# Critical Math Advisors

*Adaptive Asset Allocation*

## Asset Management through Adaptive Allocation

**A MULTI-STRATEGY, ACTIVELY-MANAGED APPROACH to INVESTING**
**which seeks to adapt to any given market environment, reducing market exposure when risk is deemed high and investing aggressively when risk is considered low.**

Critical Math Advisors is an investment firm located in Princeton, New Jersey. Our primary focus is to serve as the advisor to the Adaptive Allocation Fund and the Adaptive Allocation Portfolio. We believe our management techniques and strategies are very unusual, even possibly unique, and so, we thought we would try to provide some insight into what we do, how we do it and why we do it.

## CONVENTIONAL "WISDOM"

Most investment advisors follow what has become known as "modern portfolio theory" or "the efficient frontier." In the real world, this translates into "ASSET ALLOCATION." The idea is that risk can be reduced by diversifying into various asset classes. If some lose value, others may not, while still others may gain value – the idea being not to keep all of one's eggs in one basket.

**We see major difficulties with this static model.**

- **What percentages should be put in which asset classes?** If the classes chosen are too conservative, the portfolio might underperform in an up market. If the portfolio is too aggressive, it might significantly underperform in a down market. If it is "balanced," returns would tend to be mediocre.
- **What might the future correlation be?** There have been times when stocks and bonds have been highly correlated; where they go up and down pretty much in lockstep. However, there have been other times when they go in essentially opposite directions. How can one tell how asset classes will be correlated going forward? If the assets ARE highly correlated and those classes go down together, all the eggs in your basket will be scrambled.

# WHAT WE DO

We have concluded, after decades of research, that the best way to attempt to reduce risk and enhance returns is by asset allocating based on what the market is doing at any given time. In essence, our asset mix is extremely flexible and is designed to adapt to current market conditions. All of this dynamic asset allocation is done within the Adaptive Allocation Fund/Portfolio, reducing the need to hold many mutual funds and trying to determine when to buy or sell them.

In order to reduce risk and increase diversification, we use two distinct and different types of investment strategies: Financial Statement Analysis and Trend Following.

**"FINANCIAL STATEMENT ANALYSIS"** models seek to outperform the market by making monthly selections of **INDIVIDUAL STOCKS** based on domestic and foreign companies' financial statements and price ratios.

Separately, in terms of **BROAD MARKET INDICES** (S&P 500, Russell 2000, Bonds), we have developed multiple **"TREND FOLLOWING"** models. If bond funds or equity indices are trending up, we try to be invested in them. If they are trending down, we tend to avoid them. As a consequence, there will be times when our trend following models might be invested in stock index funds but not bond funds, or in bond funds but not stock index funds, or in both stock and bond funds or in neither (moving to cash).

We believe using these strategies to select the investments for our funds makes us quite different from the typical mutual fund. Being different can make it difficult for the media and ratings agencies to properly put into context certain aspects of our fund. Let's dig a little deeper and look at a few of those points: Style Box, Expense Ratio and Turnover Ratio.

## STYLE BOX

Many ratings companies that categorize mutual funds like to describe a fund by "style" (such as large cap or small, growth or value, etc). Since we are so flexible and adaptable, in that our investments can be allocated in almost any combination of assets at any point in time, we believe it is impossible to fit the Adaptive Allocation Fund/Portfolio into any particular "style box." Furthermore, we believe we have effectively eliminated the "all of your eggs in one basket" problem, because all of our eggs and our overall basket can change at any time. We are never locked into a static position.

## EXPENSE RATIO

For a mutual fund, expense ratio is defined as "a measure of what it costs an investment company to operate the fund. An expense ratio is determined through an annual calculation, where a fund's operating expenses are divided by the average dollar value of assets under management." It is a little known fact that transaction costs, such as brokerage commissions paid to trade assets in a mutual fund, are **not included** in the fund's published expense ratio. A 2009 study, reported by the Wall Street Journal, which looked at thousands of U.S. stock funds, put the average trading costs at 1.44% of total assets, which would have to be **added** to the **published "Expense Ratio"** in order to get a truer picture of a fund's total costs. The Adaptive Allocation Fund/Portfolio's trading costs during 2009 were less than 0.1% of total assets.

In looking at expense ratios, investors also need to consider whether the fund manager is providing added value. If you are comparing **identical** index funds, the one with the lowest expense ratio (taking into account brokerage trading costs) would be the logical choice. However, if you invest in a mutual fund that is actively managed and provides added value, such as reducing risk or outperforming an index, you should be willing to bear the higher cost. Shouldn't the real question concerning expense ratios be: are you getting value for what you paid?

## TURNOVER RATIO

For a mutual fund, turnover ratio is defined as a "measure of the change in portfolio holdings; extent to which an investment company's portfolio changes during a year. A rough calculation can be made by dividing the lesser of portfolio purchases or sales (to eliminate the effects of net sales or redemptions of fund shares) by average assets." But what is the intended purpose of this ratio? Presumably, it is to gain insight into a fund that may be trading excessively, which could cause unnecessary costs or adverse tax consequences. However, do you know how turnover ratios are calculated? Most people don't. Here's an interesting example. Let's presume that a mutual fund is invested 99% in cash for an entire year. With the other 1%, they invest in a single stock in January, sell that stock and invest in a new one in February and continue that pattern each month. By the end of the year, their 1% was invested in 12 separate stocks, each held for one month. What would their turnover ratio be? How about **1200%**. This ratio **ignores** cash positions! In 2008, we carried a significant cash position, which reduced risk during a falling stock market but led us to have a high turnover ratio, which conventional wisdom considers a bad thing. In 2009, we maintained a smaller cash position when the markets were trending higher, and we had greater market exposure but had a lower turnover ratio, which conventional wisdom considers a good thing. Reducing risk in a down market is considered bad but increasing risk in an up market is considered good? Shouldn't both scenarios be viewed favorably? Due to the calculation ignoring cash or short term securities, we wonder how much value this ratio really has in properly evaluating actively-managed, risk-averse funds like ours.

# WHY US?

Surveys have shown that average mutual fund investors substantially underperform the market because they react emotionally to market performance, causing them to sell after markets decline and to buy after markets rise. They are afraid to buy after a decline, fearing further losses, thereby missing the significant advances that often follow. They fail to sell after a market advance, fearing that they will miss additional gains, thereby holding too long when markets collapse.

Our strategy is designed to avoid these emotional traps by providing an investment that is responsive to virtually any market condition by using non-emotional and rule-based techniques, while providing complete liquidity in a regulated and transparent environment. Thus, investors don't have to decide when to buy or sell, or what assets to own. Our strategy does that for them, all within one mutual fund.

## For more information, please do not hesitate to contact

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The S&P 500 Index is an unmanaged composite of 500 large capitalization companies. This index is widely used by professional investors as a performance benchmark for large-cap stocks. You cannot invest directly in an index.

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