THE ETF INDUSTRY: PAST, PRESENT, AND FUTURE

As Of Date:
4/13/2019

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Structure Matters

Prepping for Pan Am's

Just one week to go before racing begins at the XVI Pan American Games in Guadalajara. Fourteen US crews, including 6 Beijing Olympians, are set to compete. Check back all week for news and interviews with the 2011 Pan Am Team.
What is an Exchange Traded Fund?
ETFs: Growing Fast

Source: ETFGI data sourced from ETF/ETP sponsors, exchanges, regulatory filings, Thomson Reuters/Lipper, Bloomberg, publicly available sources, and data generated in-house.
What Are the Benefits of ETFs?
The Benefits of ETFs

- Transparent
- Low Cost
- Tax Efficient
The Benefits of ETFs

Transparent
Should I invest in the marijuana industry Arnold??

Let it rip bro. There’s an ETF for that.
# Transparency

## THE ETFMG Alternative Harvest ETF (MJ)

<table>
<thead>
<tr>
<th>Name</th>
<th>% Total Net Assets</th>
<th>Ticker</th>
<th>Shares Held</th>
<th>Market Value USD</th>
</tr>
</thead>
<tbody>
<tr>
<td>CANOPY GROWTH CORP</td>
<td>8.90</td>
<td>WEED CN</td>
<td>1576433</td>
<td>$58863237.12</td>
</tr>
<tr>
<td>AURORA CANNABIS INC COM</td>
<td>8.71</td>
<td>ACB CN</td>
<td>8197285</td>
<td>$57562551.70</td>
</tr>
<tr>
<td>CRONOS GROUP INC COM</td>
<td>8.30</td>
<td>CRON</td>
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</tr>
<tr>
<td>TILRAY INC COM CL 2</td>
<td>8.18</td>
<td>TLRY</td>
<td>543656</td>
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</tr>
<tr>
<td>GW PHARMACEUTICALS PLC ADS</td>
<td>6.72</td>
<td>GWPH</td>
<td>305395</td>
<td>$44441080.40</td>
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<tr>
<td>CORBUS PHARMACEUTICALS HLDGS COM</td>
<td>4.61</td>
<td>CRBP</td>
<td>4187801</td>
<td>$30487191.28</td>
</tr>
<tr>
<td>CANNTRUST HOLDINGS INC</td>
<td>4.28</td>
<td>TRST CN</td>
<td>4096237</td>
<td>$28264133.86</td>
</tr>
<tr>
<td>HYDROPOTHECARY CORP NEW COM</td>
<td>4.15</td>
<td>HEXO CN</td>
<td>5747391</td>
<td>$27417820.99</td>
</tr>
<tr>
<td>EMERALD HEALTH THERAPEUTICS IN COM</td>
<td>3.76</td>
<td>EMH CN</td>
<td>7713147</td>
<td>$24844269.76</td>
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<tr>
<td>ORGANIGRAM HOLDINGS INC</td>
<td>3.38</td>
<td>OGI CN</td>
<td>4984435</td>
<td>$22332441.97</td>
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</tbody>
</table>

Source: https://www.etfmj.com/
The Benefits of ETFs

Low Cost
Lower costs

<table>
<thead>
<tr>
<th>Asset Class</th>
<th>Weight</th>
<th>Fund</th>
<th>Ticker</th>
<th>ER</th>
</tr>
</thead>
<tbody>
<tr>
<td>U.S. Equity</td>
<td>40%</td>
<td>iShares Core S&amp;P Total U.S. Market ETF</td>
<td>ITOT</td>
<td>0.03%</td>
</tr>
<tr>
<td>Developed Markets Equity</td>
<td>30%</td>
<td>Schwab International Equity ETF</td>
<td>SCHF</td>
<td>0.06%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>SPDR S&amp;P World ex-US ETF</td>
<td>GWL</td>
<td>0.04%</td>
</tr>
<tr>
<td>Emerging Markets Equity</td>
<td>5%</td>
<td>Schwab Emerging Markets Equity ETF</td>
<td>SCHE</td>
<td>0.13%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>SPDR Portfolio Emerging Markets ETF</td>
<td>SPEM</td>
<td>0.11%</td>
</tr>
<tr>
<td>Fixed Income</td>
<td>15%</td>
<td>Schwab U.S. Aggregate Bond</td>
<td>SCHZ</td>
<td>0.04%</td>
</tr>
<tr>
<td>REITs</td>
<td>5%</td>
<td>Schwab U.S. REIT ETF</td>
<td>SCHH</td>
<td>0.07%</td>
</tr>
<tr>
<td>Commodities</td>
<td>5%</td>
<td>GraniteShares Bloomberg Commodity Broad Strategy No K-1 ETF</td>
<td>COMB</td>
<td>0.25%</td>
</tr>
</tbody>
</table>

**COMBINED FEE**

0.06%
0.05%

Source: Hougan 10/19/2017 https://www.etf.com/sections/blog/worlds-lowest-cost-portfolio-hits-005-fee
Lower costs

Cutting Costs: How To Cut Your Arm Off To Save Your Life
June 2018, GraniteShares gains traction:

Tiny Gold ETF Wages Fee War to Reap 10-Fold Surge in Assets

End of June 2018, State Street Responds:

Gold ETF fee war continues, as new fund undercuts rivals

Published: June 26, 2018 11:51 a.m. ET

October 2018:

Low-cost gold ETF GraniteShares cuts fees as price rivalry hots up

© Reuters
The Benefits of ETFs

Tax Efficient
## Tax Efficiency

<table>
<thead>
<tr>
<th></th>
<th>Latest Distribution History - VSIGX</th>
<th>Latest Distribution History - IEF</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>S/T Capital Gain</strong></td>
<td><strong>L/T Capital Gain</strong></td>
<td><strong>S/T Capital Gain</strong></td>
</tr>
<tr>
<td>2017</td>
<td>$0.00</td>
<td>$0.00</td>
</tr>
<tr>
<td>2016</td>
<td>$0.00</td>
<td>$0.02</td>
</tr>
<tr>
<td>2015</td>
<td>$0.00</td>
<td>$0.01</td>
</tr>
<tr>
<td>2014</td>
<td>$0.00</td>
<td>$0.00</td>
</tr>
<tr>
<td>2013</td>
<td>$0.01</td>
<td>$0.06</td>
</tr>
<tr>
<td>2012</td>
<td>$0.07</td>
<td>$0.16</td>
</tr>
<tr>
<td>2011</td>
<td>$0.02</td>
<td>$0.02</td>
</tr>
<tr>
<td>2010</td>
<td>$0.21</td>
<td>$0.00</td>
</tr>
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</table>


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**Tax Efficiency**

### EXHIBIT 8
Average Tax Consequences for ETFs and Mutual Funds, 1993–2017

**Panel A: Average Annual Capital Gains Tax Burden, by Fund Type**

<table>
<thead>
<tr>
<th>Fund Type</th>
<th>No CG Distributions</th>
<th>0%–1% Burden</th>
<th>&gt;1% Burden</th>
<th>Average Burden</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mutual Fund</td>
<td>4.9%</td>
<td>54.9%</td>
<td>40.2%</td>
<td>0.9%</td>
</tr>
<tr>
<td>ETF</td>
<td>53.3%</td>
<td>46.7%</td>
<td>0.0%</td>
<td>0.0%</td>
</tr>
</tbody>
</table>

**Panel B: Average Annual Capital Gains and Dividend Tax Burden, by Fund Type**

<table>
<thead>
<tr>
<th>Fund Type</th>
<th>No CG or Div Distributions</th>
<th>0%–1% Burden</th>
<th>&gt;1% Burden</th>
<th>Average Burden</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mutual Fund</td>
<td>2.3%</td>
<td>48.9%</td>
<td>48.8%</td>
<td>1.1%</td>
</tr>
<tr>
<td>ETF</td>
<td>5.3%</td>
<td>94.4%</td>
<td>0.3%</td>
<td>0.3%</td>
</tr>
</tbody>
</table>

*Source: Research Affiliates, LLC, using data by Morningstar Direct.*

*The results are hypothetical results and are NOT an indicator of future results and do NOT represent returns that any investor actually attained. Please see disclosures for additional information. Additional information regarding the construction of these results is available upon request. Indexes are unmanaged, do not reflect management or trading fees, and one cannot invest directly in an index.*
Tax Efficiency Potentially Matters

Hypothetical Growth of 100k, Net of Fees

Hypothetical example, for discussion purposes only
How Did We Get Here?
2005: Beta to the World

Source: https://www.etf.com/sections/etf-league-tables.html
2017: Fine Tuning Factors ("Smart Beta")

Source: https://www.etf.com/sections/etf-league-tables.html
Is Factor Investing Next?
Hold on,
What’s a factor?
We Believe in **Focused** Value and Momentum Factors

### Value Strategy: “Buy Cheap”

- **VAL_10** = Top Decile Value, mid/large cap
  - Ranked on book-to-market
  - Annually rebalanced
- **SP500** = SP500 Total Return Index
- **Simulated Performance**: 1/1/1963 to 12/31/2015
- **Net of fees**: 1% mgmt. fee, .5% transaction costs
- **Total returns**, including dividends and distributions

### Momentum Strategy: “Buy Strong”

- **MOM_10** = Top Decile Momentum
  - Ranked on cumulative 12 months, skip last month
  - Monthly rebalanced
- **SP500** = SP500 Total Return Index
- **Simulated Performance**: 1/1/1963 to 12/31/2015
- **Net of fees**: 1% mgmt. fee, 2.5% transaction costs
- **Total returns**, including dividends and distributions

**Value and momentum are anchored** in risk and mispricing

Performance figures contained herein are hypothetical, unaudited and prepared by Alpha Architect, LLC; hypothetical results are intended for illustrative purposes only. Past performance is not indicative of future results, which may vary. Index returns are for illustrative purposes only and do not represent actual fund performance. Index performance returns do not reflect any management fees, transaction costs, or expenses, which would reduce returns. Indexes are unmanaged and one cannot invest directly in an index. Source: [Ken French Data](https://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html) and Bloomberg.
We believe factors are more effective when they are **Focused**

Job Security or Alpha? **Pick One.**

<table>
<thead>
<tr>
<th>Holding Period for each Stock</th>
<th>Number of Stocks Selected each month</th>
<th>CAGR</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>50</td>
<td>100</td>
</tr>
<tr>
<td>1</td>
<td>17.36%</td>
<td>15.85%</td>
</tr>
<tr>
<td>2</td>
<td>16.35%</td>
<td>15.41%</td>
</tr>
<tr>
<td>3</td>
<td>15.97%</td>
<td>14.68%</td>
</tr>
<tr>
<td>4</td>
<td>15.25%</td>
<td>13.86%</td>
</tr>
<tr>
<td>5</td>
<td>14.79%</td>
<td>13.53%</td>
</tr>
<tr>
<td>6</td>
<td>14.15%</td>
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<tr>
<td>7</td>
<td>13.87%</td>
<td>12.86%</td>
</tr>
<tr>
<td>8</td>
<td>13.47%</td>
<td>12.72%</td>
</tr>
<tr>
<td>9</td>
<td>13.06%</td>
<td>12.37%</td>
</tr>
<tr>
<td>10</td>
<td>12.57%</td>
<td>12.11%</td>
</tr>
<tr>
<td>11</td>
<td>11.94%</td>
<td>11.73%</td>
</tr>
<tr>
<td>12</td>
<td>11.42%</td>
<td>11.35%</td>
</tr>
</tbody>
</table>

+ **Focused Factors** **Increase** Expected Performance
- **Focused Factors** **Increase** Tracking Error & Volatility

*The results are hypothetical results and are NOT an indicator of future results and do NOT represent returns that any investor actually attained. Additional information regarding the construction of these results is available upon request. Sample is from 1970 to 2016. Results are associated with a generic 2-12 momentum index strategy. Indexes are unmanaged, do not reflect management or trading fees, and one cannot invest directly in an index. All returns are gross total returns and include the reinvestment of distributions (e.g., dividends).
Great,
Where Do I Sign Up?
**Career Risk is Real – Value in the Late ‘90s**

**Buffett: -39%**
**SP500: 7%**
**QQQ: 110%**

![Graph showing stock performance from June 1999 to February 2000](image)

**Charlie, should we buy tech?**

"Warren Buffett may be losing his magic touch.”

**Sustainable Investing Requires Perspective**

Source: Factset. 6/1/1999 to 2/29/2000. The results are hypothetical results and are NOT an indicator of future results and do NOT represent returns that any investor actually attained. Please see disclosures for additional information. Additional information regarding the construction of these results is available upon request.
Closet Indexes Won’t Deliver the Academic Factor Results

- **VTV US Equity** = Vanguard Value ETF
- **SPY US Equity** = SPDR S&P 500 ETF Trust
- **Simulated Performance**: 1/1/2004 to 2/28/2018
- Total returns, including dividends and distributions
- Past performance is not indicative of future results, which may vary. Source: Bloomberg, LP

Yes, I’m a closet indexer. So sue me!
Visual Active Share

Source: https://tools.alphaarchitect.com/visual-active-share
Visual Active Share

Vanguard “Value”? = S&P 500 +/-

Expensive <----- Value -----> Cheap

Source: https://tools.alphaarchitect.com/visual-active-share
Risky: Long-only **momentum** portfolios can underperform!

**5-Year Rolling CAGR Relative to S&P 500**

**High Relative Risk**

- **FF_MOM** = Top Decile Momentum
  - Ranked on cumulative 12 months, skip last month
  - Monthly rebalanced
- **SP500** = SP500 Total Return Index
- **Simulated Performance**: 1/1/1927 to 12/31/2016, Gross of fees, total returns, including dividends and distributions

Performance figures contained herein are hypothetical, unaudited and prepared by Alpha Architect, LLC; hypothetical results are intended for illustrative purposes only. Past performance is not indicative of future results, which may vary. Index returns are for illustrative purposes only and do not represent actual fund performance. Index performance returns do not reflect any management fees, transaction costs, or expenses, which would reduce returns. Indexes are unmanaged and one cannot invest directly in an index. Source: Ken French Data and Bloomberg.
Firm Mission

We Empower Investors Through Education

In order to

Develop Sustainable Investors
Patience and Discipline are “Alpha”

Our Approach
Sustainable Process

Our Clients
Sustainable Investors

Our Goal
Expected Long-Term Performance

Education is critical for cultivating long-term, sustainable investors

“Alpha” is Earned via Patience & Discipline
We are Systematic Value and Momentum Thought Leaders

Wesley R. Gray, Ph.D.
- PhD/MBA, University of Chicago
- BS Economics, Wharton
- Captain, Marine Corps

Wesley R. Gray, Ph.D. has been an active participant in financial markets throughout his career. He is the Founder, CEO and Co-CIO for Alpha Architect, an SEC-Registered Investment Advisor. Dr. Gray has published multiple academic articles and books, to include the co-authored books Quantitative Value, DIY Financial Advisor, and Quantitative Momentum.

Jack R. Vogel, Ph.D.
- PhD, Drexel University
- MS Mathematics, Drexel Univ.
- BS Mathematics, U. of Scranton

Jack Vogel, Ph.D., conducts research in empirical asset pricing and behavioral finance, and has collaborated with Dr. Gray on multiple projects. He is the CFO and Co-CIO for Alpha Architect, an SEC-Registered Investment Advisor. Dr. Vogel has published multiple academic articles and co-authored the books DIY Financial Advisor, and Quantitative Momentum.

“This book [QV] is an excellent primer to quantitative investing...”
--Alex Edmans, Ph.D., Associate Professor of Finance, The Wharton School, University of Pennsylvania

“Gray and Carlisle take systematic value-based investing to the next level.”
--Raife Giovinazzo, Ph.D., CFA, Research Analyst in Scientific Active Equity, Blackrock

“Anyone interested in systematic investing should read this book [QM]...”
--Cliff Asness, Ph.D., Managing and Founding Principle of AQR

“Anyone who is using, studying or incorporating momentum will find a wealth of information in the pages of Quantitative Momentum
--Chris Geczy, Ph.D., Founder and CEO of Forefront Analytics

“Quantitative Momentum is the story of momentum-based stock selection algorithms. Wes and Jack lucidly explain how and why these systems work.”
--Narasimhan Jegadeesh, Ph.D. Dean’s Distinguished Chair in Finance at Goizueta Business School

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Index returns are for illustrative purposes only and do not represent actual fund performance. References to an index do not imply that the portfolio will achieve returns, volatility or other results similar to that index. The composition of the index may not reflect the manner in which a portfolio is constructed in relation to expected or achieved returns, portfolio guidelines, restrictions, sectors, correlations, concentrations, volatility or tracking error targets, all of which are subject to change. Index performance returns do not reflect any management fees, transaction costs, or expenses, which would reduce returns.

Indexes are unmanaged and one cannot invest directly in an index. There are no active components of indexes; therefore, using them as a proxy can be of limited value because there is no guarantee that the portfolio would have been managed to match the index. Realized returns and/or volatility may come in higher or lower than expected.

Annual performance is calculated based on monthly return streams, geometrically linked as of the end of the specified month end.

Results, unless cited otherwise, are shown gross of fees and do not reflect the effect of investment fees which would lower performance. Performance reflects the reinvestment of dividends and other earnings. The following hypothetical illustrates the compound effect fees have on investment return: For an account charged 1% with a stated annual return of 10%, the net total return before taxes would be reduced from 10% to 9%. A ten year investment of $100,000 at 10% would grow to $259,374, and at 9%, to $236,736 before taxes. For a complete description of all fees and expenses, please refer to Alpha Architect’s Form ADV Part 2A.
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CAGR: Compound annual growth rate
Standard Deviation: Sample standard deviation
Downside Deviation: Sample standard deviation, but only monthly observations below 41.67bps (5%/12) are included in the calculation
Sharpe Ratio (annualized): Average monthly return minus treasury bills divided by standard deviation
Sortino Ratio (annualized): Average monthly return minus treasury bills divided by downside deviation
Appraisal Ratio (annualized): CAPM regression intercept estimate divided by regression residual volatility
Worst Drawdown: Worst peak to trough performance (measured based on monthly returns)
Rolling X-Year Win %: Percentage of rolling X periods that a strategy outperforms
Sum (5-Year Rolling MaxDD): Sum of all 5-Year rolling drawdowns
Down %: The Down Number Ratio is a measure of the number of periods that the investment was down when the benchmark was down, divided by the number of periods that the benchmark was down. The smaller the ratio, the better
Up %: The Up Number Ratio is a measure of the number of periods that the investment was up when the benchmark was up, divided by the number of periods that the benchmark was up. The larger the ratio, the better
Tracking Error: Tracking Error is measured by taking the square root of the average of the squared deviations between the investment’s returns and the benchmark’s returns
Negative Correlation: Correlation of returns relative to benchmark returns when the benchmark is negative
Positive Correlation: Correlation of returns relative to benchmark returns when the benchmark is positive