

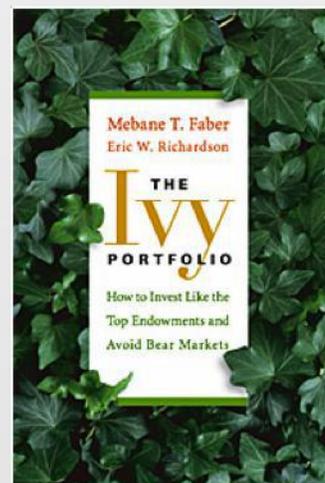
GLOBAL VALUE: BUILDING TRADING MODELS WITH THE 10-YEAR CAPE

ABSTRACT

Over seventy years ago Benjamin Graham and David Dodd proposed valuing securities with earnings smoothed across multiple years. Robert Shiller popularized this method with his version of the cyclically adjusted price-to-earnings ratio (CAPE) in the late 1990s, and issued a timely warning of poor stock returns to follow in the coming years. We apply this valuation metric across more than thirty foreign markets and find it both practical and useful. Indeed, we witness even greater examples of bubbles and busts abroad than in the United States. We then create a trading system to build global stock portfolios based on valuation, and find significant outperformance by selecting markets based on relative and absolute valuation.



Mebane T. Faber



The Ivy Portfolio



2321 Rosecrans Avenue
Suite 3225
El Segundo, CA 90245

Phone: 310.683.5500
Fax: 310.683.5505

info@cambriainvestments.com
www.cambriainvestments.com

INTRODUCTION – THE FUTILITY OF FORECASTING

Investors spend an inordinate amount of time and effort forecasting stock market direction, often with very little success. The conventional efficient market theory is that markets are not predictable and cannot be forecasted. Value has no place in the efficient market ivory tower, but does it seem reasonable for an investor, or perhaps a retiree, to have allocated the same amount of a portfolio to stocks in December 1999 versus in 1982? Of course not.

However, valuation is best used as a strategic guide rather than as a short-term timing tool. It is most useful on a time scale of years and decades rather than weeks and months (or even days). While we can formulate a hypothesis for where the S&P 500 'should' be trading, the animal spirits contained in the marketplace invariably cause prices to deviate quite substantially from 'reasonable' levels, often for years and even decades.

There are numerous models to consider when valuing stock markets, and a great summary can be found in a publication by The Leuthold Group titled, "Stock Market Valuation: What Works and What Doesn't?" The paper covers a number of models, including price-to-earnings (P/E) on trailing 12-month earnings per share (EPS), P/E on 5-year normalized EPS, return on equity (ROE) based normalized EPS, dividend yield, price-to-book, price-to-cash flow, and price-to-sales. In general they find that many of these metrics are decent at forecasting stock returns. Other models include the Q-Ratio, and market capitalization to GNP/GDP (Buffett's favorite). Another great summary is set forth in the paper "[Estimating Future Stock Market Returns](#)" by Adam Butler and Mike Philbrick.

We are not going to summarize all of the stock valuation models in existence, but rather focus on just one. Often, in individual stocks as well as in stock markets, many of the value metrics end up producing broadly similar statistics and fair value estimates. We direct the readers to the Appendix as well as our blog [World Beta](#) where we list links to other papers and resources mentioned in this paper if they wish to explore other models more in depth.

A SIMPLE MODEL – TEN YEAR NORMALIZED EARNINGS

Benjamin Graham and David Dodd are universally seen as the fathers of valuation and security analysis. In their 1934 book "[Security Analysis](#)" they were early pioneers in comparing stock prices with earnings smoothed across multiple years, preferably five to ten years. Using backward looking earnings allows the analyst to smooth out the business and economic cycle, as well as price fluctuations. This long-term perspective dampens the effects of expansions as well as recessions.

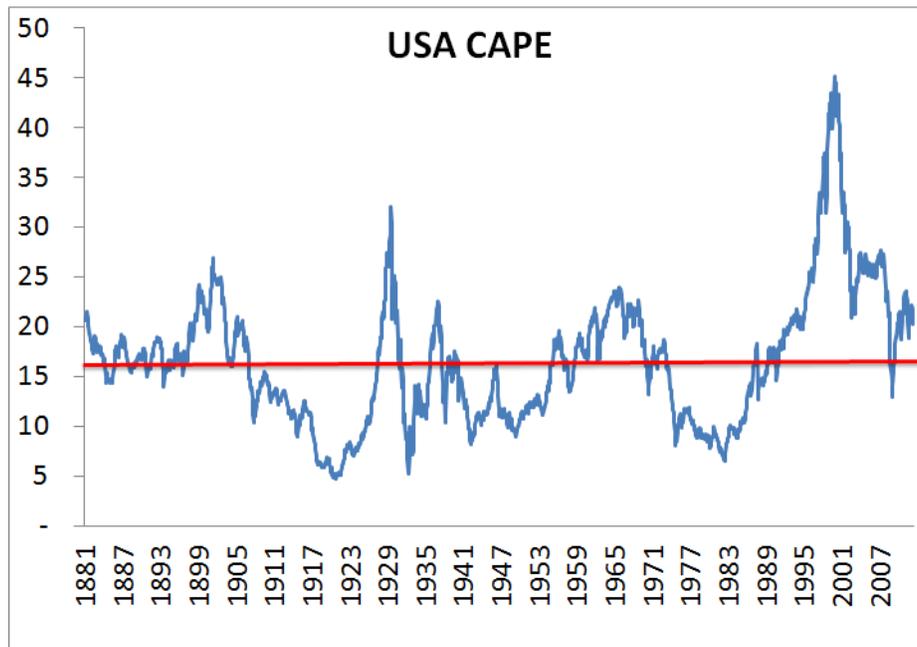
Robert Shiller, the author and Yale professor, popularized Graham and Dodd's methods with his version of this cyclically adjusted price-to-earnings ratio (CAPE). His 1998 paper "[Valuation Ratios and the Long-Run Stock Market Outlook](#)" was shortly followed by his book "[Irrational Exuberance](#)" that included a warning on overvaluation prior to the 2000 stock market crash.

[Shiller maintains a website with an Excel download](#) that includes historical data with formulas illustrating how to construct his ten year CAPE. For a step-by-step guide [Wes Gray at Turnkey Analyst](#) has a good post that walks through the steps necessary to construct the metric.

One common criticism of the CAPE is that the measurement period of ten years is too long. Critics claim recessions and expansions have an outsized impact long after they have faded from memory. "[Estimating Future Stock Market Returns](#)" by Adam Butler and Mike Philbrick tackles the issue of different measurement periods from one year up to thirty (as well as other valuation models). Critics also claim adjustments to CPI and accounting rules render comparisons across decades, or even centuries meaningless. While we agree there may be some variation, later in the paper we examine the CAPE in over 30 foreign markets with supporting results.

Figure 1 below is a chart of the CAPE going back to 1881. The long-term series spends about half of the time with values ranging between 10 and 20, with an average and median value of about 16. The all-time low reading was 5, reached at the end of 1920, and the high value of 45 was reached at, you guessed it, the end of 1999.

FIGURE 1
US 10-YEAR CAPE
1881 - 2011



Source: Shiller

Asset allocators that believe in efficient markets allocate the same percentage of assets to equities when valuations are high as they do when valuations are low. But does that seem even remotely reasonable looking at the above chart?

THE 10 BEST, AND WORST, TIMES IN HISTORY TO INVEST

To illustrate this point, we examined all year-end periods with a holding period for the next ten years. What have been the ten best, and worst, years to invest since 1871? Figure 2 details these years and their corresponding ten-year compounded real returns.

Many of the best starting points seem obvious in retrospect. 1948 and 1949 were great entries, preceding the Nifty Fifty mania, and of course 1918-1920 and the upcoming Roaring Twenties are on the list. 1988 and 1989 certainly would not be left out with the Internet bull market ahead as well.

The same hindsight applies for the bad years as they often fell at the end of these massive bull runs. Bear markets set the stage for future bull markets and vice versa.

One simple take away from Figure 2 below is the valuations at the start of these ten-year periods. The average valuation for the ten best years was 10.92. The average valuation for the ten worst years was 23.31, double that of the best starting points.

FIGURE 2
US STOCK REAL RETURNS VS. 10-YEAR CAPE
1881 - 2011

#	Top			Bottom		
	Date	10 Year Real Return	CAPE	Date	10 Year Real Return	CAPE
1	12/31/1948	18.1%	9.88	12/31/1910	-4.7%	12.99
2	12/31/1918	17.7%	5.93	12/31/1964	-4.0%	22.87
3	12/31/1949	17.0%	10.49	12/31/1998	-3.9%	39.87
4	12/31/1988	16.1%	14.68	12/31/1968	-3.6%	21.60
5	12/31/1920	15.8%	4.72	12/31/1999	-3.5%	45.08
6	12/31/1919	15.7%	6.11	12/31/1909	-3.0%	15.16
7	12/31/1946	15.7%	11.43	12/31/1967	-2.7%	21.93
8	12/31/1989	15.3%	17.82	12/31/1965	-2.5%	23.80
9	12/31/1951	15.1%	12.29	12/31/1911	-2.4%	12.82
10	12/31/1990	14.8%	15.86	12/31/1971	-2.3%	17.02
Avg		16.1%	10.92		-3.3%	23.31

Source: Shiller. Index returns are for illustrative purposes only. Indices are unmanaged and an investor cannot invest directly in an index. Past performance is no guarantee of future results.

BUY LOW, SELL HIGH

In Figures 3a and 3b, we examine a table of all of the CAPE yearly readings at the end of the year from 1881 – 2011. We list how often they occur, as well as the real forward returns. The red bar in Figure 3b is where we find ourselves as of the summer of 2012.

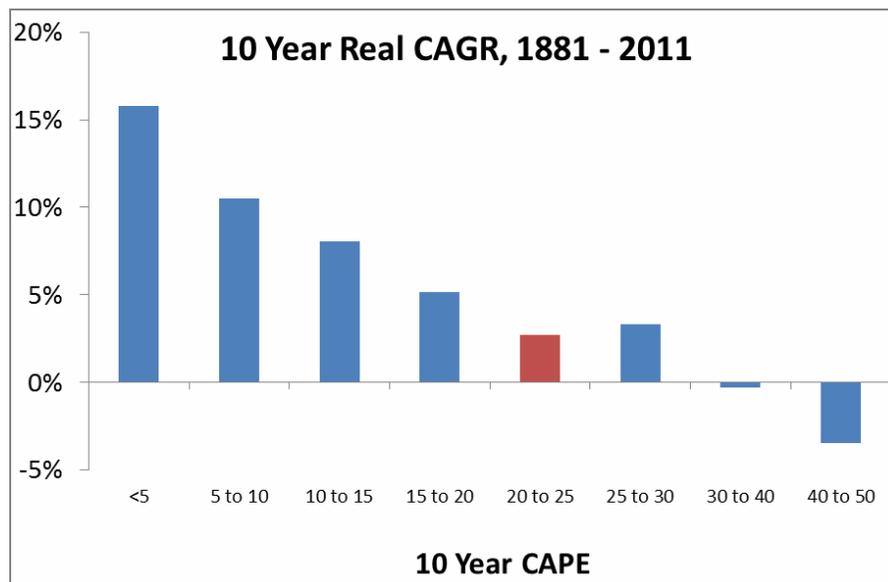
What we find is no surprise, it very much matters what price one pays for an investment! Indeed it is an almost perfect stair step - future returns are lower when valuations are high, and future returns are higher when valuations are low.

FIGURE 3A
US STOCK AVERAGE REAL COMPOUND RETURNS VS. 10-YEAR CAPE
1881 - 2011

		1 Year fwd Real CAGR	3 Year fwd Real CAGR	5 Year fwd Real CAGR	7 Year fwd Real CAGR	10 Year fwd Real CAGR
<5	0.8%	25.4%	18.9%	21.6%	22.6%	15.8%
5 to 10	17.1%	14.5%	12.6%	12.6%	11.6%	10.5%
10 to 15	26.4%	10.6%	8.3%	6.7%	6.5%	8.1%
15 to 20	31.0%	6.4%	4.7%	5.2%	5.3%	5.2%
20 to 25	15.5%	1.6%	5.4%	4.9%	4.3%	2.7%
25 to 30	5.4%	1.3%	-1.0%	-1.3%	1.5%	3.3%
30 to 40	3.1%	1.9%	0.3%	-1.1%	-0.5%	-0.3%
40 to 50	0.8%	-12.5%	-17.0%	-4.8%	-1.5%	-3.5%

Source: Shiller. Index returns are for illustrative purposes only. Indices are unmanaged and an investor cannot invest directly in an index. Past performance is no guarantee of future results.

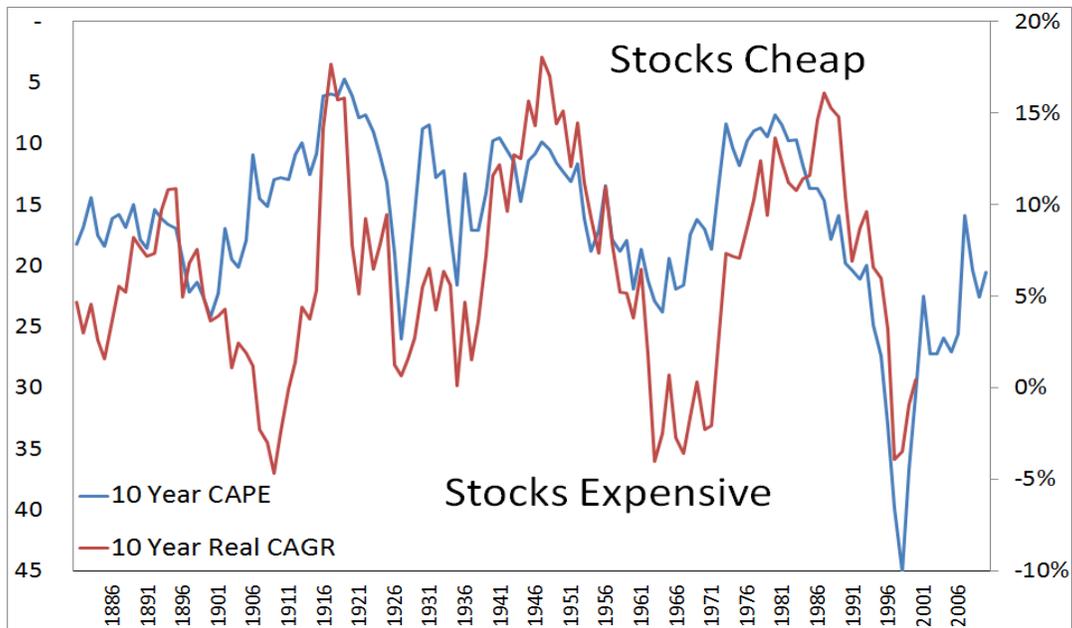
FIGURE 3B
US STOCK AVERAGE REAL COMPOUND RETURNS VS. 10-YEAR CAPE
1881 - 2011



Source: Shiller. Index returns are for illustrative purposes only. Indices are unmanaged and an investor cannot invest directly in an index. Past performance is no guarantee of future results.

While more sophisticated models can be built, below is a simple figure of an inverse CAPE and future 10-year real stock returns – shockingly similar. John Hussman has a few good articles on this topic: [“Estimating the Long Term Returns on Stocks”](#) and [“The Likely Range of Market Returns in the Coming Decade”](#) Joachim Klement also recently published the paper, [“Does the Shiller-PE Work in Emerging Markets?”](#) that performs a similar analysis.

FIGURE 4
US STOCK 10-YEARE REAL COMPOUND RETURNS VS. 10-YEAR CAPE
1881 - 2011



Source: Shiller. Index returns are for illustrative purposes only. Indices are unmanaged and an investor cannot invest directly in an index. Past performance is no guarantee of future results.

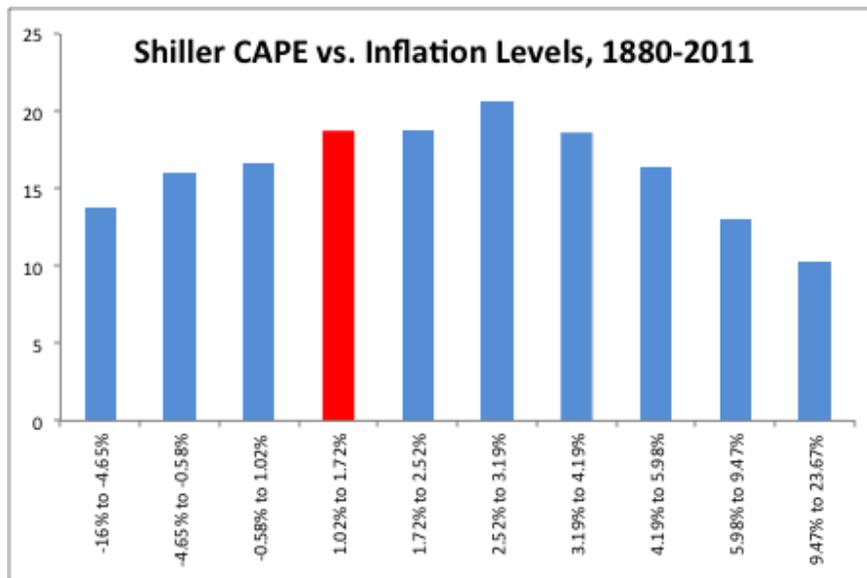
VALUATION AND INFLATION

Besides general sentiment, what might cause this large variation in what multiples investors are willing to pay for stocks? After all, at a current value of around 1374, this means the S&P 500 could trade at either 315 or 2800 based on historical low and high multiples of 5 and 45, respectively. It is difficult for most investors to comprehend the possibility of stocks declining 80% or increasing over 100%, but both of these multiples have occurred in the past.

One of the determinants of the valuation multiple investors are willing to pay is the inflation rate as seen in Figure 5. The red bar is where we find ourselves as of the summer of 2012. When inflation is in the 1-4% “comfort zone”, investors are willing to pay a valuation premium

compared to when there is either high inflation or outright deflation. Rob Arnott of Research Affiliates touches on this important topic in his white paper, "[King of the Mountain.](#)" Two other books speak of CAPEs and inflation/deflation levels. The first is [Unexpected Returns: Understanding Secular Stock Market Cycles](#) by Ed Easterling, and John Mauldin's [Bull's Eye Investing: Targeting Real Returns in a Smoke and Mirrors Market.](#)

FIGURE 5
SHILLER CAPE VS. INFLATION LEVELS
1880 - 2011



Source: Shiller, Arnott. Index returns are for illustrative purposes only. Indices are unmanaged and an investor cannot invest directly in an index. Past performance is no guarantee of future results.

GLOBAL CAPE

There is very little in the literature regarding global CAPEs for international equity markets. One such resource is Russell Napier, who authored [Anatomy of the Bear: Lessons From Wall Street's Four Great Bottoms](#), and who discusses global CAPEs in a video [here](#). We also found two great recently published papers by Joachim Klement– "[Does the Shiller-PE Work in Emerging Markets?](#)", and "[Value Matters: Predictability of Stock Index Returns](#)" by Angelini, Bormetti, Marmi, and Nardini.

We examined 32 countries with data from Global Financial Data and Morningstar, including as much data as we could find. We realize there is some bias in this study (if you have German PE data to 1685 or French to 1724 please contact us), but we did the best with what we have. We utilized local real returns (and found dollar based real returns to be nearly identical) to net out the effects of inflation.

While only two had century long data (US and UK), most of the other countries go back to the 1970s and 1980s.

FIGURE 6
GLOBAL COUNTRIES INCLUDED IN STUDY AND 10-YEAR CAPE
AS OF JUNE 2012

Country	Latest	Min	Max	Median
Australia	12.87	7.65	31.60	17.15
Austria	7.66	6.04	59.11	26.80
Belgium	9.06	4.88	29.49	14.89
Brazil	11.63	11.04	29.73	17.34
Canada	17.31	5.83	63.33	19.85
Chile	22.81	9.71	32.95	20.93
China	14.30	14.30	61.98	24.40
France	10.53	6.20	57.16	19.92
Germany	12.07	7.83	56.86	17.90
Greece	2.04	1.95	39.81	15.91
Hong Kong	15.27	8.55	34.55	18.16
India	18.63	12.69	47.80	24.56
Indonesia	24.25	5.05	34.96	16.37
Ireland	4.97	3.02	18.25	10.94
Italy	6.54	5.92	52.91	21.66
Japan	14.09	13.27	94.25	43.89
Malaysia	20.15	7.77	26.50	18.49
Mexico	20.77	11.69	35.33	19.62
Netherlands	9.95	4.62	38.52	11.95
Portugal	7.20	7.02	39.36	16.43
Russia	7.16	5.13	22.88	9.15
Singapore	12.18	9.40	37.80	21.96
South Africa	16.58	10.16	24.12	16.22
South Korea	15.14	4.74	27.65	17.84
Spain	8.49	7.25	40.06	17.33
Sweden	14.17	4.82	74.18	19.54
Switzerland	14.37	7.12	57.94	18.16
Taiwan	13.69	9.18	42.28	19.43
Thailand	15.09	3.00	17.97	11.48
Turkey	13.64	8.24	42.96	17.02
UK	12.41	4.43	28.69	11.84
USA	20.88	4.72	45.08	14.63

Source: Global Financial Data Index returns are for illustrative purposes only. Indices are unmanaged and an investor cannot invest directly in an index. Past performance is no guarantee of future results.

We examined all the countries on a yearly basis since 1980, CAPE levels, and future returns. The sample includes approximately 10 countries in 1980, 20 in 1990, and 30 by 2000. The results are in the table below and largely confirm the US data. Buy low, sell high.

FIGURE 7
10-YEAR CAPE LEVELS AND FUTURE AVERAGE REAL COMPOUND RETURNS FOR 32 COUNTRIES
1980 - 2011

Avg CAPE by Bucket	% occurrence	1 Year Real CAGR	3 Year Real CAGR	5 Year Real CAGR	7 Year Real CAGR	10 Year Real CAGR
<10	10.2%	25.9%	17.0%	17.1%	13.4%	10.9%
10 to 15	20.5%	22.8%	13.8%	12.2%	11.2%	9.6%
15 to 20	25.2%	11.2%	10.8%	10.6%	8.8%	8.0%
20 to 25	18.3%	4.4%	6.8%	5.6%	6.5%	5.7%
25 to 30	11.0%	-1.3%	0.7%	3.4%	3.4%	3.3%
30 to 40	7.5%	3.0%	-1.1%	-0.8%	1.7%	2.1%
40 to 50	4.4%	-3.3%	-3.4%	0.0%	0.2%	-0.2%
>50	2.0%	-4.5%	-12.3%	-6.4%	-1.9%	-3.1%

Source: Global Financial Data, Morningstar. Index returns are for illustrative purposes only. Indices are unmanaged and an investor cannot invest directly in an index. Past performance is no guarantee of future results.

We found most CAPEs averaged around 15-20, bottomed out around 7, and maxed out around 45 (and a few made the United States bubble in the late 1990's look pathetic in comparison, like Japan reaching a value of nearly 100 in 1989).

THE BEST OF TIMES, THE WORST OF TIMES

Similarly, do the extremes in valuation signal bubbles and generational buying opportunities?

We examined at the database for all instances where CAPEs were below 5 at the end of the year. We also included the longer US and UK datasets here for some context. We only found nine out of about 850 total market years: the US in 1920, the UK in 1974, the Netherlands in 1981, South Korea in 1984, 1985, and 1997, Thailand in 2000, Ireland in 2008, and...Greece in 2011.

Can you imagine investing in any of these markets in those years? In every instance the news flow was horrendous and many of these countries were in total crisis.

Now what would happen if you invested in these seemingly deplorable markets, the literal worst of the most disgusting geopolitical headlines? Below are local country real returns (net of inflation):

	1 Year	3 Year	5 Year	10 Year
CAGR	35%	30%	20%	12%

Likewise, there are only six instances where countries ended the year with CAPE values over 50. Malaysia in 1993, Japan in 1986-1990, 1999, 2005, and 2006, Italy in 2000, India and China in 2007, and Austria in 1991. The Internet bubble in the US narrowly missed the mark with a value of 45 in December 1999. But wow talk about a list of awful times to invest!

Below are local country real returns, on average:

	1 Year	3 Year	5 Year	10 Year
CAGR	-15%	-9%	-6%	-3%

Source: Global Financial Data, Morningstar. Index returns are for illustrative purposes only. Indices are unmanaged and an investor cannot invest directly in an index. Past performance is no guarantee of future results.

A GLOBAL STOCK TRADING SYSTEM

The next question is, can we turn this into a trading system? There is evidence that sorting countries on other measures of value works well. A good summary of the dividend literature can be found in the Tweedy Browne paper entitled, "[The High Dividend Return Advantage](#)." In the paper they summarize a 1991 study by Michael Keppler titled, "[The Importance of Dividend Yields in Country Selection](#)" that found that ranking the universe of countries by dividend yield also resulted in outperformance. He found that the highest yielding countries outperformed the lowest yielding from 1969-1989 by more than 12 percentage points per year.

[Running a similar study using a different database](#) (Global Financial Data), we sorted countries by quartiles from 1920-2011, beginning with nine countries and expanding to eighteen by study end. We found that countries in the highest dividend paying quartile outperformed the countries in the lowest paying quartile by 11 percentage points per year. (Also see the Appendix for tests on book value, dividends, cash flow, and earnings.)

We then set out to test CAPE in a similar manner. Starting in 1980 we sort all countries by CAPE, and invest in the most undervalued x%, rebalanced yearly. We also show the effects of investing in the most overvalued x% as well as a long/short portfolio. These returns are real returns net of inflation, and with yearly data (which will naturally understate drawdown figures). The sample

FIGURE 8
PORTFOLIOS SORTED ON CAPE LEVELS, REAL RETURNS
1980 - 2011

		Eq Wt Cheapest	Eq Wt Expensive	Eq Wt Spread	Eq Wt All
Yearly Top 33%	CAGR	13.5%	6.0%	7.2%	9.4%
	Stdev	29.8%	22.3%	20.0%	22.9%
	Maxdd	55.3%	47.8%	38.1%	48.1%
Yearly Top 25%	CAGR	13.5%	4.3%	9.0%	9.4%
	Stdev	31.0%	22.1%	20.8%	22.9%
	Maxdd	55.3%	47.8%	38.1%	48.1%
Yearly Top 10%	CAGR	16.7%	3.9%	11.9%	9.4%
	Stdev	41.8%	23.5%	36.4%	22.9%
	Maxdd	61.4%	61.0%	61.2%	48.1%
Yearly Top 3	CAGR	14.7%	2.6%	11.8%	9.4%
	Stdev	40.6%	22.3%	34.3%	22.9%
	Maxdd	61.4%	53.8%	30.6%	48.1%

Source: Global Financial Data, Morningstar. Index returns are for illustrative purposes only. Indices are unmanaged and an investor cannot invest directly in an index. Past performance is no guarantee of future results.

includes approximately 10 countries in 1980, 20 in 1990, and 30 by 2000. Investing in the cheapest countries produces four to seven percentage points of outperformance, and an equal amount of underperformance for the overvalued countries. The spread is approximately similar as the previously mentioned dividend studies, albeit slightly lower. However, investing in the cheapest countries on a relative basis does not protect the investor when all countries are expensive in a global equity bubble like 1999. We repeated the same study, but only invested long if the country was below a CAPE of 15, and only short above a CAPE of 30. If the country does not qualify for the valuation filter then that part of the portfolio sits in cash (although we do not receive any interest income in this test).

FIGURE 9
PORTFOLIOS SORTED ON CAPE LEVELS, REAL RETURNS
1980 - 2011

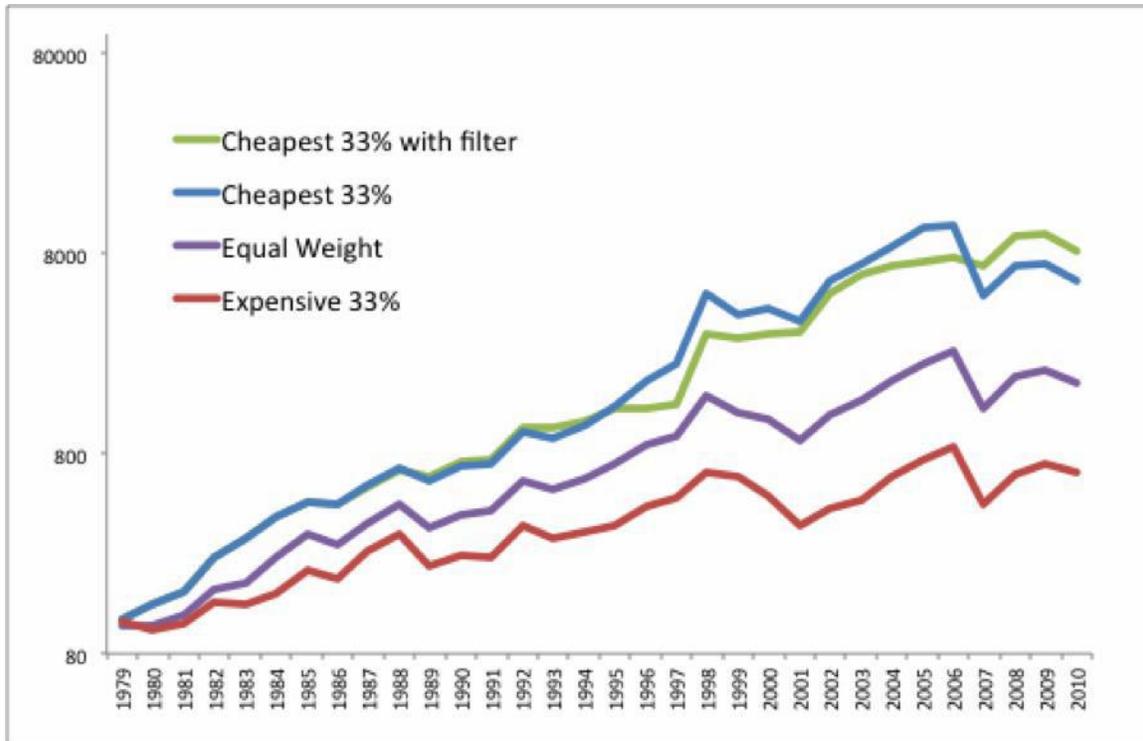
		Eq Wt Cheapest	Eq Wt Expensive	Eq Wt Spread	Eq Wt All
Yearly Top 33%	CAGR	14.7%	0.3%	14.4%	9.4%
	Stdev	26.1%	11.8%	21.2%	22.9%
	Maxdd	17.8%	43.2%	20.4%	48.1%
Yearly Top 25%	CAGR	15.0%	0.3%	14.3%	9.4%
	Stdev	27.1%	13.1%	22.4%	22.9%
	Maxdd	17.8%	46.8%	25.1%	48.1%
Yearly Top 10%	CAGR	18.7%	0.8%	15.3%	9.4%
	Stdev	39.0%	21.4%	37.6%	22.9%
	Maxdd	23.4%	71.0%	61.2%	48.1%
Yearly Top 3	CAGR	17.0%	-1.5%	17.8%	9.4%
	Stdev	37.5%	14.9%	34.3%	22.9%
	Maxdd	23.4%	63.7%	19.6%	48.1%

Source: Global Financial Data, Morningstar. Index returns are for illustrative purposes only. Indices are unmanaged and an investor cannot invest directly in an index. Past performance is no guarantee of future results.

For the most part, adding the absolute CAPE level filter results in better performance with lower drawdowns. This is to be expected as the portfolio could be sitting in 20%, 50%, or even 100% cash (like 1999 or 2007). In this case the returns are higher as well. As many investors look at this table and salivate over the prospect of 15% real returns, recall Figure 6 and note that most of the cheapest countries fall in the troubled Eurozone. How many investors have the stomach to invest in these countries with potential for the markets to get even cheaper? How many professional investors would be willing to bear the career risk associated with being potentially wrong in buying these markets?

Figure 10 on the following page depicts the equity curves from taking the cheapest 33% of countries (also with filter), the most expensive 33% of countries, and the equal weight benchmark.

FIGURE 10
PORTFOLIOS SORTED ON CAPE LEVELS, REAL RETURNS
1980 - 2011



Source: Global Financial Data, Morningstar. Index returns are for illustrative purposes only. Indices are unmanaged and an investor cannot invest directly in an index. Past performance is no guarantee of future results.

SUMMARY

Warren Buffett famously said, “Price is what you pay. Value is what you get.” Over periods of years and decades it is evident that an investor’s real return is heavily dependent on the price paid for the asset. Investors can use CAPE valuation as a guidepost for both opportunities arising from negative geopolitical events, as well as a sanity check against bubbling stock markets. Comparing global equity markets on a relative basis allows the portfolio manager to create portfolios of cheap stocks markets, while avoiding or even shorting expensive markets.

APPENDIX A – Other Valuation Models

Samuel Lee has a great article [“The Hedgehog’s Error”](#) on Morningstar that sorts global countries based on value (Price/Book) using the French Fama database. Not surprisingly, he finds that sorting on value works well.

We utilize the database to sort the countries (twelve in 1975 and rising to twenty by 1991) based on various measure of value. Below in Figure A we demonstrate the results of sorting the countries on a yearly basis and choosing the cheapest X% of the universe (from 33% to 10%).

Below are results that are US dollar based, nominal.

**FIGURE A
1975 - 2011**

33%	B&H	Book	Earnings	Cash Flow	Dividends
CAGR	12.7%	13.5%	15.6%	13.2%	14.3%
STD	22%	24%	24%	25%	24%
MaxDD	47%	46%	50%	46%	49%

25%	B&H	Book	Earnings	Cash Flow	Dividends
CAGR	12.7%	15.4%	14.3%	14.0%	14.9%
STD	22%	25%	26%	25%	24%
MaxDD	47%	43%	61%	46%	46%

10%	B&H	Book	Earnings	Cash Flow	Dividends
CAGR	12.7%	18.1%	16.4%	13.5%	12.9%
STD	22%	29%	28%	34%	26%
MaxDD	47%	38%	54%	55%	48%

Source: Global Financial Data, Morningstar, Fama & French. Index returns are for illustrative purposes only. Indices are unmanaged and an investor cannot invest directly in an index. Past performance is no guarantee of future results.

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There are inherent limitations in hypothetical

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