# Hold or Fold?  An Analysis of HOLDRs

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**Abstract**

*We analyze HOLDRs, a variation on exchange-traded funds. After exploring HOLDRs' potential market-spanning qualities, we provide basic descriptive data for the seventeen HOLDRs created to date concentrating on their diversification possibilities. Returns comparison reveals that HOLDRs underperform U.S. stock market proxies. Most HOLDRs do perform on par with their underlying indexes. However, four of seventeen HOLDRs show a surprising deviation.*

## I. Introduction

Merrill Lynch introduced **HOL**ding Company **D**epository **R**eceipts (HOLDRs), trust-issued receipts that trade on the American Stock Exchange (AMEX) in September, 1999.[1] Each HOLDRs' underlying trust owns shares in individual companies of a designated market segment. As such, the seventeen HOLDRs that now exist are a variation of exchange-traded funds (ETFs) in keeping with iShares such as WEBS (**W**orld **E**quity **B**enchmark **S**ecurities), Spiders (Standard & Poor's Depository Receipts), and DIAMONDS (Dow Jones Industrial Average Depository Receipts) traded on the AMEX since 1993. This paper examines HOLDRS' performance record since their inception along with background information about the investment.

Merrill Lynch touts HOLDRs as a potential market-spanning device that allows investors to easily diversify investment portfolios while enjoying benefits equal to or better than individual company share ownership. The diversification comes from the fact that with one transaction, an investor can purchase a bundle of stocks (usually about twenty companies) in a given industry or sector. This benefit is much like ordinary mutual funds. However, a HOLDRs owner has investment flexibility advantages compared to most ETFs and mutual funds. The investor can unbundle the HOLDRs' underlying stocks and trade any one individually. As such, the investor has personal control of which stocks remain in the account (which may help optimize investment goals).

HOLDRs exhibit other advantages when compared to traditional mutual funds. First, unlike open-end mutual funds, HOLDRs provide added liquidity by trading throughout the day. Second, unlike closed-end funds, purchasers of HOLDRs can sell a particular company's stock. The underlying trust will still be constituted in the same manner, but the individual's holding will now be without the sold stock. Third, the HOLDRs investor receives any dividend payments and keeps voting rights for each company within the HOLDRs.[2] Fourth, Merrill Lynch states that while there are annual custody fees (2%) and transaction fees (from trading any individual

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[1] Acually, Merrill Lynch's first product using the HOLDRs format debuted in 1998. It reconstituted the parts of Telebras, the Brazilian telecommunications company. That product trades under the symbol TBH.

[2] Since a HOLDRs' owner receives all dividends, each HOLDRs will trail its index category if only by the cumulative impact of no dividend reinvestment.

stocks), HOLDRs have no management fees. Further, Merrill Lynch will wave any portion of the custody fee not earned via dividend distributions.

However, HOLDRs' biggest advantage over mutual funds may be related to taxes. HOLDRs' buy-and-hold strategy limits tax implications from portfolio turnover. Thus, the HOLDRs investor could avoid capital gains for the duration of the trust without needing to keep the securities within a retirement fund or some other more restrictive tax-avoidance instrument. Also, a HOLDRs investor could still generate capital losses (if desired to offset capital gains) by selling specific stocks.

According to Merrill Lynch's prospectus, HOLDRs' goal is to index a single market sector. This goal is similar to sector-specific ETFs. Thus, HOLDRs provide diversification possibilities with a relatively low investment requirement.[3] However, the HOLDRs issued so far are not similar to ETFs that mimic an entire country's market or an underlying market index and, thus, HOLDRs seem to provide questionable diversification benefits unless used within the context of a larger portfolio. All but one of the currently issued HOLDRs have U.S. stocks as their foundational assets (see Table 1 for a listing of the HOLDRS investment areas).

A further issue is the composition of each HOLDRs. Merrill Lynch set two portfolio composition goals. Each HOLDRs was to: 1) have twenty or more companies and 2) limit the market value weight of any one company within a HOLDRs to 20% or less. Corporate activities such as mergers and failures will naturally decrease the number of component companies over time (as Merrill Lynch's prospectus warns). Table 1 shows that only eight of the seventeen HOLDRs continue to have twenty or more companies within their trusts. The technology and internet-related category HOLDRs have experienced the greatest decrease in the number of underlying companies. Table 2 presents the dates and reasons for each company's exit from a given HOLDRs.

Uneven market capitalization changes will also lead to some firms' composing a larger than intended weighting. Table 1 shows that only seven of the trusts continue to have 20% or less of their value from one company. In fact, nine HOLDRs (Biotech, Broadband, Internet, Internet Architecture, Internet Infrastructure, Pharmaceuticals, Retail, Semiconductor, and Telecommunications) have over 50% of their value from the three largest firms in each HOLDRs.[4] The changes since inception leave only three HOLDRs (Europe 2001, Market 2000+, and Wireless) meeting both original composition criteria with the Wireless HOLDRs' largest firm, Verizon Communications, comprising 17.94% of its value. The Europe 2001 and Market 2000+ HOLDRs easily meet the compositions goals as they are the only two non-industry sector HOLDRs and have forty-nine and fifty-six firms, respectively.

Another interesting fact is Merrill Lynch's portrayal of HOLDRs as index funds. At times, this indexation clearly refers to the industry sector (and Merrill Lynch notes that its selected

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[3] The diversification benefits of the thirty or so closed-end country funds and seventeen ETFs may be limited by their co-movement with the U.S. stock market. (See Pennathur, Delcoure, and Anderson, 2002.)

[4] For example, AOL Time Warner, Ebay, and Yahoo! combine for 71.87% of the Internet HOLDRs while IBM, Dell, and Cisco comprise 67.24% of the Internet Architecture HOLDRs.

companies may not always provide an exact tracking of the desired industry).[5] Based on Merrill Lynch criteria, companies must meet the following four requirements to be considered for inclusion in a HOLDRs: (1) a market capitalization of $840 million or more, (2) 200,000 or more shares traded daily, (3) an average daily trading value of $7.5 million or more, and (4) a ninety-day or more trading history. At other times, Merrill Lynch uses the term "index" in accord with the idea of an "index fund" that mirrors the stock market.

Merrill Lynch created HOLDRs to sell near their respective net asset values (NAVs), where open-end mutual funds trade at NAVs and closed-end funds often sell at discounts. HOLDRs' market values exhibit some deviation from NAV. Such a discount is explainable since breaking apart the trusts into the individual stocks and selling each company would create transactions costs. Thus, a slight discount from NAV would not likely present an arbitrage opportunity. Indeed, Solodar and Seiler (2001) find the Internet HOLDRs sells at a small discount from its NAV. However, the observed discount does not provide an arbitrage opportunity.

HOLDRs is a market-spanning product that provides diversification, like mutual funds, but with added flexibility for investors, and at a lower cost than buying all underlying stocks separately. Examining HOLDRs since their inception allows us to discern if such a combination holds. The next section presents relevant literature. Section III outlines the data and methodology. Sections IV and V discuss and summarize findings, respectively.

## II. Literature Review

Solodar and Seiler (2001) conduct the only known empirical work specifically examining HOLDRs. They study Internet HOLDRs (HHH) from September 1999 through February 2000. During their test period, all twenty stocks underlying HHH continue to trade. They find HHH trades at an average discount of 8% to its NAV, but they conclude that the discount would be unlikely to provide arbitrage possibilities. Further, they find the mean and standard deviations of returns for HHH are insignificantly different from their counterparts in the portfolio consisting of the twenty underlying internet stocks.

The literature examining ETFs is also limited given these securities' relatively short existence. Khorana, Nelling, and Trester (1998) provide an examination of WEBS in the initial six-month period after their introduction in March 1996. They find that WEBS performed as well as closed-end country funds and tracked underlying Morgan Stanley Capital International (MSCI) indexes. They also find WEBS to be less correlated to the S&P500 index than closed-end country funds and, thus, suggest that these new securities may provide added diversification benefits.

Patro (2001) uses event-study methodology to examine MSCI equity indexes' reactions to the announcements from the introduction of WEBS. Using data from November 1994 to November 1996, the study finds a positive price response from the MSCI index to the announcement of the WEBS that is to track a country-specific MSCI index. Pennathur, Delcoure, and Anderson (2002) extend the WEBS analysis until December 1999. They, like Khorana, et al. (1998), find

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[5] For instance, in its Biotech HOLDRs, Merrill Lynch includes the heading "Not necessarily representative of the biotechnology industry."

that country-specific WEBS closely track the appropriate MSCI index. However, their tests show WEBS to retain significant exposure to the U.S. stock market.

Olienyk, Schwebach, and Zumwalt (1999) examine ETFs' cointegration with closed-end country funds from March 1996 through October 1998. They find that all but three of the WEBS closely track their respective country index. Interestingly, their results support the conclusion that the WEBS' price movements precede SPDRs' such that price changes related to foreign stocks lead those in the U.S. market. They also find interrelationships between various WEBs.

Harper, Madura, and Schnusenberg (2001) study ETFs in comparison to twenty-nine closed-end mutual funds from eighteen countries. Using April 1996 through December 1999 data, the authors find ETFs to have greater mean returns and higher risk exposure compared to closed-end country funds. The authors speculate the market might be receptive to ETFs that could be created to track contrived indexes and provide lower risk.

Good, Ferguson, and Treynor (1976) examine the benefits of index funds and their diversification limits. Larsen and Resnick (1998) present a more current review of the problems associated with asset selection and weighting for an index fund. Malkiel and Radisich (2001) find that while there is a pricing "pop" from being included in an index, the stock prices of firms within the index are not inflated over long trading periods. These empirical findings support the idea that asset selection and the non-reinvestment of dividends are the most likely reasons why index funds have poor tracking accuracy.

Another issue, beyond the scope of our paper, is investors' ability to trade the underlying securities within a HOLDRs category. Trading may lead to a different return for the investor as compared to the original HOLDRs. On average, transactions costs will lead to lower returns unless investors are able to time markets. Kon (1983) finds little empirical support of mutual fund managers' ability to time the markets profitably. Other empirical research sheds light on the ability of specialized mutual funds to earn greater returns than a market index. Howe and Pope (1993) find specialized funds' returns in line with traditional mutual funds, but with higher systematic and unsystematic risk than the traditional mutual funds. The best support that HOLDRs' trading ability might be valuable comes from O'Neal (2000) who finds empirical evidence that sector index funds can be used as momentum investing tools to earn greater returns than the general market. Thus, trading HOLDRs sector funds, if not within them, may be valuable. However, just as with others, O'Neal finds that sector-specific index funds exhibit higher risk levels associated with the higher returns.

### III. Data and Methodology

We obtain daily closing prices for the seventeen HOLDRs, S&P500 index, Russell 2000 index, and the seventeen HOLDRs index funds that track the underlying HOLDRs from the CSI database for the period January 1, 2000 through February 5, 2002.[6] We calculate returns for a

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[6] Given that trading in HOLDRS is relatively thin, beta estimates using monthly data would be preferable. However, HOLDRs' short trading history makes the use of monthly returns impractical for the period we examine.

given period as: $RET_t = (P_t - P_0)/P_0$. Where $RET_t$ is the return for period t, $P_t$ is the value of the asset of interest (HOLDRs, market index, or HOLDRs index) at time t, and $P_0$ is the value at the beginning of the desired estimation period.

Table 1 shows that most HOLDRs categories would be described as high-growth. It also reveals that the underlying trusts hold from fourteen to fifty-six stocks with twenty stocks being the mode. A number of the underlying trusts exhibit poor diversification. For example, nine HOLDRs have more than fifty percent of their investment in their three highest market capitalization firms and the three Internet-related HOLDRs: Internet (HHH), Internet Architecture (IAH), and Internet Infrastructure (IIH), have 71.87%, 67.24%, and 70.26 % of their respective trust's assets invested in their three largest market capitalization firms.

While Merrill Lynch did not intend these concentrations (remember that each HOLDRs started with at least twenty companies with no more than twenty percent invested in any given company) the trusts' characteristics make it likely that such concentrations would occur over time. Differences in company valuation changes along with mergers and failures would naturally lead to the concentrations we now find within most HOLDRs. Table 3 reveals that two separate HOLDRs contain the same company in nine instances. For instance, Verizon is 26.27% and 17.94% of the Telecom and Wireless HOLDRs, respectively, while Qualcomm is 21.23% and 9.59% of the Broadband and Wireless HOLDRs, respectively. Thus, a portfolio of HOLDRs would have less diversification benefit than investors anticipate.

To examine the HOLDRs performance over the past year, we estimate a basic one-factor regression model, shown in equation (1).

$$(RET_{it} - R_f) = \alpha_i + \beta_i(MKTINDEX_t - R_f) + \varepsilon_i \qquad (1)$$

where $RET_{it}$ is the return on HOLDRs (i) at time t,
$R_f$ is the risk-free rate (proxied by the ten-year U.S. Treasury Bond rate),
$MKTINDEX_t$ is the return on the U.S. stock market at time t (proxied by the S&P500 index and the Russell 2000 index),
$\alpha_i$, $\beta_i$, and $\varepsilon_i$ are the usual ordinary least squares estimations

A significant coefficient estimate, $\beta$, means that the returns on the market index do explain some returns for a given HOLDRs. The intercept, $\alpha$, should not be significantly different from zero if the HOLDRs perfectly track the stock market since the returns are net of the risk-free rate of return. Given the HOLDRs' compositions and the non-reinvesmtent of dividends, we expect $\alpha$ estimates to be negative if any are statistically different from zero. We expect the Market 2000+ HOLDRs to be the one most likely to have a significant $\beta$ estimate and an insignificant $\alpha$ estimate, but its large number of internationally traded stocks makes it an unlikely candidate to perfectly track the U.S. stock market.

To examine whether HOLDRs mimic their underlying sectors, we estimate a single-factor regression analysis using the model specified by equation (2).

$$(RET_{it} - R_f) = \alpha_i + \beta_i(INDUSTRYINDEX_t - R_f) + \varepsilon_i \tag{2}$$

where  $RET_{it}$ is the return on HOLDRs (i) at time t,
$R_f$ is the risk-free rate (proxied by the ten-year U.S. Treasury Bond rate),
$INDUSTRYINDEX_t$ is the return on the appropriate underlying HOLDRs index at time t,
$\alpha_i$, $\beta_i$, and $\varepsilon_i$ are the usual ordinary least squares estimations

We also expect to find the estimated β coefficient for industry index return for each HOLDRs to be statistically significant and close to 1.0.

## IV. Results

Table 4 presents the results from estimation of equation (1). The estimated β coefficients show that all HOLDRs have a statistically significant and positive relationship to the market (whether the market proxy is the S&P500 or Russell 2000) in a CAPM-context. One can view these results in two ways. First, HOLDRs' returns are significantly related to the general markets as one would expect if HOLDRs are trying to index the underlying market. Second, the HOLDRs' return-generating mechanism is similar to the market's, thus, HOLDRs would be a poor diversification tool. Taken together, we conclude that HOLDRs cannot be both a market indexing and a diversification tool simultaneously as Merrill Lynch's prospectus suggests.

Table 4 also shows that all intercept, α, terms are negative and statistically significant. These results indicate that between January 2000 and February 2002 each HOLDRs trust underperformed the market as proxied by the S&P500 or the Russell 2000. One possible explanation is that each and every HOLDRs segments do underperform the market. Another plausible explanation is that the non-reinvestment of dividends led to the HOLDRs' underperformance. However, the lack of dividends in the technology sectors seems to cast doubt on that explanation. A final reason for the underperformance would be the HOLDRs' 2% management fee. The significance of the estimated α coefficients suggests that HOLDRs are managed portfolios rather than traditional "index" funds. An unmanaged index portfolio does not have such a fee. These results cast more doubts on Merrill Lynch's claim that HOLDRs are a better alternative to ETFs and index mutual funds.

Table 5 lists the underlying index for each HOLDRs. Each index is an estimate of the per share value of the securities underlying one share of a specific HOLDRs. An examination of the underlying stocks in each index shows them to be the same, as one would expect, as for the HOLDRs being indexed. Each index also trades on the AMEX so that the HOLDRs and the HOLDRs index should move in concert or arbitrage possibilities should occur (ignoring transactions costs). Not surprisingly, only one estimated α coefficient (for Market 2000+) is significantly different from zero. However, in ten cases (including the one case with statistical significance) the estimated α coefficients are negative. Thus, we have evidence that HOLDRs underperform their respective HOLDRs indexes, although that evidence is significant in only one case.

We expect to find the estimated β coefficient for each HOLDRs statistically significant and close to 1.0. Empirical results indicate that thirteen of the seventeen HOLDRs estimated β coefficients meet our expectations. The results from four model estimations surprise us. Two models (Biotech and Oil Services) have β coefficients that are not statistically significant. Two other models (Market 2000+ and Software) have significant β coefficient estimates, but their values are much closer to 0.0 than 1.0.

It seems inconceivable that one could regress the index for an asset on that asset and not have a β coefficient close to 1.0. One plausible explanation is that the underlying index is misaligned with the specific HOLDRs' assets. However, we confirm that each HOLDRs index consists of the stocks included in its respective HOLDRs. It is also possible that the portfolio composition weightings of the appropriate HOLDRs index and its HOLDRs are not exactly the same. A third explanation is that daily excess returns, as used in this study, may present greater autocorrelation problems. Thus, beta estimates from daily data tend to have lower significance levels and are often not as close to 1.0 as expected. Brown and Warner (1985) provide an early discussion of the problem as it relates to event studies while Dickens and Philippatos (1994) discuss the implications for financial institutions. The first two explanations shed some light as to why β coefficient estimates are not 1.0 while the third is a potential reason why they are not significant at all. The composition of the HOLDRs indexes would seem to make the first two explanations moot.

We are also perplexed by the finding that the Market 2000+ and Software HOLDRs' estimated β coefficients are significant, but with coefficient estimates much closer to 0.0 than 1.0. It seems very odd to describe these two HOLDRs indexes as significantly following their respective HOLDRs, but almost not at all. For the Market 2000+ HOLDRs, a 1.0% change in the underlying HOLDRs index corresponds to only a 0.0002% change in the HOLDRs itself. Such a finding seems incredible (but holds after re-checking our data and re-running our model estimates). These unexpected findings point to arbitrage possibilities. However, after accounting for transaction costs, these arbitrage opportunities will not hold.

### V. Conclusion

Our purpose is to examine a relatively new Merrill Lynch investment, HOLDRs. The investment vehicle is of special interest given its potential to be a market-spanning tool that provides lower risk with an equal or higher return as compared to the same stocks bought in the open market or via a mutual fund.

Basic descriptive data show that HOLDRs exhibit lessening diversification opportunities since their inception. Only two of the seventeen trusts meet the original composition goals of twenty or more companies and with no more than 20.0% invested in any company within HOLDRs. This problem becomes worse since HOLDRs do not add new companies to the underlying trusts and some of the existing companies may be acquired, merge, or fail.

Using data from January 2000 through February 2002, we find that HOLDRs generally underperform the market as proxied by the S&P500 and Russell 2000 indexes. This result is in line with Solodar and Seiler's (2001) conclusions. However, our findings are not surprising since

most of the HOLDRs follow industry segments and not the entire market. We find only one HOLDRs with marginally significant underperformance relative to its underlying index. However, the majority of HOLDRs provide evidence of such underperformance, although that evidence is not statistically significant.

While HOLDRs do not statistically underperform their HOLDRs index funds, we do find that four of the seventeen trusts' return-generating mechanisms are uncorrelated with the underlying index. Two of the four have no statistical relationship at all. The other two have coefficient estimates that are significant, but with values closer to 0.0 than to 1.0.

In all, we find HOLDRs to be imperfect market indexation vehicles. That result is as we suspect, as most HOLDRs' are designed to mimic industry segments and not the market as a whole. However, we also find HOLDRs to be imperfect industry segment indexation vehicles. It is possible that HOLDRs' main advantage relates to the tax properties for individual investors. However, this issue needs further empirical investigation.

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## Table 1: HOLDRs Investment Areas

This table shows the number of companies in each HOLDRs investment area (segment) and the percentage invested in firms with the greatest market capitalization within the segment.

| HOLDRs Segment | Ticker | # of Companies in HOLDRs | Percentage of HOLDRs invested in (n) firms with the greatest market capitalization | | |
|---|---|---|---|---|---|
| | | | n=1 | n=2 | n=3 |
| Biotech | BBH | 20 | 22.58 | 40.16 | 50.39 |
| B2B Internet | BHH | 15 | 18.05 | 33.71 | 49.26 |
| Broadband | BDH | 19 | 21.23 | 38.96 | 52.19 |
| Europe 2001 | EKH | 49 | 5.16 | 9.89 | 14.50 |
| Internet | HHH | 14 | 35.91 | 58.50 | 71.87 |
| Internet Architecture | IAH | 21 | 40.45 | 54.88 | 67.24 |
| Internet Infrastructure | IIH | 15 | 31.86 | 62.78 | 70.26 |
| Market 2000+ | MKH | 56 | 4.37 | 8.65 | 11.22 |
| Oil Services | OIH | 18 | 12.14 | 22.49 | 31.64 |
| Pharmaceutical | PPH | 18 | 24.54 | 40.34 | 54.25 |
| Regional Banks | RKH | 18 | 11.98 | 22.50 | 32.76 |
| Retail | RTH | 20 | 22.02 | 42.79 | 50.70 |
| Semiconductor | SMH | 20 | 21.84 | 37.65 | 51.34 |
| Software | SWH | 20 | 23.03 | 37.01 | 46.66 |
| Telecommunications | TTH | 19 | 26.27 | 52.39 | 67.55 |
| Utilities | UTH | 19 | 11.97 | 20.66 | 29.22 |
| Wireless | WMH | 20 | 17.94 | 29.13 | 39.67 |

## Table 2:  Chronology of HOLDRs Company Changes

This table shows the date and reason for company exits from HOLDRs.

| HOLDR | Spin-off, Mergers, Delisting, others | HOLDR | Spin-off, Mergers, Delisting, others |
|---|---|---|---|
| BBH – May 2001 | Biochem Pharma Inc. merges with Shire Pharmaceuticals Group ADSs | HHH – May 2001 | PSINet, Inc delisted from NASDAQ |
| BBH – November 2001 | PE Corp becomes PE Biosystems Group | HHH – February 2001 | E*Trade Group, Inc. |
| BBH - June 2000 | QLT Phototherapeutics Inc. | HHH – January 2001 | AOL |
| BDH – February 2001 | JDS Uniphase Corp. merges with SDL Inc. | HHH – November 2000 | Terra Networks acquires Lycos, Inc. |
| BDH – October 2000 | Lucent Technologies Inc. | HHH – October 2000 | InfoSpace Inc. acquires GO2Net Inc. |
| BDH – May 2000 | Nortel Networks Corporation (New Holding CO.) | HHH – February 2000 | Earthlink Network, Inc. merges with MindSpring Enterprise. |
| BHH – January 2002 | Ventro Corp | IAH – February 2001 | EMC Corp. spins off McData Corp. |
| BHH – November 2001 | Scient Corp. merges with IXL Enterprise Inc. (IIXL) | IAH – December 2000 | Sun Microsystems Inc. 2-for-1 stock split; Cobalt Networks Inc. |
| BHH – October 2001 | Imagex. com. Inc; SciQuest Inc. | IAH – November 2000 | Veritas acquires Seagate Technology. |
| BHH – June 2001 | Proxicom Inc. | IAH – July 2000 | 3Com Corp. spins- off Palm, Inc. |
| BHH – May 2001 | PurchasePro.com | IAH – June 2000 | Hewlett-Packard spins-off Agilent. |
| BHH – September 2000 | Healtheon Corp. acquires CareInsite, Inc; | IIH – January 2002 | Kana Software Inc., Usinternetworking Inc. |
| BHH – August 2000 | CheckFree Holding Corp. | IIH – December 2001 | Exodus Communications, Inc. |
| BHH – June 2000 | Peregrine Systems, Inc. merges with Harbinger Corp. | IIH – September 2001 | Digital Island Inc. merges with Cable & Wireless PLC. |
| BHH – May 2000 | Pegasus Systems Inc | IIH – October 2000 | Nortel Networks Corp. acquires Alteon Websystems, Inc. |
| BHH – April 2000 | SBC Communications acquires Sterling Commerce; Kana Communications acquires Silknet Software | IIH – June 2000 | Network Solutions merges with VeriSign Inc. |
| BHH – March 2000 | Chemdex Corp | MKH – November 2001 | British Telecommunications PLC de-merges mmo2 PLC* |
| EKH – June 2001 | ASM Lithography Holding NV | MKH – July 2001 | AT&T Corp. spins-off AT&T Wireless |
| HHH – October 2001 | At Home Corp.; Exodus Communications | MKH – June 2001 | MCI Group realigns its business into WorldCom Group |
| MKH – February 2001 | EMC Corp. spins-off McData Corp. | TTH – June 2001 | MCI Group realigns its business into WorldCom Group |
| MKH – January 2001 | AOL acquires Time Warner Inc. | TTH – November 2000 | Global Crossing Ltd. |
| MKH – November 2000 | De-merger between Syntega AG from Novartis AG. * | TTH – October 2000 | NTL Inc. |

* De-merger: to remove (a component division or company) from a corporation, usually by sale or spin-off.

| HOLDR | Spin-off, Mergers, Delisting, others | HOLDR | Spin-off, Mergers, Delisting, others |
|---|---|---|---|
| OIH – November 2001 | Global Marine Inc. mergers with Santa Fe International Corp. | TTH – July 2000 | Qwest Communications Intl. Acquires US West Inc.; GTE Corp merges with Bell Atlantic Corp. Simultaneously the new company will do business as Verizon Coomunication Corp. |
| PPH – September 2000 | Andrx Corp. – Andrx Group | UTH – January 2002 | Enron is delisted from NYSE. |
| PPH – September 2000 | Jones Pharma Inc. merges with King Pharmaceutical Inc. | UTH – December 2001 | El Paso Corporation |
| PPH – June 2000 | Pfizer Inc. merges with Warner Lambert Co. | UTH – April 2001 | Southern Co. spins-off Mirant Corp. |
| PPH – April 2000 | Pharmacia & Upjohn, Inc. merges with Monsanto Companies. | UTH – December 2000 | CP&L Energy Inc. |
| RKH – September 2001 | Wachovia Corp. merges with First Union Corp. | UTH – October 2000 | Unicom Corp. merges with PECO Energy Company. |
| RKH – February 2001 | U.S. Bancorp merges Firstar Corp. | WMH – July 2001 | AT&T Corp. spins-off AT&T Wireless |
| SWH – March 2001 | BMC Software Inc. begins trading NYSE. | WMH – June 2001 | Deutsche Telecom ADS acquires VoiceStream Wireless Corp. |
| TTH – July 2001 | AT&T Corp. spins-off AT&T Wireless | WMH – April 2001 | Crown Castle International Corp. |

* De-merger: to remove (a component division or company) from a corporation, usually by sale or spin-off.

**Table 3: Companies in Multiple HOLDRs**

This table shows firms that are listed in two HOLDRs, along with their percentage of total market capital within each segment.

| Company Name | HOLDRs (% capitalization) |
|---|---|
| AT&T Wireless Service | TTH (2.17%), WMH (9.40%) |
| Ciena | BDH (1.25%), IAH (0.47%) |
| Motorola | BDH (17.73%), WMH (11.19%) |
| Nextel | TTH (0.73%), WMH (1.71%) |
| Qualcomm | BDH (21.23%), WMH (9.59%) |
| Sprint | TTH (1.19%), WMH (3.67%) |
| Sycamore Networks | BDH (0.87%), IAH (0.22%) |
| Veritas | IAH (0.97%), SWH (6.34%) |
| Verizon | TTH (26.27%), WMH (17.94%) |

## Table 4: HOLDRs Returns in Comparison to the Overall Stock Market

The estimated equation is: $(RET_{it} - R_f) = \alpha_i + \beta_i(MKTINDEX_t - R_f) + e_i$ where $RET_{it}$ is the return on HOLDRs(i) at time t, $R_f$ is the risk-free rate (proxied by the ten-year U.S. Treasury Bond rate), $MKTINDEX_t$ is the return on the U.S. stock market at time t (proxied by the S&P500 index and the Russell 2000 index), and $\alpha_i$, $\beta_i$, and $e_i$ are the usual ordinary least squares estimations. The associated *p*-values are reported in parentheses.

| HOLDRS | Regression on the S&P 500 | | | Regression on Russell 2000 | | |
|---|---|---|---|---|---|---|
| | $\alpha$ | $\beta$ | $R^2$ | $\alpha$ | $\beta$ | $R^2$ |
| Biotech (BBH) | -0.025*** (.000) | 0.467*** (.000) | 0.063 | -0.025*** (.000) | 0.470*** (.000) | 0.079 |
| Broadband (BDH) | -0.019*** (.003) | 0.518*** (.002) | 0.036 | -0.025*** (.000) | 0.362** (.025) | 0.019 |
| B2B Internet (BHH) | -0.020*** (.004) | 0.650*** (.000) | 0.046 | -0.023*** (.000) | 0.607*** (.000) | 0.051 |
| Europe 2001 (EKH) | -0.018*** (.000) | 0.490*** (.000) | 0.131 | -0.021*** (.000) | 0.418*** (.000) | 0.105 |
| Internet (HHH) | -0.020*** (.000) | 0.619*** (.000) | 0.078 | -0.023*** (.000) | 0.580*** (.000) | 0.085 |
| Internet Architecture (IAH) | -0.021*** (.000) | 0.568*** (.000) | 0.089 | -0.026*** (.000) | 0.467*** (.000) | 0.075 |
| Internet Infrastructure (IIH) | -0.018** (.013) | 0.675*** (.000) | 0.045 | -0.023*** (.001) | 0.589*** (.000) | 0.044 |
| Market 2000+ (MKH) | -0.019*** (.000) | 0.543*** (.000) | 0.263 | -0.023*** (.000) | 0.462*** (.000) | 0.219 |
| Oil Services (OIH) | -0.019*** (.000) | 0.474*** (.000) | 0.059 | -0.021*** (.000) | 0.421*** (.001) | 0.052 |
| Pharmaceutical (PPH) | -0.021*** (.000) | 0.537*** (.000) | 0.248 | -0.026*** (.000) | 0.444*** (.000) | 0.213 |
| Regional Bank (RKH) | -0.020*** (.000) | 0.505*** (.000) | 0.218 | -0.023*** (.000) | 0.449*** (.000) | 0.202 |
| Retail (RTH) | -0.014*** (.000) | 0.506*** (.000) | 0.140 | -0.017*** (.000) | 0.409*** (.000) | 0.115 |
| Semiconductor (SMH) | -0.011** (.038) | 0.772*** (.000) | 0.115 | -0.016*** (.001) | 0.654*** (.000) | 0.096 |
| Software (SWH) | -0.016*** (.004) | 0.617*** (.000) | 0.072 | -0.020*** (.000) | 0.536*** (.000) | 0.063 |
| Telecom (TTH) | -0.022*** (.000) | 0.555*** (.000) | 0.217 | -0.026*** (.000) | 0.471*** (.000) | 0.196 |
| Utilities (UTH) | -0.021*** (.000) | 0.505*** (.000) | 0.237 | -0.025*** (.000) | 0.422*** (.000) | 0.194 |
| Wireless (WMH) | -0.021*** (.000) | 0.489*** (.000) | 0.094 | -0.024*** (.000) | 0.394*** (.000) | 0.071 |
| | | *0.5582* | *0.1265* | | *0.4797* | *0.1105* |

*** Significant at 1% significance level
 ** Significant at 5% significance level

## Table 5:  HOLDRs Returns in Comparison to the Underlying Index

The estimated equation is: $(RET_{it} - R_f) = \alpha_i + \beta_i(INDUSTRYINDEX_t - R_f) + e_i$, where $RET_{it}$ is the return on HOLDRs (i) at time t, $R_f$ is the risk-free rate (proxied by the ten-year U.S. Treasury Bond rate), $INDUSTRYINDEX_t$ is the return on the appropriate underlying HOLDRs index at time t, and $\alpha_i$, $\beta_i$, and $e_i$  are the usual ordinary least squares stimations. The associated *p*-values are reported in parentheses.

| HOLDRS | Underlying Index | $\alpha$ | $\beta$ | $R^2$ |
|---|---|---|---|---|
| Biotech (BBH) | Biotech HOLDRS Index (IBH) | 0.00003 (.847) | -0.00003 (.444) | 0.001 (.444) |
| Broadband (BDH) | Broadband HOLDRs Index (XDH) | -0.00037 (.106) | 0.844*** (.004) | 0.695*** (.004) |
| B2B Internet (BHH) | B2B Internet HOLDRs Index (BUX) | -0.00004 (.803) | 0.844*** (.000) | 0.695*** (.000) |
| Europe 2001 (EKH) | Europe 2001 HOLDRs Index (EKI) | -0.00013 (.802) | 0.936*** (.000) | 0.807*** (.000) |
| Internet (HHH) | Internet HOLDRs Index (BUX) | 0.00002 (.657) | 1.018*** (.000) | 0.962*** (.000) |
| Internet Architecture (IAH) | Internet Architecture HOLDRs Index (XAH) | -0.00012 (.901) | 0.847*** (.000) | 0.721*** (.000) |
| Internet Infrastructure (IIH) | Internet Infrastructure HOLDRs Index (YIH) | 0.00002 (.984) | 0.958*** (.000) | 0.847*** (.000) |
| Market 2000+ (MKH) | Market 2000+HOLDRs Index (XKH) | -0.00137* (.086) | 0.0002* (.055) | 0.011** (.055) |
| Oil Services (OIH) | Oil Service HOLDRs Index (OXH) | -0.00130 (.589) | -0.0002 (.606) | 0.001 (.606) |
| Pharmaceutical (PPH) | Pharmaceutical HOLDRs Index (IPH) | 0.00013 (.659) | 0.936*** (.000) | 0.838*** (.000) |
| Regional Bank (RKH) | Regional Bank HOLDRs Index (XRH) | 0.00014 (.410) | 0.953*** (.000) | 0.955*** (.000) |
| Retail (RTH) | Retail HOLDRs Index (IRH) | 0.00002 (.973) | 0.970*** (.000) | 0.876*** (.000) |
| Semiconductor (SMH) | Semiconductors HOLDRs Index (XSH) | -0.00022 (.818) | 0.883*** (.000) | 0.784*** (.000) |
| Software (SWH) | Software HOLDRs Index (XWH) | -0.00182 (.419) | 0.013*** (.000) | 0.028*** (.002) |
| Telecom (TTH) | Telecom HOLDRs Index (ITH) | -0.00010 (.754) | 0.809*** (.000) | 0.695*** (.000) |
| Utilities (UTH) | Utilities HOLDRs Index (XUH) | 0.00010 (.814) | 0.783*** (.000) | 0.709*** (.000) |
| Wireless (WMH) | Wireless HOLDRs Index (IWH) | -0.00009 (.762) | 0.953*** (.000) | 0.966*** (.000) |

\*\*\* Significant at 1% significance level
 \*\* Significant at 5% significance level
  \* Significant at 1% level