Shiller Barclays CAPE US Index Family

Sector selection based on the Cyclically Adjusted Price Earnings (CAPE™) Ratio

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Robert Shiller has partnered with Barclays to jointly develop the Shiller Barclays CAPE US Index Family. Robert Shiller is a Yale professor, author of numerous books including the New York Times best seller "Irrational Exuberance," and was jointly responsible for developing the Standard & Poor's/Case-Shiller Home Price Indices.

After a year-long collaboration the result is the Shiller Barclays CAPE US Index Family. These equity indices utilize the Cyclically Adjusted PE Ratio (CAPE) as a key driver to identify undervalued US sectors. Robert Shiller and John Campbell originally devised the CAPE ratio in their paper "Stock Prices, Earnings and Expected Dividends" (1988). The Shiller Barclays CAPE US Index Family offers US equity market exposure with a value bias and is intended for buy and hold investors with a multi-year time horizon – within this framework they may provide attractive long-term returns for investors. Other variations and European versions will be available too.

This paper highlights the Shiller Barclays CAPE US Index Family methodology that selects value sectors based on the Relative CAPE indicator and uses momentum to eliminate value traps. Rebalancing monthly, the three indices in the Shiller Barclays CAPE US Index Family outperform benchmarks with improved annualized returns, lower volatility and better risk profiles. This analysis builds on 40 years of sector-level return and earnings information, which has been made possible by the use of firm-level data and aggregating these into sector-level quantities.

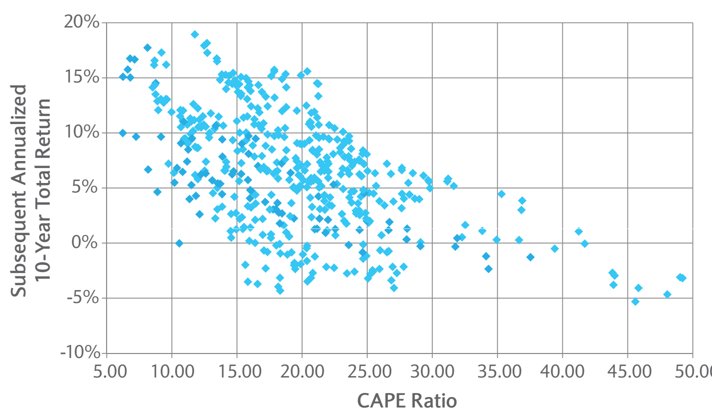
Value investing has a long tradition in the investment management community and plays a prominent role in the academic finance literature as an outgrowth of the analysis of market (in)efficiency. Within the realm of academic finance, its origins can be traced back to the work of Basu (1977), Fama and French (1992), and Lakonishok, Shleifer, and Vishny (1994). Traditional valuation measures relate market variables to balance sheet variables (e.g., the Book-to-Price ratio) or market variables to income statement variables (e.g., the Price-Earnings (PE) ratio).

A problematic aspect of the PE ratio for investors with a medium-/long-term focus is its reliance on earnings information from only the past year. One-year earnings tend to provide noisy signals, which are influenced by the business cycle. While this information can be useful for investors with a short investment horizon as it incorporates the most up-to-date trends, the noise of this signal increases with the investment horizon.

The Cyclically Adjusted Price Earnings (CAPE) ratio addresses this concern by using an average of longer-term earnings. Instead of using earnings over just the past 12 months, it is a ratio of current price to an average of inflation-adjusted earnings over the past 10 years. This long-term focus motivates the use of the term "cyclically adjusted", as it exceeds the length of most business cycles. It makes the ratio suited for detecting long-term over-and under-valuations in the stock market, making it more informative for investors with a long-term focus.

The CAPE ratio was formally devised by Campbell and Shiller (1988) and has been widely used as a valuation tool for the overall stock market. Analogous to the much referenced PE ratio, the intuition behind the CAPE ratio is that low ratios generally indicate high future market returns and high ratios provide an overall contraction signal. Figure 1 shows the historical CAPE ratios at each quarter-end going back to the 1880s for the overall stock market (as measured by the S&P 500 Index) with corresponding subsequent 10-year returns of this market index. In line with the intuition, there is a strongly negative correlation (-55%) between the CAPE ratio and subsequent long-term returns, indicating that the CAPE ratio provides useful information about the subsequent long-term performance of the stock market.

FIGURE 1: The CAPE Ratio of the US Stock Market in Relation to Subsequent Annualized 10-Year Real Total Returns from 1882 until 2012



Source: Barclays Research

Using a stock universe of the largest 500 companies in the US (the universe is reset every month), this paper constructs a 40-year dataset of returns and earnings for the 10 sectors in the S&P Global Industry Classification Standard (GICS). After the creation of 40 years worth of data, the same strong negative correlation exists between the Sector CAPE ratio and subsequent long-term sector returns. Figure 2 illustrates the predictive ability of CAPE for the GICS sectors of Consumer Staples and Materials. It should be noted that the historical time period used for the sector analysis in Figure 2 is substantially shorter than that of Figure 1, 30 years instead of 130 years. In order to ensure statistical significance in our analysis for the sectors, we limit the return horizon to two years which allows us to use 15 non-overlapping periods, in line with the analysis for the overall market in Figure 1. Otherwise one might encounter spurious relationships between the predictor variable and subsequent returns.

Note: See Bunn and Shiller (2012) for further details about this plot. Source: Cowles (1939), S&P Security Price Index Record (Various Volumes), S&P Analysts; Handbook (Various Volumes) Note the Index utilizes the tradable versions of the GICS sectors, where Telecommunications and Information Technology have been combined.

What we note in Figure 2 is in line with the above evidence for the overall market, as lower values of CAPE are generally associated with higher future returns and higher values of CAPE indicate lower future returns. Building on these initial findings on the predictive power of CAPE for long-term sector returns, we have developed the Shiller Barclays CAPE US Index Family that systematically selects the favorable – undervalued – sectors based on the CAPE ratio. It is important to note that these indices are based on the relative valuation of sectors and translates these assessments into an allocation, which is fundamentally different from an approach based on market timing.

Before turning our attention to the indices, it is necessary to take a more detailed look at the evolution of the CAPE ratio across different sectors. As an example, Figure 3 depicts the CAPE ratio for the Industrials and the Utilities sectors. Whereas the Industrials sector is being considered a rather typical cyclical sector, the Utilities sector is a good example for a defensive sector. Accordingly, the CAPE ratio for the Industrials sector is substantially more volatile than that of the Utilities. However, not only does the volatility of the CAPE ratio vary between the two sectors, but they also appear to be fluctuating at different levels.

Fundamental valuation ratios, such as the CAPE ratio, are potentially difficult to compare across different sectors for a variety of reasons, including different levels of maturity and, accordingly, different growth prospects for the sectors, regulations and varying accounting standards. For example the Utilities sector typically trades at a relatively low CAPE, while the Information Technology sector trades at a relatively higher CAPE ratio. Thus, if one just examined and selected a sector out of these two based only on the CAPE ratio, one would repeatedly choose Utilities almost all the time. Hence, to make the CAPE ratio more comparable across

FIGURE2: The CAPE Ratio of Consumer Staples and of Materials in Relation to Subsequent Annualized Two-Year Total Returns from 1982 until 2012

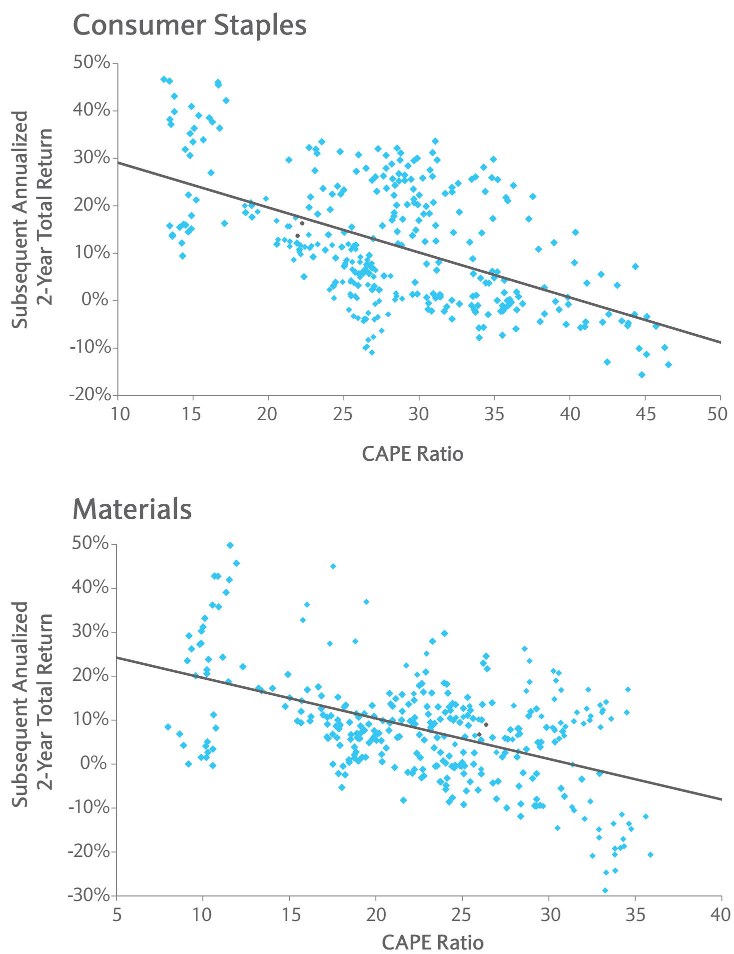
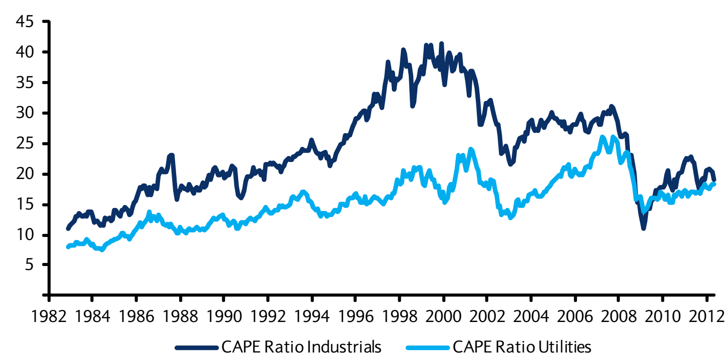


FIGURE 3: CAPE Ratio for Industrials Sector (cyclical) and Utilities Sector (defensive). (Dec 1982–May 2012)



Source: Barclays Research

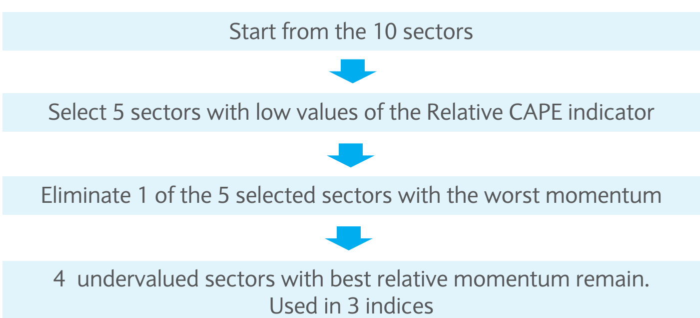
sectors, this paper introduces a standardization of it, the Relative CAPE indicator. To compute this indicator, we divide a sector's CAPE ratio at a given point in time by the 20-year historical average of this sector's CAPE ratio (numbers used for this average are winsorized* at the 5% level). The CAPE Ratio here uses total return prices with the objective of eliminating the effects of corporate payout policy, which was a criticism of the original CAPE Ratio.

Note:* Winsorizing is used to smooth any outlying values that may distort the signal as 20 years of values are used.

It is this Relative CAPE indicator that rests at the core of the Shiller Barclays CAPE US Index Family. Each month, the index selects the five sectors with the lowest values of the Relative CAPE indicator, i.e., the sectors that are the most undervalued according to the indicator. Only four of these five sectors, however, end up in the final portfolio for a given month, as the sector with the worst 12-month momentum among the five selected sectors is eliminated. This momentum filter, identifying the sector with the worst market sentiment in recent history, helps us in addressing the so-called "value traps", a key theme in value investing. The "value trap" occurs when a stock or sector may appear to be cheap and attracts investors because the stock or sector seems inexpensive. The trap springs when investors purchase a stock or sector and it takes a significant amount of time to improve, if ever.

Graphically this is represented as follows:

FIGURE 4: CAPE-Based Sector Selection Strategy

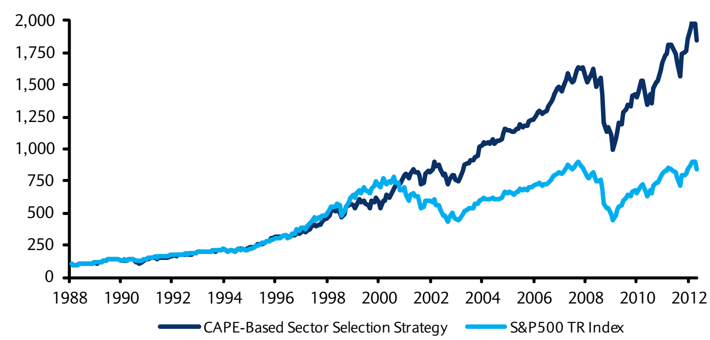


Source: Barclays Research

Based on this methodology Barclays, in collaboration with Professor Shiller, has created three tradable indices. The Shiller Barclays CAPE US Sector Index takes an equal weighted long position in each of four favored sectors that are undervalued and possess relatively stronger price momentum over the past 12 months. The Shiller Barclays CAPE US Sector Tilted Index overweights the four favored US sectors and underweights the rest of the sectors, based on their market capitalization weights. The Shiller Barclays CAPE US Sector Market Hedged Index takes a long position in the four favored US sectors and a short position on the market benchmark according to the weighted beta of the four favored sectors.

Figure 5 summarizes the historical performance the Shiller Barclays CAPE US Index Family. The first extension is a beta-hedged version, which is designed to extract excess returns over the market while targeting market neutrality. As we can see, this version delivers an attractive Return/Risk ratio along with a relatively low maximum drawdown and low correlation with the S&P 500 Total Return index. The second extension aims at closely tracking the market benchmark while tilting the weights of the sectors away from their market weights as a function of the CAPE-based selection of sectors. This strategy generates returns that are more than 95% correlated with the market benchmark over the historic period analysed. Crucially, this strategy outperforms the market, in line with the core CAPE-based sector selection strategy, as evidenced by an excess 17% in its information ratio.

FIGURE 6: Long Term Performance of CAPE-Based Sector Selection Strategy (Feb 1988 – May 2012) versus the S&P500 TR Index



Source: Barclays Research

FIGURE 5: Performance of Shiller Barclays CAPE US Indices (Sept 2002 – 28th Sept 2012)

	CAPE US Sector Index	CAPE US Sector Market Hedged Index	CAPE US Sector Tilted Index	S&P 500 TR Index
Annualized Return	11.70%	6.46%	8.72%	7.17%
Annualized Volatility	20.18%	5.54%	19.89%	21.24%
Return/Volatility	0.58	1.17	0.44	0.34
Maximum Drawdown	-43.54%	-9.55%	-47.84%	-55.25%
Correlation with SPTR	94.54%	14.69%	98.54%	

In summary, the Shiller Barclays CAPE US Index Family aims to achieve consistent outperformance in the long-term, allowing for short-term instances of underperformance against the benchmark.

At its very core, the CAPE ratio and Relative CAPE indicator are value indicators that take a long-term view of the sectors. During the 1990s, this focus led the strategy to identify the information technology sector – the crucial driver of the run-up to the technology bubble. As a result, the strategy took a defensive stance against the technology bubble early on, which ultimately led to its outperformance after the bubble burst. By its very nature, the run-up to the technology bubble was driven by the outperformance of growth stocks, which necessarily disadvantaged value-based investment approaches. This period brings about the most substantial underperformance of the CAPE-based sector selection versus the market benchmark. The underperformance before the burst of the technology bubble is followed by the most dramatic outperformance period.

The indices have a variety of uses, namely the Shiller Barclays CAPE US Sector Index may be used in a portfolio as a replacement/complement for a sector rotation strategy, or as a substitute for a value allocation or in a contrarian alpha portfolio. The Shiller Barclays CAPE US Tilted Index may be used in a portfolio as a replacement for US equity exposure, as it is designed to closely track the S&P 500. Finally the Shiller Barclays CAPE US Market Hedged Index may be used in a portfolio as a replacement/complement for a long-term equity market neutral portfolio or for investors seeking access to the value risk premia.

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