



ANALYTICS INVESTMENT ADVISORS, LLC

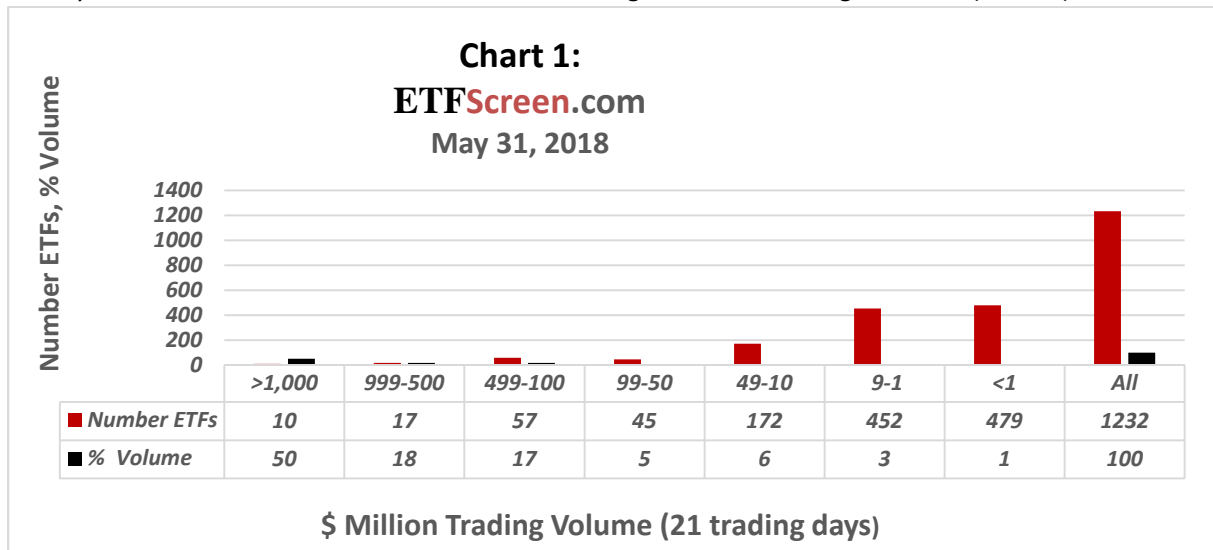
Momentum Investing with Exchange Traded Funds

“The aim is to construct more efficient portfolios, with efficiency defined as higher returns for a given level of overall risk, through the use of increased diversification and efficient implementation”<sup>1</sup>

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What?

- In less than 25 years, exchanged traded funds (ETFs) have become one of the most popular investment vehicles for both institutional and individual investors.
• Often promoted as having numerous advantages to mutual funds, ETFs offer low-cost diversification, no hidden fees, trading and arbitrage options for investors.
• ETFs regularly boast having over \$ 1 trillion assets under management, with copious new ETF launches each year being commonplace.
• Most ETFs are index funds that attempt to replicate the performance of a specific indices, which may be based on stocks, bonds, commodities or currencies.
• A commonly used and popular website that compiles daily ETF statistics is ETFScreen.com which as of May 31, 2018 included 1,232 ETFs with dollar trading volume exceeding \$100,000 (Chart 1)



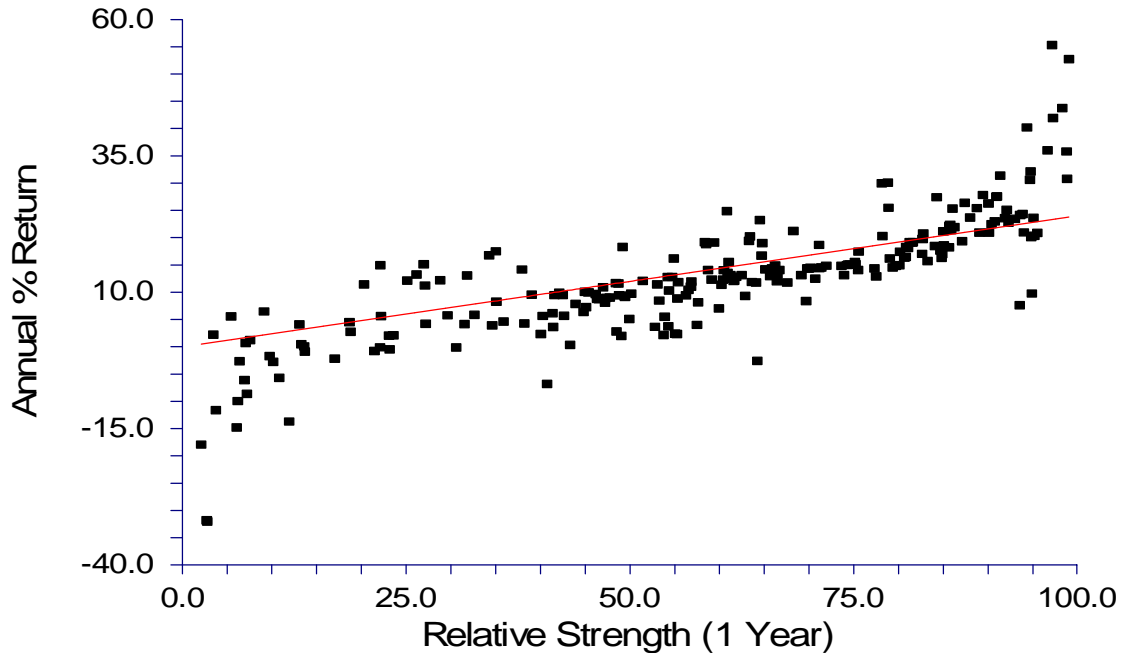
- Of the total 1,232 ETFs referenced in Chart 1, the 10 largest accounted for 50% of the 12 month traded dollar volume.<sup>3</sup> Moreover, 301 ETFs with trading volume exceeding 9 million dollars were responsible for 96% of all trading dollar volume.

<sup>1</sup> Koesterich, Russ, The ETF Strategist, Balancing Risk and Reward for Superior Returns, First published by Portfolio, a member of Penguin Group (USA) Inc, 2008, p.13.

<sup>2</sup> See Stephen D. Simpson, CFA “A Brief History of Exchange Traded Funds”, Updated January 22, 2018.

- Deleting fixed income ETFs (and ETFs with incomplete data) from the 301 ETFs representing 96% of all ETF trading volume, resulted in 232 observation which became the sample of equity ETFs for the regression results depicted in Chart 2, and the ensuing statistics.

Chart 2: Annual Return vs Relative Strength



Regression Coefficients							
						R <sup>2</sup>	N
Return Equities (1) =	RS x	0.2402				0.821	232
		32.5255	(t-Value)				
Return Equities (2)* =	RS x	0.2161	+	S.Dev x	0.0452	0.932	232
		24.158	(t-Value)		1.128	(t-Value)	

- Equation 1 shows that for the one year between May 31, 2017 and 2018, 82.1% of Annual % Return on Equities was explained by Relative Strength (RS); and, that for every 10% increase in Relative Strength there was a corresponding 2.402% increase in Annual Return (statistically significant at .01).
- Equation 2, which adds a dependent variable for volatility (S.Dev), while intuitively positive, is not statistically significant. However, conducting a Tukey Robust Regression<sup>4</sup> to remove sensitivity of outlier data, the R<sup>2</sup> (coefficient of determination<sup>5</sup>) increased to 93.2%, with a slight decrease in the regression coefficient from .2402 to .2161 (statistically significant at .01).

<sup>3</sup> The top five ETFs: SPY (SPDR S&P500, 27.4%); QQQ (PowerShares QQQ, 21.4%); EEM (MSCI Emerging, 4.3%); IWM (Russell 2000; 4.3%), and EFA (MSCI EAFE; 1.4%) represented 44.6% of the ETF.Screen.com trading dollar volume as of May 31, 2018.

<sup>4</sup> Robust regression using the Tukey concept of iterative reweighting of central tendency re-weights outliers, making the results more robust and less sensitive to disparate (outlier) data shown in Chart 2.

<sup>5</sup> The percent of variation in the regression equation (Annual % Return) explained by the independent variable (Relative Strength).

## Why?

- **Diversification:** One ETF can give exposure to a group of equities, market segments and styles, can track a broader range of stocks, or even mimic the returns of a country or group of countries. Mutual funds can be diversified, but ETFs trade like an equity investment. This combined benefit of diversification and trading like a stock can produce significant synergies: i.e., 1) ETFs can be purchased on margin or sold short; 2) ETFs trade at a price which is transparent and updated during the day; and, 3) ETFs allow one to manage risk by trading futures, options and stop and limit orders.
- **Lower Fees:** Most ETFs are passively managed, and as such have lower expense ratios compared to other managed funds.
- **Dividends Reinvested Immediately:** Dividends in open-ended ETFs are reinvested immediately, but timing can vary for index mutual funds. However, dividends in unit investment trust ETFs are not reinvested automatically, creating a dividend drag.
- **Capital Gains Tax Exposure Limited:** ETFs can be more tax-efficient than mutual funds because most of the tax on capital gains is paid on the sale price and completely the responsibility of the investor. Mutual funds, however, are required to distribute capital gains to shareholders if the manager sells securities in the mutual fund for a profit.
- **Current Data and Transparency:** Because ETFs trade like a stock, one can immediately determine real-time prices with the ETF ticker symbol. This data aggregation and flexibility has fostered useful websites and algorithms which simplify and facilitate the interpretation and management of portfolios and inherent overall levels of risk.

## How?

- **Macroeconomic Analysis:** Sound portfolio construction begins with an in depth understanding of U.S. and world macroeconomics. Analyze Aggregate Demand (consumption, retail sales, housing, capital and durable goods, government and trade), Aggregate Supply (manufacturing and production, capacity utilization, productivity, Inventories, and employment), and Determinants (gross domestic product, corporate profits, leading indicators, inflation and interest rates) in terms how they relate to the Business Cycle (early expansion, middle expansion, late expansion, early contraction and late contraction), and accordingly which sectors are likely to perform best in each milieu.
- **Relative Strength:** Given the significant statistical relationship between Return and Relative Strength demonstrated above, it would seem to make sense to begin to develop efficient portfolios by first examining ETFs with high Relative Strength.
- **Establish Benchmarks and Optimal Allocations:** Establish an accurate and familiar benchmark (S&P500, for example) for the strategic allocations under consideration, but also create “optimal” allocation models through the use of Risk/Return Scatter Plots simulations to identify “Low Return High Risk” ETFs for potential elimination or modification to improve volatility and Risk/Return Ratios.<sup>6</sup>
- **Volume and Liquidity:** Since the null hypothesis for “21 day trading volume” was not rejected when added to the multiple regression analysis described above, it is reasonable to assume that ETFs of that magnitude (10million or more) are not effected by lack of liquidity, and thus propitious.

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<sup>6</sup> AIA, LLC utilizes Morningstar Advisor Workstation (MAW) subscription for this purpose. The MAW Stock Intersection Report capability for the top 50 equities in each portfolio is also a useful capability to better understand the degree and specificity of portfolio diversification.

- **Use Graphing Techniques:** Graphing price performance of individual and groups of ETF can be very helpful at any stage and is highly recommended in the context of the technical nature of market movement.<sup>7</sup>
- **Repeat Repeatedly:** Constructing efficient passive ETF portfolios generating high returns for a predetermined level of risk, through diversification and efficient implementation, requires active vigilance and replication of the above principles to insure desirable outcomes, associated with good portfolio management.

## Performance Summary

- **Cautious Strategy:** Cautious investors seeking better than nominal returns, but with low risk and emphasis on preservation of wealth (Risk Score: 111-200).
- **Moderate Strategy:** Prudent investors desiring a portfolio designed to accomplish medium to long term financial goals and an investment strategy which accounts for taxes and inflation. Calculated risk is acceptable to achieve good returns (Risk Score: 201-290).
- **Assertive Strategies 1 & 2:** Assertive investors with sufficient income to invest mostly for capital growth. Higher volatility, moderate risk, and more aggressive investments are acceptable to accumulate wealth over time (Risk Score: 291-390).
- **Aggressive Strategy:** Aggressive investors intending to compromise portfolio balance in pursuit of higher long term returns. Security of capital is secondary to potential wealth accumulation (Risk Score: 391-450).

	2012-2017 Avg.*	YTD* 06/30/2018	Beta	R <sup>2</sup>	SD	Sharpe**
S&P500	12.87%	1.67%				
Barclay US TR	2.48%	-1.62%				
<b>Cautious</b>	9.88%	-.78%	.90	90	9.31	1.27
<b>Moderate</b>	12.81%	1.60%	1.10	87	11.61	1.51
<b>Assertive 1</b>	15.34%	2.34%	1.26	92	12.88	1.46
<b>Assertive 2</b>	20.13%	3.20%	1.57	90	16.22	1.39
<b>Aggressive</b>	22.58%	5.39%	2.21	92	22.52	1.51

\*Net Average Return, Portfolio Center, Schwab Portfolio Technologies. Returns are negotiable and range between 50 and 125 basis points.

\*\* Risk Statistics, Morningstar Advisor Workstation; most recent 5 years, computed quarterly.

Beta Expected change in portfolio return per 1% change in market index return.

R<sup>2</sup> Percent of variation in regression equation explained by the independent variable (S&P500).

SD Standard deviation of the dependent variable (Net Return).

Sharpe Ratio Reward-to-Variability Ratio; i.e., portfolio return above risk free rate of return divided by standard deviation (RVAR).

<sup>7</sup> Wagner, Deron, *Trading ETFs, Gaining an Edge with Technical Analysis*, Bloomberg Press, New York, 2008.