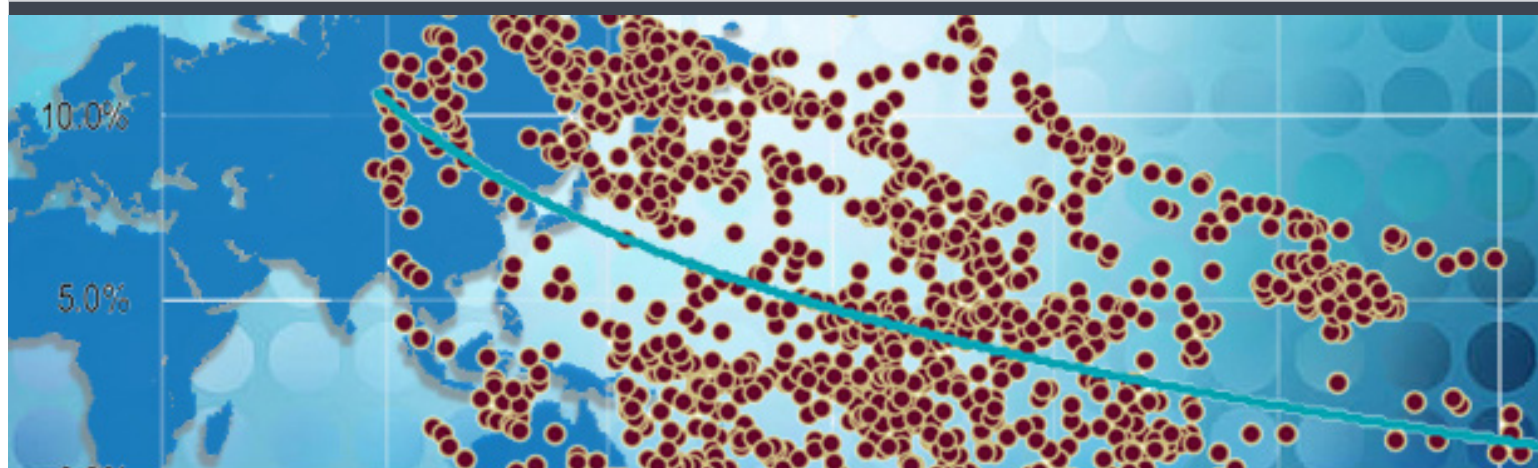


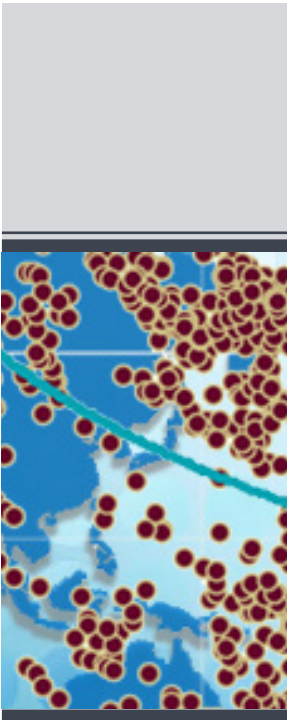
NOVEMBER 2018

ORIGINAL RESEARCH FOR INQUISITIVE INVESTORS



The CAPE Ratio and Future Returns: A Note on Market Timing

by Wim Antoons¹



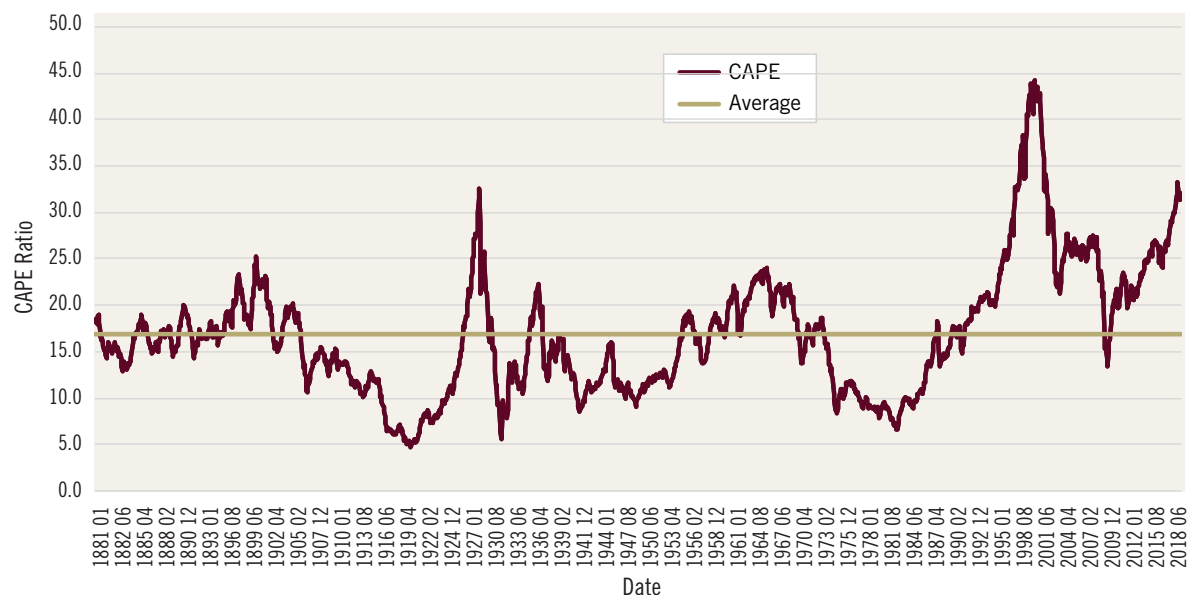
Abstract

The cyclically adjusted price earnings (CAPE) ratio is often used to express the valuation of an equity market. This paper focuses on the CAPE of the U.S. equity market and finds it was very high in June 2018. Although a high CAPE has tended to suggest lower returns in the future, such forecasts only make sense for longer periods. CAPE has not been a reliable forecasting tool for short-term movements of the market and thus it is difficult to use as a market-timing indicator. Similar results were found for other developed countries. See Table 4 later in this report.

Explanation of CAPE

The CAPE ratio was developed by Yale University economics professor and Nobel Prize winner Robert Shiller. The difference between cyclically adjusted price/earnings and ordinary price to earnings (P/E) is that corporate earnings are inflation adjusted with CAPE. The CAPE ratio has proven to be much more stable than the classic P/E ratio. CAPE reflects the current market price relative to average inflation-adjusted profits over the preceding 10 years. I use the figures from Robert Shiller's website² that show the CAPE of the U.S. equity market from January 1881 through June 2018 (monthly figures). See Figure 1. The average CAPE over this period was 16.88. Figure 1 shows some outliers.

Figure 1: CAPE for the U.S. Equity Market (January 1881 – June 2018)



Source: Robert Shiller data (<http://www.econ.yale.edu/~shiller/data.htm>), as of 6/30/18. U.S. equity market represented by the S&P Composite Price Index.

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²<http://www.econ.yale.edu/~shiller/data.htm>

I believe a study of historical CAPE ratios and subsequent returns can be instructive.

CAPE and Long-Term Future Returns: A Brief Literature Overview

Investors have used the CAPE ratio to get a sense of potential future returns. Before applying my analysis of the CAPE ratio and returns, I reviewed select, recently published articles addressing this topic. Here I summarize results from a sampling of my work. A January 2018 research paper, “CAPE Fear: Why CAPE Naysayers Are Wrong”³ discusses the many issues contemporary academics have *against* using CAPE to predict long-term returns. The issues include structural changes to earnings per share (EPS) growth, demographics, real interest rates and volatility. The paper concludes that all issues (aside from an aging workforce) are temporary in nature and that CAPE is still a good measure for predicting the long-term outlook for the market.

Another paper, “King of the Mountain: The Shiller P/E and Macroeconomic Conditions,”⁴ published in the July 2018 issue of *The Journal of Portfolio Management* studies the effect real interest rates and inflation have on the predictability of the CAPE ratio. According to this paper, adjusting CAPE for current interest rates and inflation *can* lead to an improvement in its predicatability of *near*-term capital market returns, which could lead to further research identifying other macroeconomic and market measurements that improve near-term capital market returns.

While history is not a guide for future returns and no one can predict future performance, I still believe a study of historical CAPE ratios and subsequent returns can be instructive.⁵ I believe a high CAPE ratio is most likely a time to expect lower returns going forward. In subsequent sections of this report, I will show why.

CAPE and Long-Term Future Returns: My Analysis

In his calculations of stock market performance, Shiller used the S&P Composite Price Index (USD). I did, too. I calculated annualized returns (both preceding and subsequent) for the CAPE ratio’s three highest and three lowest levels between 1881 and June 2018. I used 1-, 3-, 5- and 10-year periods for each of the extreme CAPE ratios studied. See the results in Table 1 and Table 2. Of course, I recognize that no investor could have known at these points in history that the CAPE ratio was at a historical high or low. I share them here as interesting extreme points in history and believe the returns associated with these moments can be instructive for investors today.

Table 1: Historical High and Lows in CAPE and Preceding Returns

Preceding U.S. Equity Returns (Annualized) at Extreme Low and High CAPE Ratio Points

Date	CAPE	1 Year	3 Year	5 Year	10 Year
Dec. 1920	4.78	-23.7%	0.0%	-6.4%	-2.8%
June 1932	5.57	-65.6%	-43.3%	-20.4%	-5.6%
July 1982	6.64	-15.3%	2.1%	1.8%	0.2%
June 2018	32.12	13.2%	9.5%	11.2%	7.5%
Sept. 1929	32.56	47.9%	32.9%	27.6%	13.3%
Dec. 1999	44.20	20.1%	24.3%	25.7%	15.1%

Source: Robert Shiller data (<http://www.econ.yale.edu/~shiller/data.htm>), as of 6/30/18. U.S. equity represented by the S&P Composite Price Index. Past performance is not a guarantee of future results. One cannot invest directly in an index.

³ Arnott, Rob, Vitali Kalesnik, Ph.D., and Jim Masturzo, CFA. “CAPE Fear: Why CAPE Naysayers are Wrong.” January 2018. White paper published by Research Affiliates. Available here: <https://www.researchaffiliates.com/documents/645-Cape-Fear.pdf>

⁴ Arnott, Robert D., Denis B. Chaves and Tzee-man Chow. “King of the Mountain: The Shiller P/E and Macroeconomic Conditions.” *The Journal of Portfolio Management*. Fall 2017, 44 (1) 55-68; DOI: <https://doi.org/10.3905/jpm.2017.44.1.055>

⁵ Reflecting the difficulty using CAPE to forecast short-term returns, Prof. Shiller himself said in a Bloomberg television interview on Sept. 14, 2018, “The stock market could get a lot higher before it comes down. It’s highly priced, but it could get much more highly priced. It’s a risky market now.” <https://www.bloomberg.com/news/articles/2018-09-14/shiller-says-u-s-stocks-could-go-a-lot-higher-before-dropping>

...years with higher CAPE ratios reflected higher preceding returns but lower subsequent returns.

Table 2: Historical High and Lows in CAPE and *Subsequent* U.S. Equity Returns

Date	CAPE	1 Year	3 Year	5 Year	10 Year
Dec. 1920	4.78	7.3%	7.9%	12.8%	8.6%
June 1932	5.57	117.8%	28.5%	26.8%	5.7%
July 1982	6.64	52.7%	20.7%	23.2%	14.3%
June 2018	32.12	?	?	?	?
Sept. 1929	32.56	-33.6%	-35.9%	-22.3%	-8.6%
Dec. 1999	44.20	-6.8%	-14.3%	-3.4%	-2.5%

Source: Robert Shiller data (<http://www.econ.yale.edu/~shiller/data.htm>), as of 6/30/18. U.S. equity represented by the S&P Composite Price Index. Past performance is not a guarantee of future results.

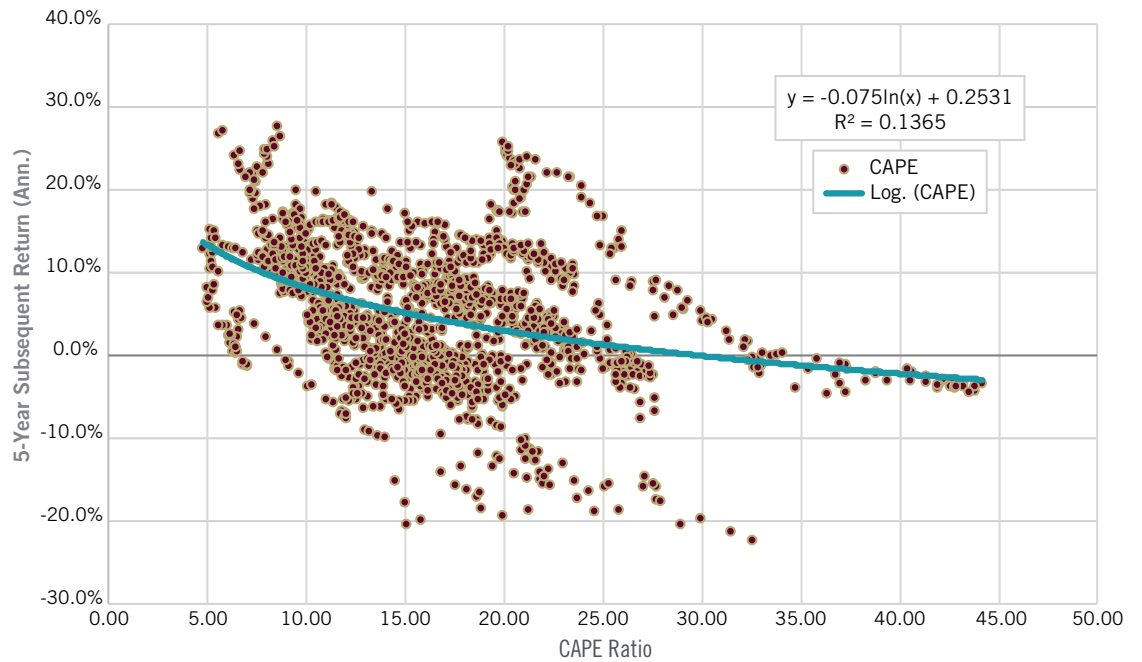
Table 1 shows the *preceding* returns (on 1, 3, 5 and 10 years) for six CAPE outliers. Not surprisingly, the very low CAPE ratios of 1920 (4.78), 1932 (5.57) and 1982 (6.64) showed preceding returns were mostly negative and sharply negative the year just preceding these CAPE bottoms. The high CAPE of 1929 (32.56), 1999 (44.20) and 2018 (32.11) showed preceding returns for all periods were more pleasant (and positive) and definitely very high in 1929 and 1999.

Table 2 shows the *subsequent* returns for low and high CAPE extremes. Looking at the same dates of low CAPE ratios (1920, 1932 and 1982), it shows that subsequent returns for all periods were very strong. The one-year returns were spectacular for 1932 and 1982, showing that a recovery went very quickly. Subsequent returns in periods of high CAPE ratios (1929 and 1999) show the opposite. Even long-term returns over the next 10 years were negative.

While I'm highlighting six periods of extreme CAPE ratios in Tables 1 and 2, I also grouped *all* CAPE ratios into deciles and show the average *preceding* returns (on 1, 3, 5 and 10 years) and average *subsequent* returns (for 1, 3, 5 and 10 years) for each decile in Figures A1 and A2 in the Appendix. The pattern across deciles is clear: years with *lower* CAPE ratios reflected lower preceding returns but *higher* subsequent returns; years with *higher* CAPE ratios reflected higher preceding returns but *lower* subsequent returns.

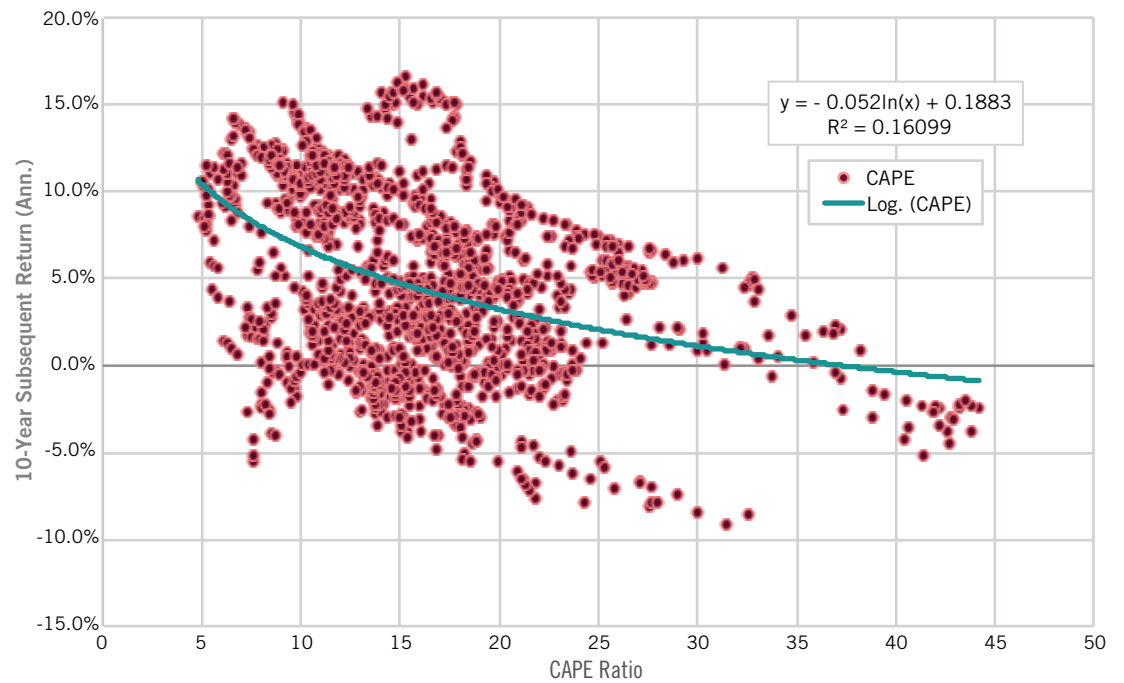
Figures 2 and 3 show linear regressions for the relationship between historical CAPE ratios (monthly) and 5- and 10-year subsequent returns for the U.S. stock market (again measured by the S&P Composite Price Index). Each figure features a logarithmic trend line (Log. CAPE) designed to illustrate the "best fit" between these variables.

Figure 2: CAPE vs. 5-Year Subsequent U.S. Equity Returns (January 1881 to June 2013)



Source: Robert Shiller data (<http://www.econ.yale.edu/~shiller/data.htm>), as of 6/30/18. U.S. equity represented by the S&P Composite Price Index. Past performance is not a guarantee of future results. Log = Logarithmic regression.

Figure 3: CAPE vs. 10-Year Subsequent U.S. Equity Returns (January 1881 to June 2008)

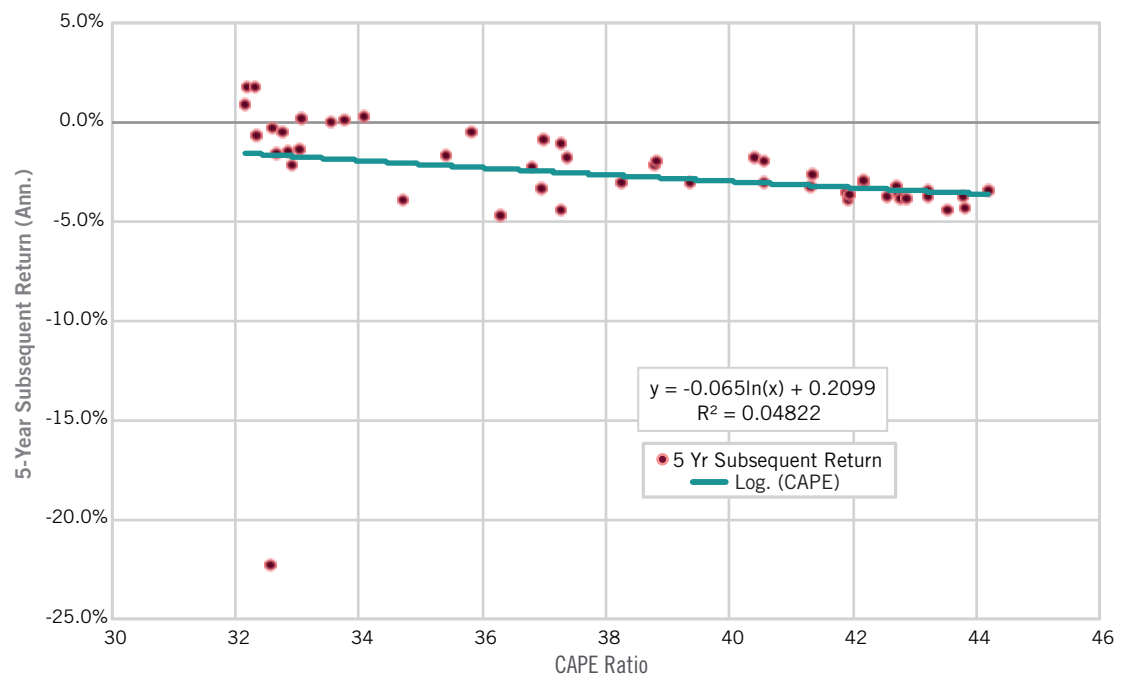


Source: Robert Shiller data (<http://www.econ.yale.edu/~shiller/data.htm>), as of 6/30/18. U.S. equity represented by the S&P Composite Price Index. Past performance is not a guarantee of future results. Log = Logarithmic regression.

Although the R^2 of both graphs is not very high, the plot points clearly are more negative as the CAPE increases in both figures. It indicates that, historically, high CAPE ratios generally have been followed by low returns in the subsequent 5- and 10-year periods and that low CAPE ratios generally have been followed by strong returns over subsequent 5- and 10-year periods. I believe the explanation for this effect stems from two influences: the value premium and mean reversion of returns. The value premium has been documented and has shown that inexpensive assets tend to offer higher future returns. The equity market has also shown a tendency to mean revert after periods of weak *or* strong performance.

Based on history, a CAPE of 31.79 (as of June 2018) suggests a future annualized 5-year return around 0.0%. Figure 4 shows the subsequent 5-year annualized return for the U.S. market when the CAPE ratio was above 32 (again, from 1881 to 2013). There have been only 51 months out of 1,644 observations where the market reached this valuation level, so the market was only more expensive in 3.1% of the monthly observations. The subsequent returns for five years were centred around 0.0%. At an extreme, after September 1929, the subsequent 5-year annualized return was -22.27%. (Note: the R^2 in Figure 4 is only 0.04, but it would jump to 0.6 if that Sept. '29 outlier were removed.)

Figure 4 : Historic CAPE Ratios Above 32 and Subsequent 5-Year Annualized U.S. Equity Returns (1881 to 2013)



Source: Robert Shiller data (<http://www.econ.yale.edu/~shiller/data.htm>), as of 6/30/18. U.S. equity represented by the S&P Composite Price Index. Past performance is not a guarantee of future results. Log = Logarithmic regression.

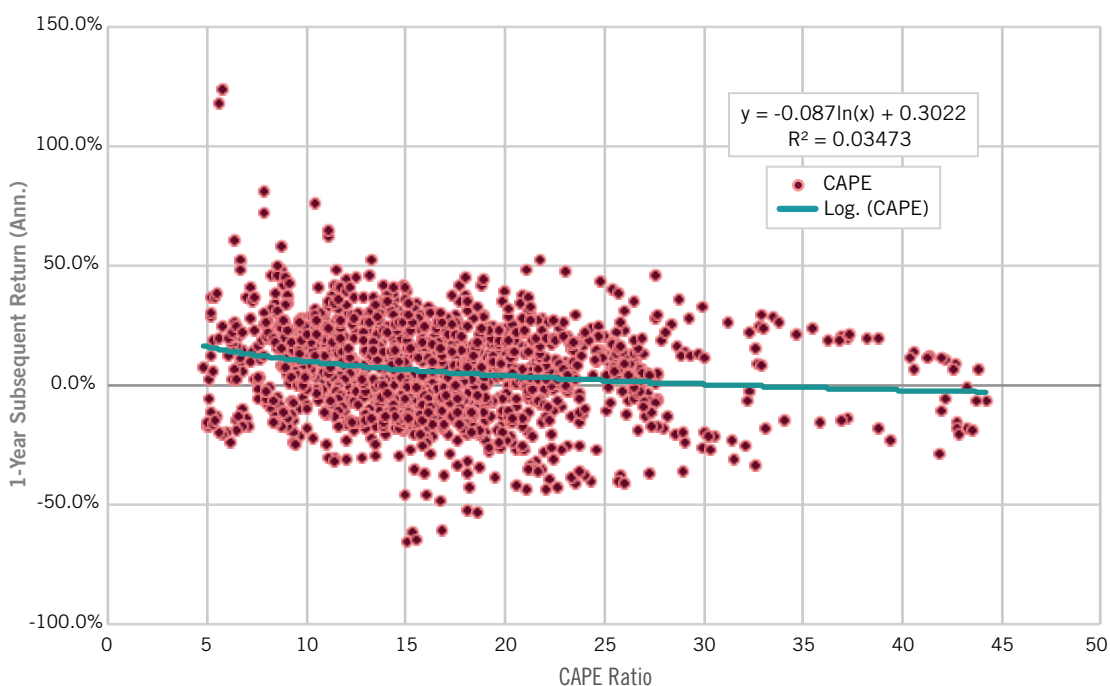
CAPE as a Market Timing Tool?

Can CAPE be used as a market timing tool? My previously published research shows that market timing is nearly impossible and is a losing strategy in the long run.⁶ Figure 5 shows the relationship between CAPE and 1-year subsequent returns. The picture is indeed different from the long-term future returns. No matter whether CAPE is low or high, the return of the next subsequent year (unlike the longer-term returns) was less dependent on CAPE. The R^2 of the regression analysis is near zero, also indicating no relationship between CAPE and subsequent 1-year returns.

⁶Antoons, Wim. "Market Timing: Opportunities and Risks." *Alternative Investment Analyst Review*. CAIA Association, Q1 2018, Vol. 7 Issue 1.

It is impossible to time markets based on actual CAPE.

Figure 5: CAPE vs. 1-Year Subsequent U.S. Equity Returns (January 1881 to June 2017)



Source: Robert Shiller data (<http://www.econ.yale.edu/~shiller/data.htm>), as of 6/30/18. U.S. equity represented by the S&P Composite Price Index. Past performance is not a guarantee of future results. Log = Logarithmic regression.

The explanation for this phenomenon is that price momentum comes into play, in my opinion. Momentum (measured over 12 months) means that positive returns *do* tend to attract investors who chase returns; it also means negative returns typically are followed in the short term by more negative returns because of panic selling. The momentum puzzle can be explained by an underreaction of investors to positive or negative newsflow. Because short-term returns do not depend on the valuation of the market, it is impossible to time markets based on actual CAPE—or to base asset allocation decisions on this measure.

In a recent article, Asness, Ilmanen and Maloney investigated whether short-term market timing based on CAPE is possible.⁷ The researchers conclude it is impossible for two reasons: drifting valuations (valuations moving higher over the last 60 years) made it impossible to correctly time the market. Using historical valuations was not a good predictive factor. The second reason is that contrarian, longer-term timing strategies tend to fight with successful short-term momentum strategies.

Table 3: Hypothetical Performance of Buy-and-Hold Strategy vs. a Short-Term Value Timing Strategy in U.S. Equities

	1900-2015		1958-2015	
	Buy & Hold	Value Timing	Buy & Hold	Value Timing
Excess Return	6.6%	7.4%	5.5%	5.4%
Volatility	17.5%	20.0%	14.9%	14.6%
Sharpe Ratio	0.38	0.37	0.37	0.37
Max Drawdown	-83%	-87%	-53%	-51%

Sources: Asness, Cliff, Antii Ilmanen and Thomas Maloney. "Market Timing: Sin a Little. Resolving the Valuation Timing Puzzle." *Journal of Investment Management*, Vol. 15, No 3, 2017. pp. 23-40. Robert Shiller's Data Library, U.S. equity market returns from Global Financial Data, Ibbotson/Morningstar and Datastream. Hypothetical performance excess of cash, gross of t-costs and fees, with monthly rebalancing. Arithmetic returns and Sharpe ratios. Drawdowns are based on total returns. Does not represent any specific investment. Actual results will vary. Past performance is not a guarantee of future results.

⁷Asness, Cliff, Antii Ilmanen and Thomas Maloney. "Market Timing: Sin a Little. Resolving the Valuation Timing Puzzle." *Journal of Investment Management*, Vol. 15, No 3, 2017. pp. 23-40.

Long-term forecasts (roughly five years or more) based on valuation do make sense...

The timing strategy of Asness, Ilmanen and Maloney allocates between U.S. stocks and cash in the range of 50% to 150% versus the buy and hold (B&H) strategy. The model rebalances monthly. The weight is determined by $100\% + (\text{trimmed Shiller EP} - \text{median Shiller EP}) / (95\text{th} - 5\text{th percentile range})$. The results are bad, even before costs. Over the last 60 years, the value timing approach underperformed B&H for the reasons mentioned above.

A similar study came to the same conclusion. Javier Estrada compared three valuation strategies (Price to Debt, Price to Earnings and CAPE) versus a buy and-hold portfolio composed of 60% equity and 40% fixed income. Over the period September 1899 to December 2014, he tested whether value could be added versus the B&H portfolio by timing the market based on valuation factors. He concluded that, in the short run, no value could be added. The standard deviation and maximum drawdown of these timing strategies was not better than B&H. However, he also came to the conclusion that *long-term forecasts (roughly five years or more) based on valuation do make sense and can be implemented for long-term investors*⁸.

Another recent article, “The Shiller CAPE Ratio: A New Look,”⁹ by Jeremy J. Siegel suggests that CAPE ratios have drifted higher over the past 30 years due to changes in GAAP accounting, specifically changes to mark-to-market valuations. Siegel adjusts the earnings used in the CAPE Ratio to non-GAAP earnings to achieve consistent earnings parameters for the 134-year time span. The paper uses NIPA (national income and product account) after-tax corporate profits, which improves the CAPE ratio forecasting ability of future U.S. equity returns.

As a counterpoint, I note an article published in May 2018 by Daniel Morris at BNP Paribas Asset Management that concludes forward P/E and price/sales are better predictors of equity returns than the CAPE ratio.¹⁰ However, the data used only goes back to 1985 and 1998, respectively, for these metrics, so the sample, in my opinion, is more limited and likely has less explanatory power than other research regarding the CAPE ratio.

CAPE: The International Evidence

Norbert Keimling, head of capital market research for German-based StarCapital¹¹, looked at the relationship between CAPE and subsequent returns in different countries. He calculated for multiple developed countries the median return for various CAPE segments in local currency between 1979 and 2013. He found that high CAPE generally meant lower subsequent returns and low CAPE was usually followed by higher subsequent returns in each of these countries. See Table 4.

⁸ Estrada, Javier. “Multiples, Forecasting, and Asset Allocation.” (April 15, 2015). Available at SSRN: <https://ssrn.com/abstract=2594612> or <http://dx.doi.org/10.2139/ssrn.2594612>

⁹ Siegel, Jeremy J. “The Shiller CAPE Ratio: A New Look.” *Financial Analysts Journal*. May/June 2016. Vol. 72, No. 3, 41-50. <https://doi.org/10.2469/faj.v72.n3.1>

¹⁰ Morris, Daniel. “A Cracked Rear-View Mirror: Shiller Price-Earnings Ratios and Equity Market Valuations.” BNP Paribas Asset Management. *Global Views and Trends*. May 3, 2018. <https://www.bnpparibas-am.com/en/a-cracked-rear-view-mirror-shiller-priceearnings-ratios-and-equity-market-valuations/>

¹¹ Keimling, Norbert. “CAPE: Predicting Stock Market Returns,” StarCapital, 2014.

I believe it makes sense to diversify toward emerging markets, Europe and Asia.

Active management... makes sense in this expensive market....

Table 4: Relationship Between Ranges of Various CAPE Ratios and Median Real Returns Over Subsequent, Rolling 15-Year Periods (Ann.) for Select Non-U.S. Countries (1979 to 2013)

	CAPE Ratio Ranges					
	8-12	12-16	20-24	24-28	28-32	>32
Australia	10.1%	8.2%	5.4%	3.2%	NA	NA
Belgium	17.1%	9.4%	5.5%	0.0%	-1.0%	NA
Canada	8.0%	7.0%	8.1%	6.4%	5.1%	4.3%
France	14.1%	15.2%	6.3%	6.6%	6.1%	1.6%
Germany	11.2%	8.6%	5.6%	3.7%	3.1%	2.2%
Italy	NA	NA	1.0%	-0.5%	-1.1%	-2.9%
Japan	NA	6.8%	5.7%	3.6%	2.9%	-2.2%
Netherlands	10.0%	5.6%	1.7%	0.8%	0.4%	-0.3%
Singapore	7.7%	7.4%	4.1%	4.5%	2.7%	1.9%
Switzerland	14.3%	11.9%	6.7%	5.1%	4.0%	2.5%
United Kingdom	12.6%	7.2%	2.3%	1.8%	NA	NA

Source: Keimling, Norbert. "CAPE: Predicting Stock Market Returns," StarCapital, 2014. All returns are inflation-adjusted, in local currency, including dividend income, based on monthly data gathered from Standard & Poor's, Robert Shiller, Worldscope, Thomson Reuters and StarCapital's own calculations. Past performance is not a guarantee of future results. Rolling periods represent a series of overlapping, smaller time periods within a single, longer-term time period. For example, over a 20-year period, there is one 20-year rolling period, eleven 10-year rolling periods, sixteen 5-year rolling periods, and so forth.

Conclusion

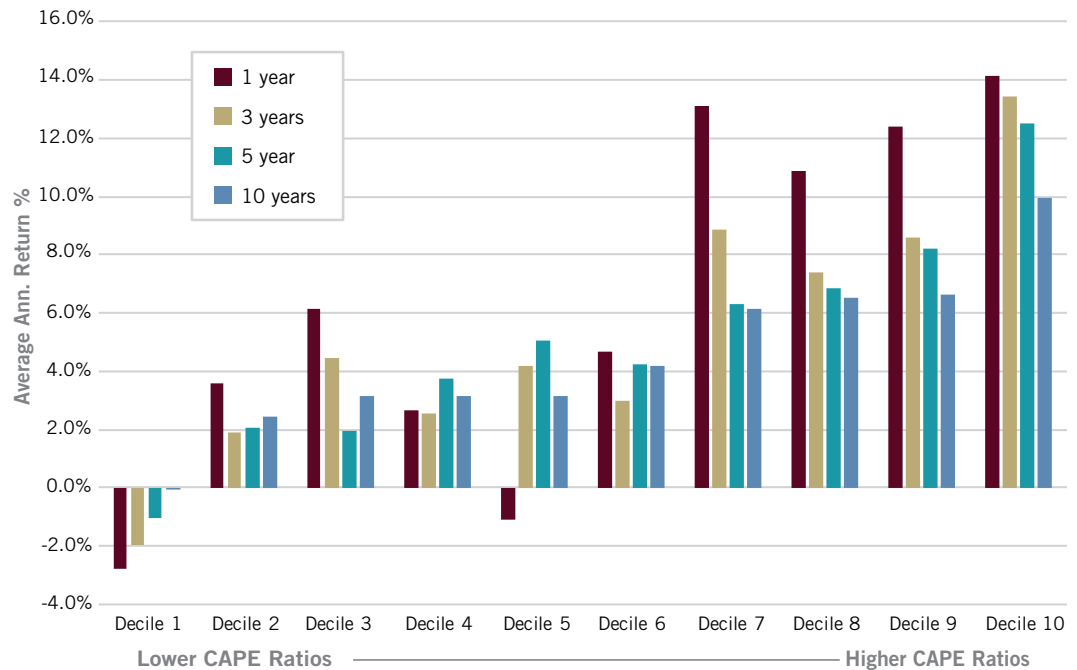
In the third quarter of 2018, the U.S. stock market appeared expensive in terms of CAPE. Valuations have been driven higher by high earnings growth, a rosy economic outlook and U.S. President Trump's stimulus plan. History, however, has suggested that buying equities when the stock market is expensive dampens subsequent returns. With a CAPE of 32 on June 30, 2018, history suggests the 5-year subsequent returns may be close to 0.0% annualized. At the same time, history also has suggested that short-term returns from this level can still be high: it's impossible to predict the stock market return over the next 12 months based on valuation factors.

Today, many global equity funds have underperformed the MSCI World Index for an extended period. The U.S. market accounts for 60.7% of the MSCI World Index as of June 30, 2018. In my opinion, a global approach to equities should be more diversified. I believe it makes sense to diversify toward emerging markets, Europe and Asia. Although one cannot predict short-term equity market results, the high valuation of Japanese equities in 1989 and the high weight for them at that point in the MSCI World Index could serve as a warning today for the United States.

Wise investors invest worldwide, not based on index weight, but based on valuation and earnings growth. To me, it definitely makes sense as a global investor to underweight U.S. stocks now based on valuation and overweight other regions. I believe the spread between value and growth stocks is, from a historic point of view, very high. The high CAPE currently is (mostly) related to the technology sector where investors have chased high-growth companies at high price levels. Active management focused on the careful selection of well-managed and reasonably priced companies still makes sense in this expensive market and, I believe, will make a large difference for patient investors in the future.

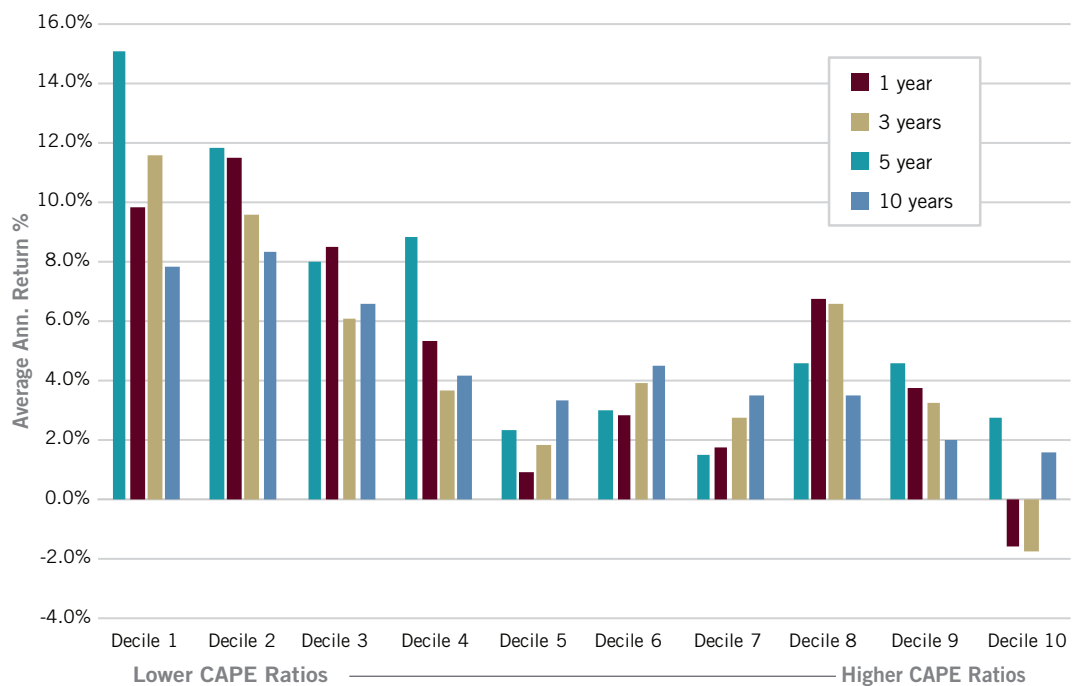
Appendix

Figure A1: Preceding Returns of U.S. Stocks (Avg. Annualized) for CAPE Deciles (Jan. 1881 to June 2018)



Source: Robert Shiller data (<http://www.econ.yale.edu/~shiller/data.htm>), as of 6/30/18. U.S. stocks represented by the S&P Composite Price Index. Past performance is not a guarantee of future results.

Figure A2: Subsequent Returns of U.S. Stocks (Avg. Annualized) for CAPE Deciles (Jan. 1881 to June 2018)



Source: Robert Shiller data (<http://www.econ.yale.edu/~shiller/data.htm>), as of 6/30/18. U.S. stocks represented by the S&P Composite Price Index. Past performance is not a guarantee of future results.

Note: Deciles for Figure A1 and Figure A2 were created using the following CAPE ranges:

Decile	CAPE Range	Decile	CAPE Range
1	4.784 to 9.148	6	16.173 to 17.650
2	9.150 to 11.146	7	17.657 to 19.370
3	11.147 to 12.745	8	19.371 to 21.643
4	12.818 to 14.670	9	21.679 to 25.668
5	14.688 to 16.170	10	25.680 to 44.198

Disclosures

Cyclically adjusted price-to-earnings (CAPE): Price divided by average 10-year earnings adjusted for inflation.

R2 (R-squared): In general, the percentage of a security or portfolio's results that was likely caused by the movements of a benchmark index.

Sharpe ratio: A ratio used to measure risk-adjusted performance. Calculated by subtracting the risk-free rate—such as that of the 10-year U.S. Treasury bond—from the rate of return for a portfolio and dividing the result by the standard deviation of the portfolio returns.

Standard deviation: A measure of the dispersion of a set of data from its mean.

Drawdown: The percentage change in the value of a security or portfolio from a peak to a subsequent trough.

Price/earnings: Price per share divided by earnings per share.

Price/sales: Price per share divided by 12-month sales per share.

Forward price/earnings: Price per share divided by earnings per share expected over the next 12 months.

The S&P 500 Index with gross dividends measures equity performance of 500 of the top companies in leading industries of the U.S. economy.

The S&P Composite Price Index blends historical performance data for the S&P 500 Index (inception March 1957) with historical data that included the companies in the S&P 90 (inception 1926), the S&P 233 (weekly index dating from 1923), and earlier market data gathered by Alfred Cowles back to 1871. This definition based on information provided at Advisor Perspectives: <https://www.advisorperspectives.com/dshort/updates/2016/09/01/validating-the-s-p-composite-stock-price-index>

The MSCI World Index with net dividends captures large and mid cap representation of developed markets.

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