Quest for the Holy Grail: The Fair Value of the Equity Market

Michael Aked, CFA, Michele Mazzoleni, PhD, and Omid Shakernia, PhD

The Holy Grail: A legendary relic described in various traditions as a sacred vessel with miraculous powers that provides happiness, eternal youth, and infinite abundance.

Forecasting the “fair” value of the US equity market can be likened to the legendary quest for the Holy Grail by the medieval knights of King Arthur. Valorous investors, accompanied by knowledgeable guides and equipped with various weapons such as stock market valuation metrics, routinely allocate their investment capital across markets. These allocation decisions are based on return expectations, which reflect investors’ beliefs about an asset’s fair valuation.

Key Points

1. Macroeconomic volatility is a useful tool in investors’ quest for the fair value of the stock market.

2. This volatility is associated with the equity risk premium: investors are willing to pay a higher price for stocks when there is lower aggregate uncertainty.

3. Macroeconomic volatility has been at historically low levels in recent years, driven largely by technological innovation, greater market integration, and improvements in monetary policy implementation.

4. Whereas lower volatility justifies a higher fair value than the historical average, the current price of the stock market still appears expensive.
Contrarian investors, who profit from prices reverting to longer-term averages, are likely confounded by the continually increasing normalized value of the US equity market. Normalized prices, adjusted for changes in earnings or dividends, have remained above their long-term averages over the last quarter-century, causing a simple contrarian strategy in US equities to fail to outperform a buy-and-hold strategy over the same time period. We ask why stock valuations have been steadily increasing, will they continue to rise, and should we expect this trend to reverse itself?

We offer an economic explanation, showing that aggregate macroeconomic volatility can provide useful real-time information about the expected path of the US stock market. The falling macroeconomic volatility of major economies has led, as it should, to lower expected returns for equities, supporting the contrarian view that rising US equity valuations will eventually revert toward the mean. We show how investors can incorporate information about the changing macroeconomic environment in the construction of a contrarian strategy. Macroeconomic volatility, although not a map to the Holy Grail, offers a useful tool for investors in their quest for fair value.

The Recent Struggles of Contrarian Investors

Academics have suggested various reasons for sustained higher equity valuations, from the microstructure benefits of improved participation and lower transaction costs to the macroeconomic benefits of larger profit shares. We examine the explanation put forward by Lettau, Ludvigson, and Wachter (2008) that rising valuations are propelled by the large reduction of macroeconomic risk in the US economy. Their intuition is simple—investors require lower returns from equity markets when the aggregate volatility of the economy is lower. It should come as no surprise that investors are glad to pay a higher price, and accept a lower return for investing in a stock market that delivers less uncertainty.

Today’s economy is drastically different from just a few decades ago, and radically different from a century ago. Judging from the volatility of two major macroeconomic variables—real output growth and inflation—it has changed for the better. From the days before the US Federal Reserve Bank until today, the annual volatility of the economy has tumbled about 80%.

When we plot the measure of macro volatility with the inverse of a very popular valuation metric, Robert Shiller’s cyclically adjusted price/earnings ratio (CAPE), we find an intriguing and significant positive correlation between expected real equity returns and the aggregate volatility of the economy. Under the restrictive assumption that prices are fair and an appropriate return on retained profits, we assert that earnings yields are an appropriate proxy for an equity market’s future real return. For clarity we name the inverse of the CAPE, an earnings yield, the cyclically adjusted earnings yield (CAEY).

The majority of the macro volatility reduction occurred during the mid-1980s at the start of the Great Moderation. Among the various explanations for this reduction in economic risk suggested by the academic research is technological innovation, greater market integration, and superior policy.

Policy planning and implementation, such as implicit or explicit inflation targeting, is likely among the more important drivers of the improved state of economic affairs. The Great Financial Recession of 2008–2009 proved that the pursuit of lower economic risk is not without its limits, although our risk measure indicates the associated rise in volatility was a minor blip on the radar screen compared to the historical record in the years preceding Paul Volcker’s appointment to the Federal Reserve in 1979.

Asness, Ilmanen, and Maloney (hereafter, AIM) (2015) argue that “secular changes can be poison to contrarian strategies, which by definition need an anchor to define
where we overweight, underweight and stick close to buy-and-hold.” We would argue that simple contrarian strategies have recently underperformed a buy-and-hold strategy, precisely because they have not adapted to changes in the macroeconomic environment.

**Influence of Macro Volatility on Equity Valuations**

To investigate the influence of macroeconomic volatility on stocks, we propose two predictive models of CAEY. Model One incorporates a replication of the historical valuation measure (CAEY) from the work of AIM, using its 60-year trailing median value. This predictor allows secular changes in the stock market to be very gradually incorporated and avoid undesired short-term trend chasing. We call this predictor *Historical CAEY*.

Model Two incorporates information contained in our simple measure of the macroeconomic environment. We call this predictor *Equilibrium CAEY*. The modeling process for Equilibrium CAEY is as follows:

1. We estimate a linear relationship relating CAEY to macro volatility using the earliest 45 years of available historical data, 1881-1926.

2. Beginning in 1927, we re-estimate our model each quarter with the latest quarter’s observation of real GDP growth and inflation.

3. Each month, given the macroeconomic risk of the prior month, we identify the implied fair value of CAEY.
In Model One, future (one-year ahead) valuation changes are conditioned on the difference between the market’s CAEY and Historical CAEY, and in Model Two the market CAEY and Equilibrium CAEY (see endnote). Our estimates show a relatively small increase in the explanatory power of the predictive regression when using Equilibrium CAEY versus Historical CAEY. On average, the model predicts that 20% of the Historical CAEY difference disappears in the subsequent year. In contrast, 25% of the Equilibrium CAEY difference evaporates annually. Thus, Equilibrium CAEY predicts a 5% faster mean reversion over the next year, which suggests macroeconomic information is useful as a way to more precisely identify the mean-reverting component of the stock market.

Specifically, we compare the performance of two contrarian strategies whose only difference is the fair valuation used to form the portfolio:

- **Historical Contrarian**: Overweight equities when CAEY is above its historical median CAEY.
- **Macro-Vol Contrarian**: Overweight equities when CAEY is above Equilibrium CAEY.

By building off AIM’s benchmark we are setting the bar relatively high for contrarian investing. First, we rebalance monthly, which tends to skew the performance toward strategies such as momentum rather than value. Second, the investment decision used in our portfolio test ignores the actual yield on cash, the other investment opportunity. Indeed, on several past occasions, stocks, even though expensive, still provided a more attractive expected return than cash, whose return is controlled by the Federal Reserve. We believe, however, that by setting a high bar for our portfolio test, we can offer more transparent and compelling evidence.

The equity allocations that result for both historical contrarian and macro-vol contrarian strategies are nearly identical in the early years of our analysis. After the early 1950s, however, as the level of macroeconomic volatility starts to fall, the holdings of the macro-vol contrarian strategy begin to deviate from those of the historical contrarian strategy. We observe that significant changes in macroeconomic volatility are reflected in the allocations of the risk-conditional strategy as it gradually reacts to the changing environment, resulting in larger relative allocations to equities.

We compare the out-of-sample performance of the two contrarian strategies relative to a buy-and-hold portfolio, which is fully invested in equities (i.e., no cash). For the period 1927–2016, we observe that the macro-vol contrarian strategy outperforms the historical contrarian strategy in years after major changes occur in the macroeconomic

---

“Macro volatility provides useful real-time information about the expected path of the US stock market.”

Higher precision in predicting the mean-reversion component of equities should translate into more profitable opportunities for contrarian investors. Equipped with Equilibrium CAEY, investors should be able to successfully apply their contrarian beliefs, even in a trending market. We investigate this premise next.

---

**Macro Vol and Contrarian Investing**

In this section, we run a simple portfolio test to quantify the impact of using our macroeconomic data to improve a contrarian strategy. We continue to build off the benchmark presented by AIM, whose research explores the out-of-sample efficacy of a contrarian market-timing strategy between the S&P 500 Index and cash. Their hypothetical contrarian investor is overweight equities when the CAEY is above historical median values and underweight equities otherwise. Hence, this simple contrarian approach can be thought of as a mean-reversion strategy with the historical median as the fair value.
When macroeconomic volatility informs equity allocations in a contrarian strategy, allocations are higher relative to those of a historical contrarian strategy.

**Equity Allocations for Contrarian Strategies, 1927–2016**

![Equity Allocations Chart](chart.png)

Note: Following Asness, Illmanen, and Maloney (2015), the contrarian market-timing strategies’ equity allocations are constrained to between 50% and 150% each month.


The macro-vol contrarian insight results in observed outperformance compared to the historical contrarian strategy.


![Cumulative Returns Chart](chart.png)

environment. The explanation for the performance difference is that the anchor for the historical contrarian strategy is backward looking and suffers from the “poison” of secular changes. At the same time, because the macro-vol contrarian strategy is responsive to macroeconomic conditions, it is better able to adapt to a changing macro risk environment.

Over the full period, conditioning on macroeconomic volatility is indeed valuable; the insight provides an average 50 basis points (bps) more a year compared to the historical contrarian strategy. Consistent with the path of macro-vol, the additional return relative to the historical contrarian strategy is not evenly distributed over time, but is additive in recent years. For example, since the start of the Great Moderation in 1985, the macro-vol contrarian strategy has outperformed a buy-and-hold strategy by 60 bps a year, while the historical contrarian strategy underperformed the same by 30 bps a year.

If we apply the allocation rules of the historical contrarian and macro-vol contrarian strategies based on year-end 2016 market prices and macroeconomic risk conditions, we observe that stocks are currently overvalued but not as

---

**Out-of-Sample Performance of Different Contrarian Strategies, 1927–2016**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Buy and Hold</td>
<td>6.6%</td>
<td>5.6%</td>
<td>6.4%</td>
<td>7.4%</td>
</tr>
<tr>
<td>Historical Contrarian</td>
<td>7.1%</td>
<td>7.5%</td>
<td>6.8%</td>
<td>7.1%</td>
</tr>
<tr>
<td>Macro-Vol Contrarian</td>
<td>7.6%</td>
<td>7.3%</td>
<td>7.4%</td>
<td>8.0%</td>
</tr>
</tbody>
</table>


---

**Implied Fair Value and Contrarian Market-Timing Allocations**

<table>
<thead>
<tr>
<th></th>
<th>CAEY</th>
<th>CAPE</th>
<th>Allocation to Equities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current (12/31/2016)</td>
<td>3.6%</td>
<td>28.0</td>
<td></td>
</tr>
<tr>
<td>Historical Contrarian Fair Value</td>
<td>5.1%</td>
<td>19.7</td>
<td>84%</td>
</tr>
<tr>
<td>Macro-Vol Contrarian Fair Value</td>
<td>4.4%</td>
<td>23.0</td>
<td>92%</td>
</tr>
</tbody>
</table>

much as suggested by the historical averages. The current low level of macrovolatility implies lower expected returns (and higher current prices). As of December 2016, a macro-vol contrarian investor would allocate a full 8% more to equities than a historical contrarian investor (92% vs. 84%).

**Conclusion**

Over the last two decades, US equity market price increases have pushed yields to remarkably low levels, leading investors to wonder, what is fair value? Our analysis suggests that macroeconomic volatility can provide meaningful guidance to investors in recognizing fair value. Currently, we find that US equity market prices are still higher than their implied value, which is based on recent low levels of macroeconomic volatility. We believe the trend toward lower macro-vol and the higher valuations it justifies is waning. Therefore, long-term investors can benefit by considering the future trajectory of economic management, both in the US and abroad, and successfully advance their progress in the quest for the Holy Grail of fair value.

**Endnote**

**Out-of-Sample Forecasting of Changes in CAEY, 1926–2015**

<table>
<thead>
<tr>
<th></th>
<th>One-Year Ahead Change in CAEY</th>
<th>One-Year Ahead Change in CAEY</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAEY – Historical CAEY</td>
<td>-0.20***</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.06)</td>
<td></td>
</tr>
<tr>
<td>CAEY – Equilibrium CAEY</td>
<td>-0.25***</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.09)</td>
<td></td>
</tr>
<tr>
<td>Constant</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td></td>
<td>(0.00)</td>
<td>(0.00)</td>
</tr>
<tr>
<td>Adjusted $R^2$</td>
<td>9%</td>
<td>11%</td>
</tr>
</tbody>
</table>

Newey-West-corrected standard errors; lag set to 18 months.
Standard errors in parentheses.
*p < 0.1, ** < 0.05; *** < 0.01


**References**


Disclosures

The material contained in this document is for general information purposes only. It is not intended as an offer or a solicitation for the purchase and/or sale of any security, derivative, commodity, or financial instrument, nor is it advice or a recommendation to enter into any transaction. Research results relate only to a hypothetical model of past performance (i.e., a simulation) and not to an asset management product. No allowance has been made for trading costs or management fees, which would reduce investment performance. Actual results may differ. Index returns represent back-tested performance based on rules used in the creation of the index, are not a guarantee of future performance, and are not indicative of any specific investment. Indexes are not managed investment products and cannot be invested in directly. This material is based on information that is considered to be reliable, but Research Affiliates™ and its related entities (collectively “Research Affiliates”) make this information available on an “as is” basis without a duty to update, make warranties, express or implied, regarding the accuracy of the information contained herein. Research Affiliates is not responsible for any errors or omissions or for results obtained from the use of this information. Nothing contained in this material is intended to constitute legal, tax, securities, financial or investment advice, nor an opinion regarding the appropriateness of any investment. The information contained in this material should not be acted upon without obtaining advice from a licensed professional. Research Affiliates, LLC, is an investment adviser registered under the Investment Advisors Act of 1940 with the U.S. Securities and Exchange Commission (SEC). Our registration as an investment adviser does not imply a certain level of skill or training.

Investors should be aware of the risks associated with data sources and quantitative processes used in our investment management process. Errors may exist in data acquired from third party vendors, the construction of model portfolios, and in coding related to the index and portfolio construction process. While Research Affiliates takes steps to identify data and process errors so as to minimize the potential impact of such errors on index and portfolio performance, we cannot guarantee that such errors will not occur.

The trademarks Fundamental Index™, RAFI™, Research Affiliates Equity™, RAE™, and the Research Affiliates™ trademark and corporate name and all related logos are the exclusive intellectual property of Research Affiliates, LLC and in some cases are registered trademarks in the U.S. and other countries. Various features of the Fundamental Index™ methodology, including an accounting data-based non-capitalization data processing system and method for creating and weighting an index of securities, are protected by various patents, and patent-pending intellectual property of Research Affiliates, LLC. (See all applicable US Patents, Patent Publications, Patent Pending intellectual property and protected trademarks located at http://www.researchaffiliates.com/Pages/legal.aspx#d, which are fully incorporated herein.) Any use of these trademarks, logos, patented or patent pending methodologies without the prior written permission of Research Affiliates, LLC, is expressly prohibited. Research Affiliates, LLC reserves the right to take any and all necessary action to preserve all of its rights, title, and interest in and to these marks, patents or pending patents.

The views and opinions expressed are those of the author and not necessarily those of Research Affiliates, LLC. The opinions are subject to change without notice.

©2017 Research Affiliates, LLC. All rights reserved

www.researchaffiliates.com