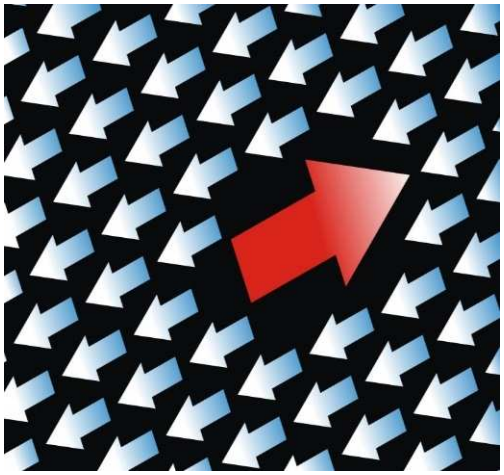
Boston QWAFAFEW

The Case for Reverse Market Cap Indexing



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GLOBAL FINESSE

Topics to Be Covered

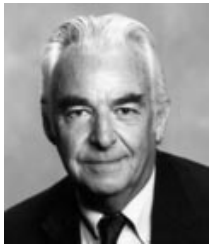
- Evolution of US Index Weighting Schemes
- Challenges to Market-Cap Weighting
- Trading and Fund Structures Get Much More Efficient
- Reverse Cap Weighting Methodology Derived
- Why Should Reverse Cap Weighting Work?
- Empirical Results
- Implications for Investors

Indexing: Back to the Beginning

- Wells Fargo: Huge Investment in “Modern” Computers

- Team Put in Place at Wells Fargo – Three Insightful Leaders





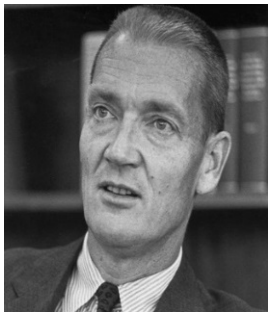
- 1971 - $6 Million Samsonite Pension Fund
  - Keith Shwayder

- Challenges of Creating and Managing a Market Portfolio

Indexing Solution: The S & P 500 Index

- Launched in 1957 based upon index developed by Alfred Cowles in 1938
- Referenced mostly by economists and academics until 1971
- Dream implementation tool for index funds when trading costs were substantial
  - Stocks still traded by open outcry
  - Bid-ask spreads were in 1/8s
  - Brokers typically charged their best institutional customers just 10 ¢ per share
- Automatic position weight tracking – **an ingenious solution** already available
- Implementation of WF S&P 500 fund led institutional investment evolution
- Technology and CME futures established Cap-weighted Indexing Benchmarks

STANDARD &POOR'S 500



- 1992 – Vanguard makes S&P 500 Indexing work for retail investors too

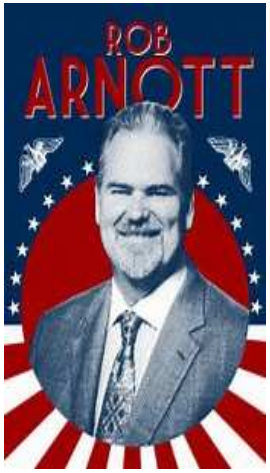
Challenges to Market-Cap Weighting

- Fama and French: 1992 – Price/Book and Small-Cap Stock Anomalies

- Fernholz, Garvey, and Hannon, 1998 – Diversity-Weighted Index

- Hillenbrand, 2003 – Mean Reversion Evidence

- Arnott, Hsu and Moore: 2005 – Fundamental Indexation



Efficiency Improvements for Trading and Fund Structure

TRADING

Techno-evolution

Decentralization

End of disintermediation

Decimalization

Deregulation

Specialist essentially eliminated

ETFs

Beta access nearly free

Insulated from daily flows

De minimus cash drag

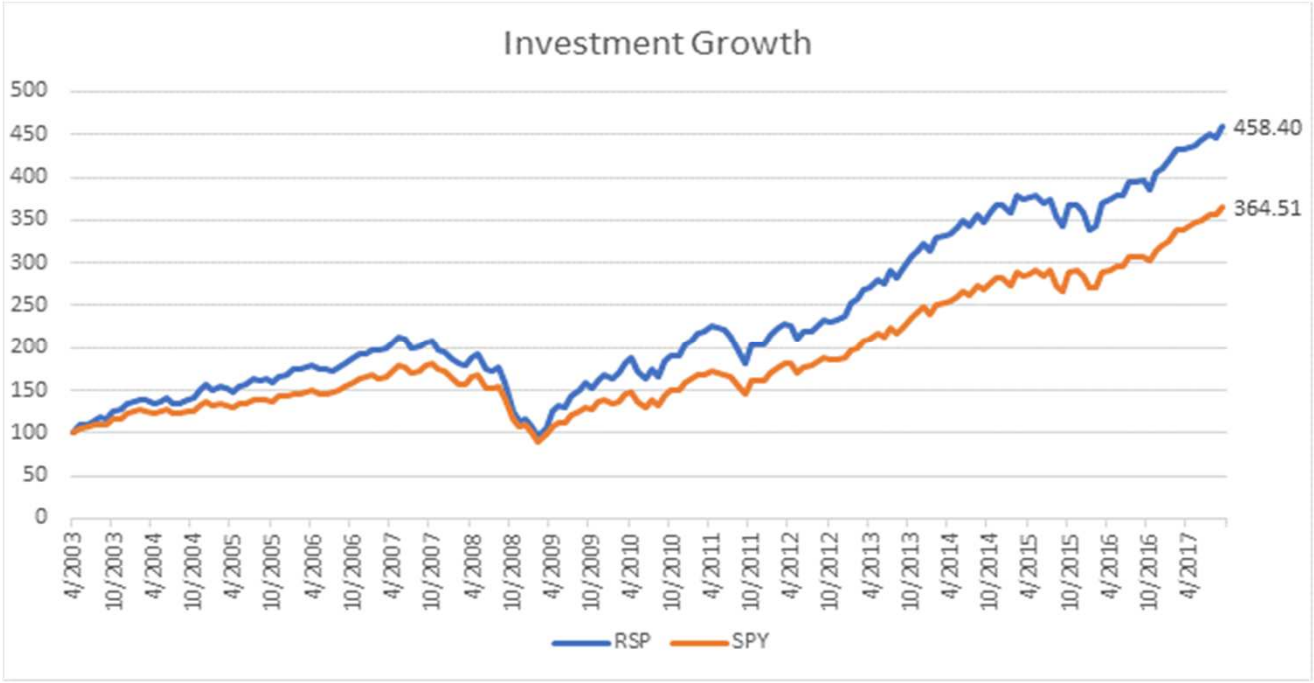
Near-zero cap gains to distribute

No redemption fees

Trading costs near zero for US equity

RSP: 14+ Year Study in Beating Market Cap Weighting

- 2003: RSP introduced by Rydex
- Equal-weighted 500 S&P Indexing
- Has outperformed SPY since inception but with higher annual vol



Index Weighting Methodologies

In all cases, only the constituents of the S&P 500 at time *t* are used.

SPY (Market Cap Weighting):

- $mv_i = MCAP_i \div (\sum MCAP_j)$ for $_{i=1}$ to $_{i=500}$
- $eq_i = (1/500) = 0.2\%$ for $_{i=1}$ to $_{i=500}$
- $rv_i = (1 / MCAP_i) \div [\sum (1 / MCAP_i)]$ for $_{i=1}$ to $_{i=500}$

Mathematical Rationale for Reverse-Cap Weighting

Dividing the 500 stock universe into top 120 stocks as ranked by market cap vs. bottom 380

Let x=the return of the market cap weighted portfolio; y=return of the equally weighted portfolio; and z=return of the reverse cap weighted portfolio

$x = \text{å}i{=}120\ mv * r \quad for\ i{=}1\ to\ i = 120 + \text{å}i{=}500\ mv * r\ for\ i = 121\ to\ 500$

$Y = \text{å}i{=}120\ eq * r \quad for\ i{=}1\ to\ i = 120 + \text{å}i{=}500\ mv * r\ for\ i = 121\ to\ 500$

$Z = \text{å}i{=}120\ rv * r \quad for\ i{=}1\ to\ i = 120 + \text{å}i{=}500\ mv * r\ for\ i = 121\ to\ 500$

Average co-efficients for the sums of the first 120 co-efficients, plugged in results in:

*E(x) = 0.667 * a + 0.333* b where a is average return for 120 top-cap stocks & b = 380 bottom cap stocks*

*E(y)= 0.240 * a + 0.760* b where a is average return for 120 top-cap stocks & b = 380 bottom cap stocks*

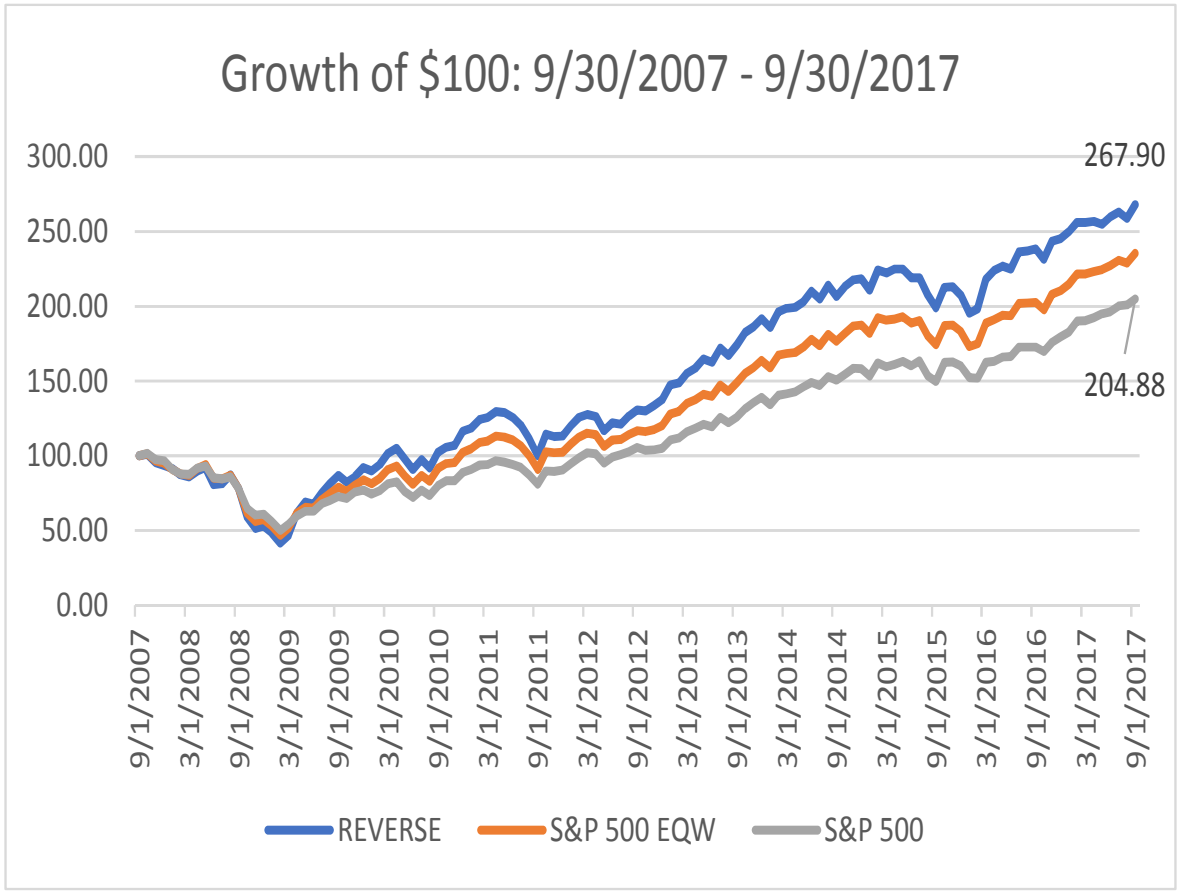
*E(z) = 0.056 * a + 0.944* b where a is average return for 120 top-cap stocks & b = 380 bottom cap stocks*

Therefore, when a <b, E(x) < E(y) <E(z) BUT when b<a, E(x) > E(y) > E(z)

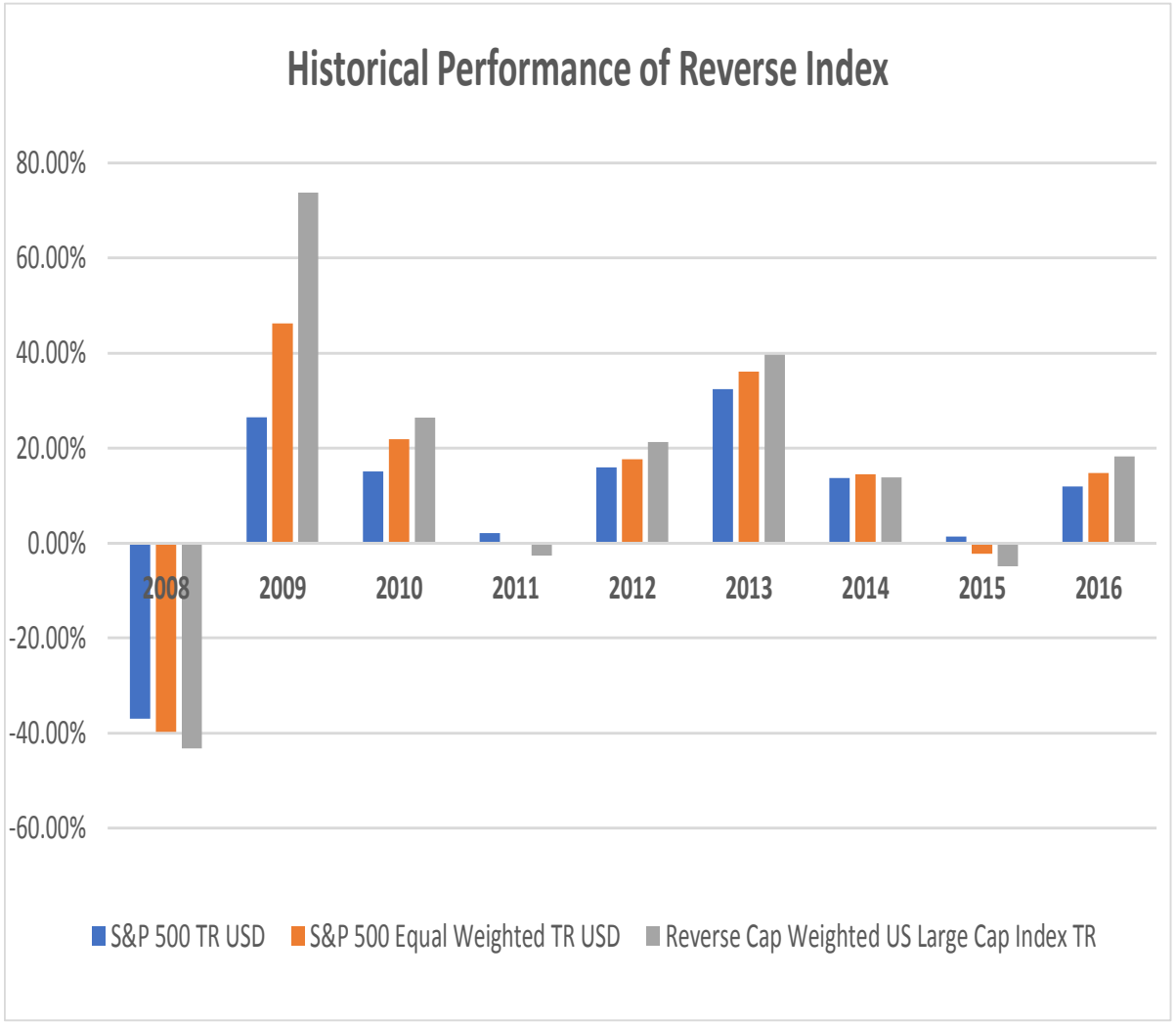
Given that empirically y has been greater than x in most periods, then we may expect z>y.>x in those same periods.

Indeed, our expectations hold true for the test period

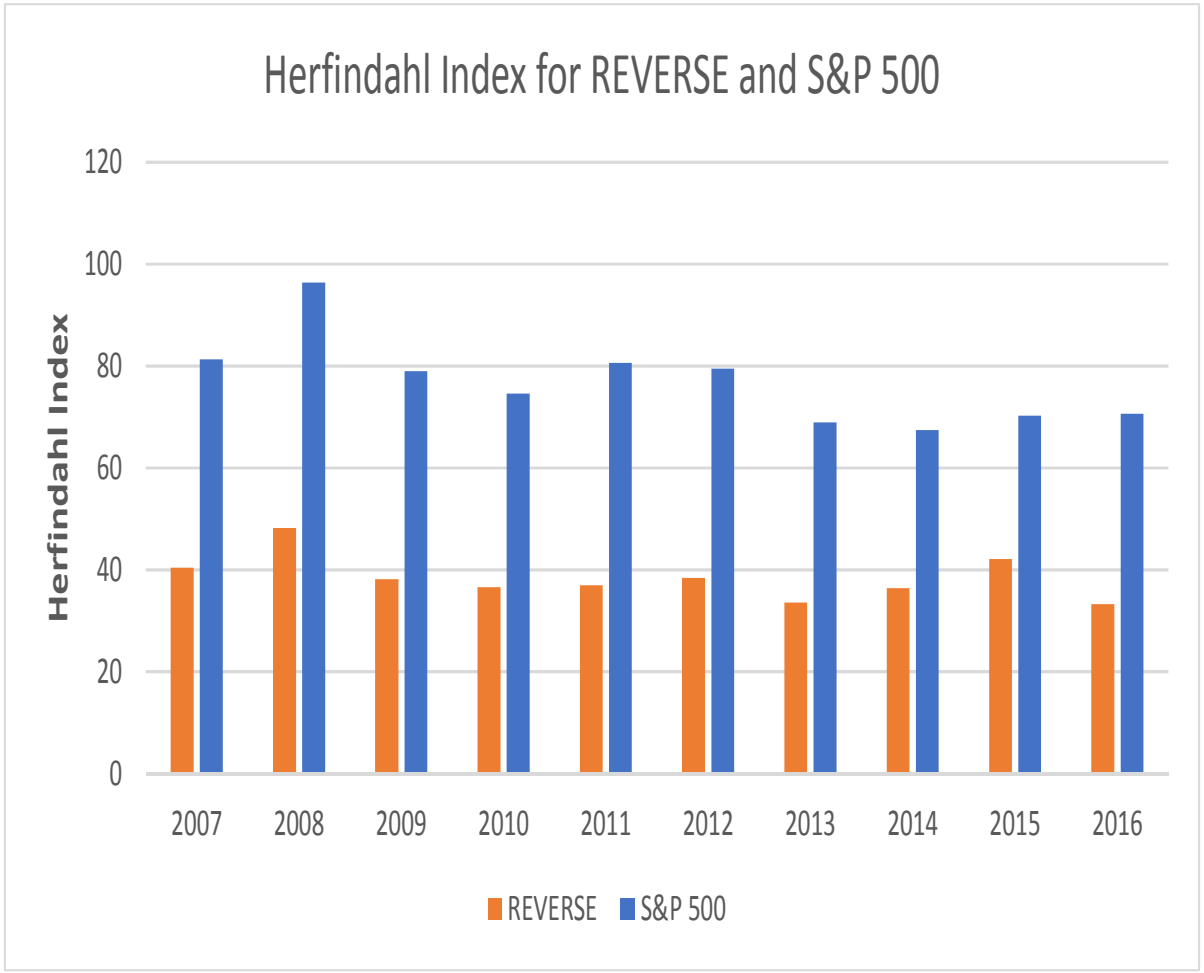
Performance calculated by S&P Custom Index Services:



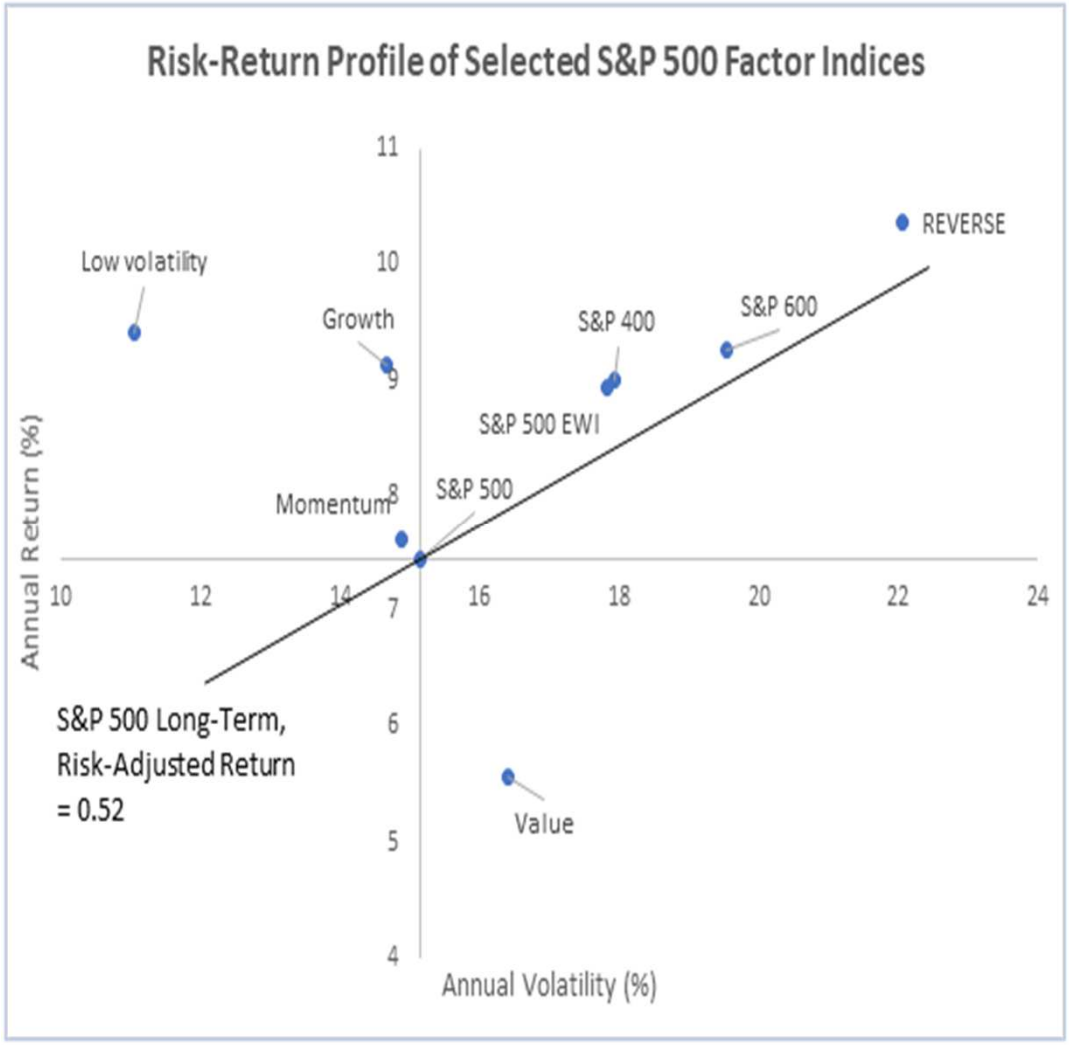
Year-by-Year Performance



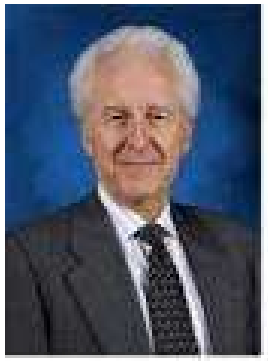
Market Concentration: Herfindahl-Hirschman Index

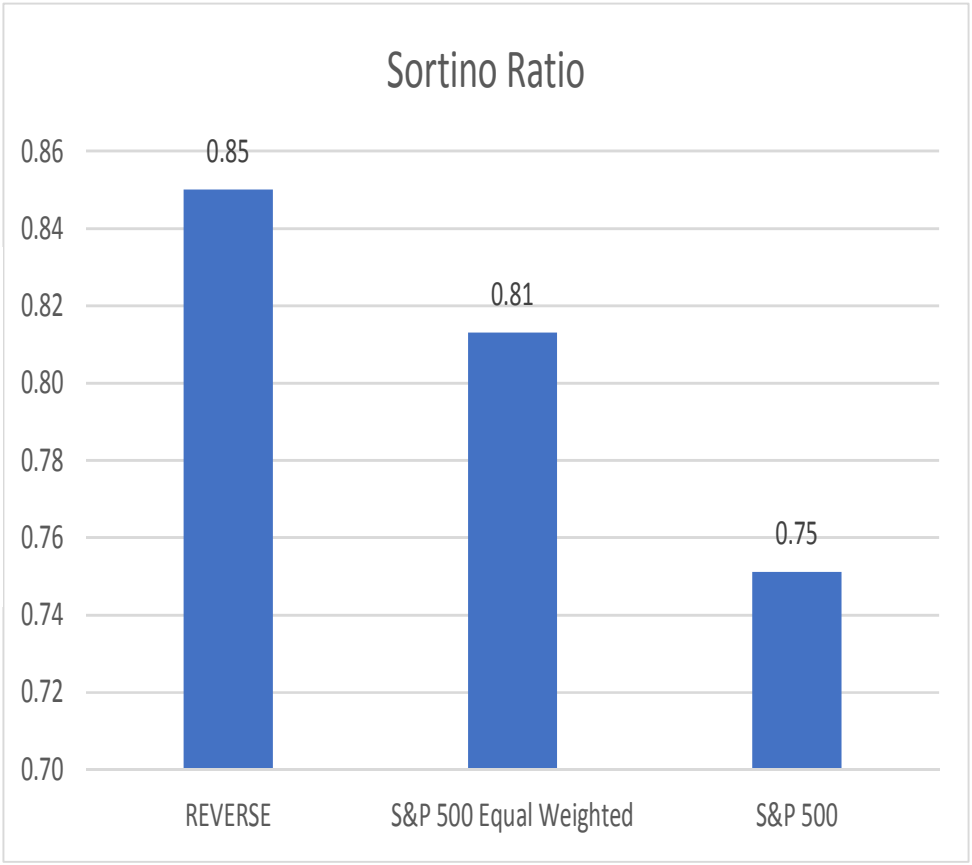


Risk-Return Comparisons



Downside Risk Comparisons of Sortino Ratios





Summary

1. Market cap weighted S&P 500 Indexing still tough to beat
2. Yet, anti-value, pro-size, pro-momentum biases are vulnerabilities
3. Alternative weighting schemes no longer as tough to implement as portfolio solutions
4. RSP, equally weighted S&P 500 ETF has outperformed SPY since inception
5. RVRS, reverse market-cap weighted index, can be expected to outperform RSP index most times when latter beats S&P 500
6. RVRS can be useful as long-term return-oriented holding and as a tactical tool for hedge funds

Thank You!

Questions? Comments?

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