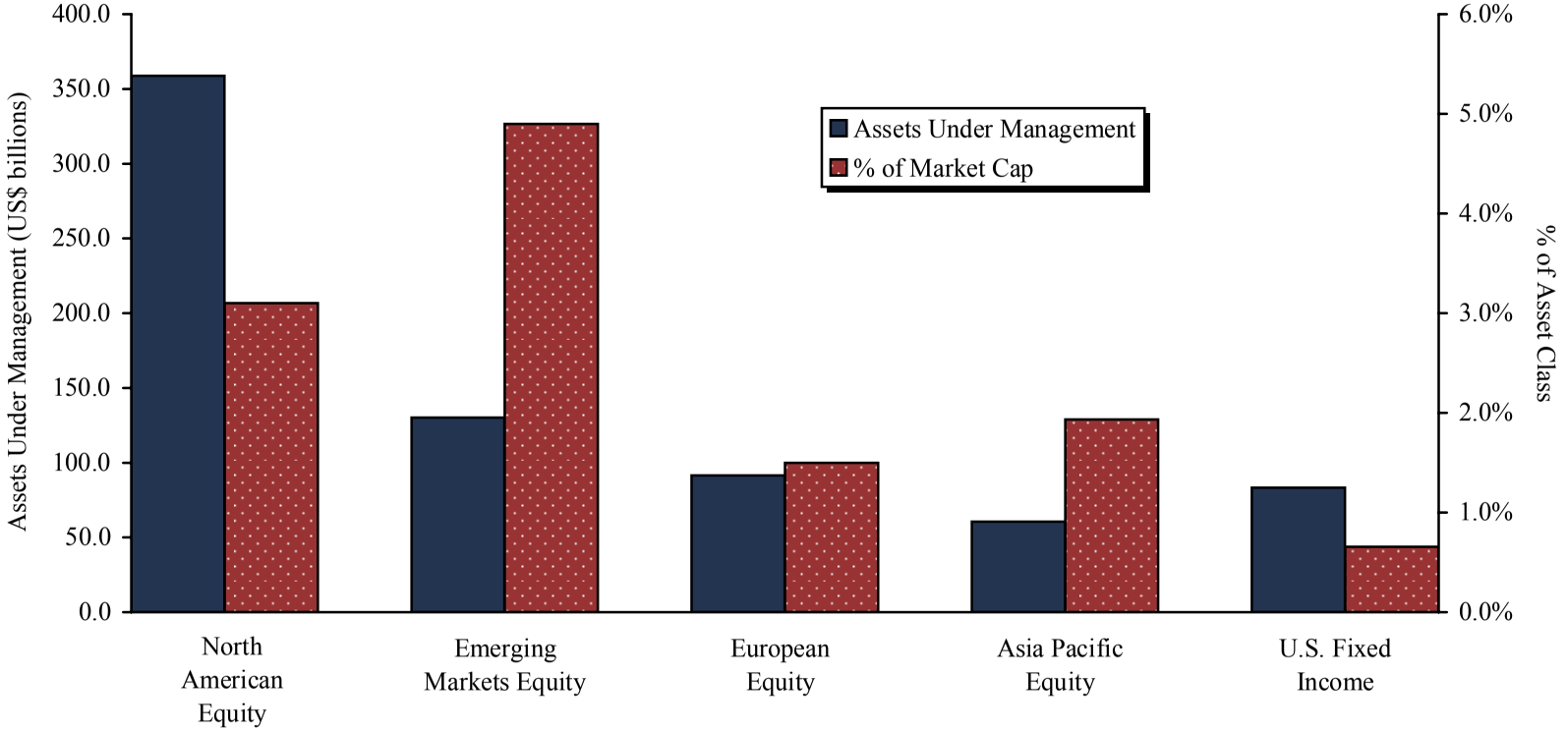
Sources: Cambridge Associates LLC, FactSet Research Systems, and Frank Russell Company.

Notes: Dispersion of return for large- and small-cap stocks represents stocks in the middle 50% of the return range for Russell 1000® and Russell 2000® stocks, respectively. Dispersion of return for large- and small-cap managers represents managers in the middle 50% of the return range for ex small-cap and small-/mid-cap U.S. equity managers, respectively.

Table I

ASSETS FOR SELECTED CATEGORIES OF EXCHANGE-TRADED FUNDS

July 31, 2009



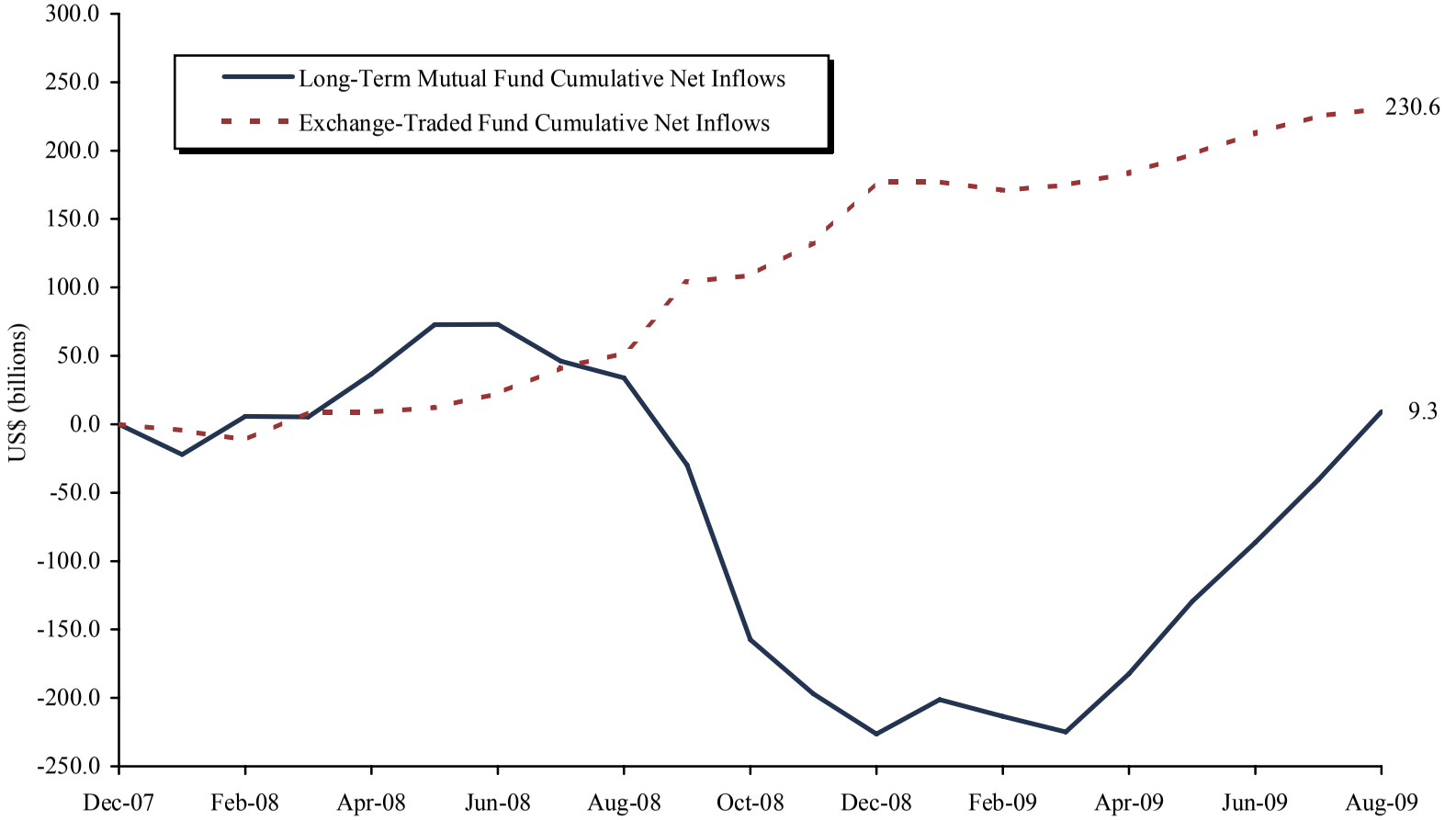
Sources: Barclays Global Investors, MSCI Inc., and Thomson Datastream. MSCI data provided "as is" without any express or implied warranties.

Notes: Refers to assets of exchange-traded products listed on all exchanges tracked by Barclays Global Investors. Equity market capitalizations used to calculate total assets for each category are float adjusted. North American equity assets represent U.S. and Canada (Mexico is included within emerging markets). U.S. fixed income assets are represented by the market value of the Barclays Capital U.S. Aggregate Bond Index; the fixed income exchage-traded fund (ETF) asset total, however, includes ETFs that track indices of bonds not included in the Aggregate index, such as municipal bonds, high-yield corporate bonds, TIPS, and Treasury bills.

Table J

CUMULATIVE NET FLOWS INTO U.S. EXCHANGE-TRADED FUNDS AND LONG-TERM MUTUAL FUNDS

December 31, 2007 – August 31, 2009



Source: Investment Company Institute.

Note: Long-term mutual funds include U.S.-registered equity, bond, and hybrid (e.g., balanced) traditional mutual funds.