

Shiller Barclays CAPE® US Sector Value strategy in Value regimes.

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Abstract: We run two conditional models (Markov Regimes) regressions of the Shiller Barclays CAPE® US Sector Value strategy (hereafter Shiller’s Strategy) over standard factor models, considering the regime-dependent nature of the Value premium.

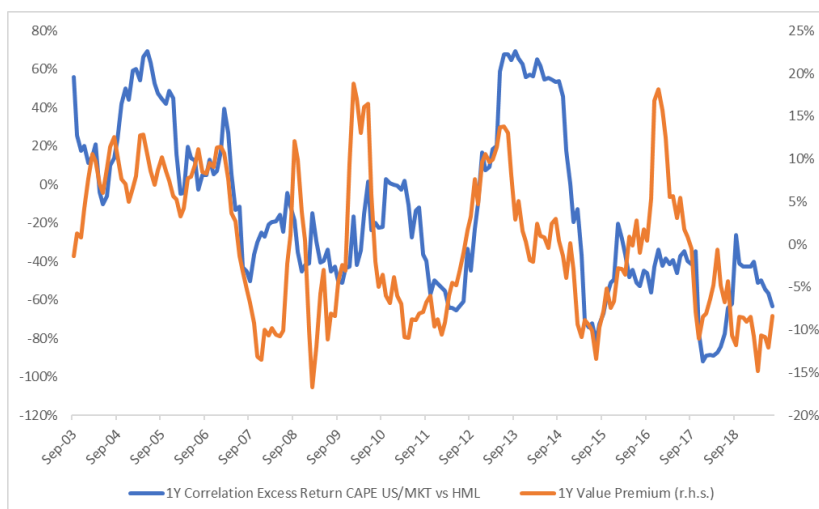
Data is sourced from Kenneth French’s website and Bloomberg. We use the Shiller Barclays CAPE® US TR Index (BXIICUGU Index) as the proxy for the ETF because i) It has a longer history (since September 2002) and ii) It is a Total Return Index, which makes it comparable with FFC gross-dividend market factor. We also consider standard Value and Growth proxies: MSCI USA Value Index (M2U000V Index) and MSCI USA Growth Index (M2U000G Index). Monthly data covers the period September 2002 to July 2019.

	MKT	SMB	HML	MOM	Shiller’s CAPE US Value Index	MSCI USA GROWTH Index	MSCI USA Value Index
Ann. Performance	10.18%	1.23%	-0.88%	-0.35%	13.34%	10.42%	9.04%
Ann. Volatility	14.17%	7.93%	8.64%	15.43%	13.14%	14.44%	14.12%

Data from September 2002 to July 2019. Calculation in USD.
Data before October 2012 (Launch date of the strategy) is based on a backtest.
Past performance is not a reliable indicator of future performances.

Over the period, we see an annual negative premium of -0.88% for the Value factor (HML) . Also, Momentum (MOM) is negative over the period, but with a much higher volatility. The only positive premium has been Size (SMB) with 1.23% p.a. The entire US market (MKT) has delivered 10.18% p.a., close to what the MSCI USA Growth Index has done (10.42% annually), while the MSCI USA Value Index has underperformed (9.04% annually). Over the period, the Shiller’s strategy has outperformed both MKT (by an annual 3.15% circa), MSCI USA Growth (by slightly less than 3% annually) and the MSCI USA Value (by over 4% annualized).

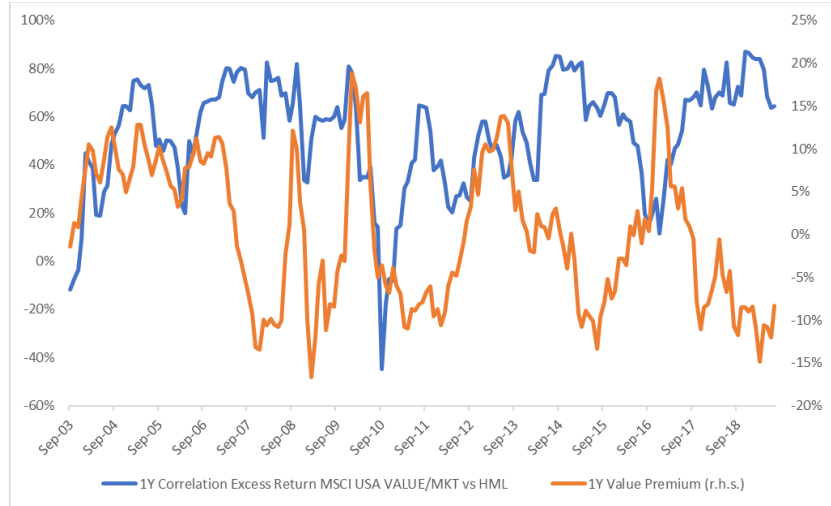
To assess how the Shiller’s strategy moves relatively to the value premium, we compute the 1-year rolling correlation between the excess return of the Shiller’s strategy over the market (CAPE – MKT) and the 1-year performance of the HML factor (the Value Premium).



Data from September 2003 to July 2019. Calculation in USD. Data before October 2012 (Launch date of the strategy) is based on a backtest. Past performance is not a reliable indicator of future performances.

The correlation between the Shiller’s strategy excess return and the value premium has been quite volatile over the last 17 years, going from periods of positive correlations (2003/2004 and 2012/2014) and periods of negative correlations. Interestingly, the Shiller’s strategy correlation with the value premium increases mostly when the premium itself is positive.

This is not the case for the MSCI USA Value Index, which tends to track the value premium whether it is positive or negative.



Data from September 2003 to July 2019. Calculation in USD. Past performance is not a reliable indicator of future performances.

Finally, we run a static 4-factor Fama-French-Carhart regression of these three indices:

	Ann. Alpha	MKT	SMB	HML	MOM	R2
Shiller’s CAPE US Value Index	3.53%***	0.94***	-0.17***	-0.01	0.05***	92.32%
MSCI USA GROWTH Index	-0.42%	1.05***	-0.05**	-0.26***	0.05***	97.61%
MSCI USA Value Index	-0.01%	0.95***	-0.21***	0.22***	-0.06***	96.7%

Data from September 2002 to July 2019. Calculation in USD. Alpha is shown annualized. Betas are significant when the absolute value of the T-Stat is > 2.5. Data before October 2012 is based on a backtest. Past performance is not a reliable indicator of future performances.

Both MSCI indices have no remaining alphas when we account for the four factors, while the Shiller’s strategy shows a large and statistically significant 3.53%.

From these preliminary results we can say that it is not straightforward to see whether a change in the US market regime, with Value taking the lead over Growth, could dampen the outperformance of the Shiller’s strategy. Indeed, the correlation of excess returns to the Value premium is very volatile, and has been positive for some years, but on the other side, over the long run, the Shiller’s strategy has very little exposure to HML.

For a deeper understanding of what we can expect in a regime where Value outpaces Growth, we start by looking at a very simple Markov regime-switching model¹ for HML, where we model it with a mixture of Gaussian:

$$HML_t = \mu(S_t) + \sigma(S_t) * \xi_t$$

1 De Franco, Guidolin, Monnier (2017). The robustness of the volatility factor: Linear versus nonlinear factor model, Journal of Index Investing 8 (3), 75-88. https://www.ossiam.com/files/research_papers/1479203195_Markov_Switching_Models_and_the_Volatility_Factor_A_MCMC_Approach.pdf

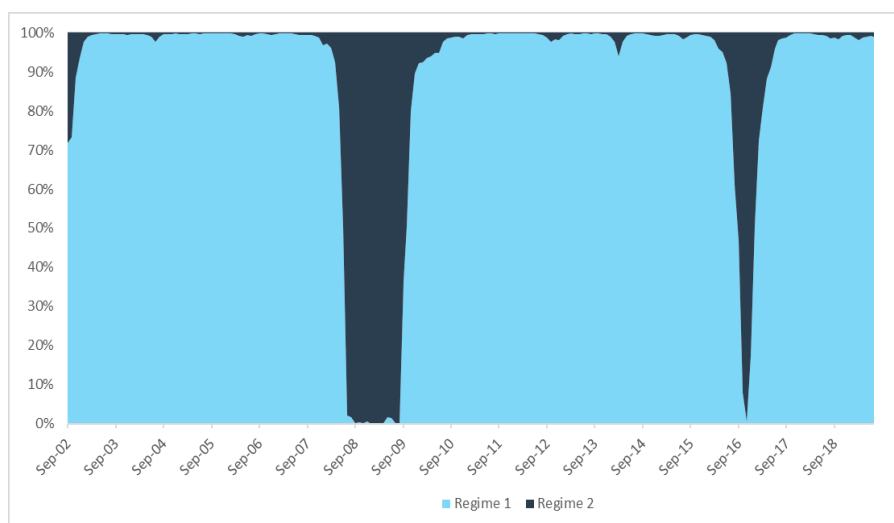
Here S is a hidden Markov-Chain denoting different regimes of the market, μ is the average return of the value factor HML in each of the (unobservable) regimes, and σ is the factor's volatility. When S takes two values, we usually distinguish the different regimes as a *Bull* and *Bear* regimes. This model allows us to capture the different nature of HML, with a regime where the premium is positive and another regime where the premium is negative. The market can switch from one regime to another with a given probability, that needs to be estimated with the data. We calibrate this model and the results are given in the table below.

		Regime 1	Regime 2
Ann. Return	HML	-1.80%	9.48%
Ann. Volatility	HML	6.50%	17.72%
Avg. Duration in Months	HML	70.05	8.39

		Regime 1	Regime 2
Probability Matrix	Regime 1	98.6%	11.9%
	Regime 2	1.4%	88.1%

Data from September 2002 to July 2019. Calculation in USD.
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The model clearly identifies two regimes: In Regime1, HML annualized returns is negative (-1.80%) and relatively low volatile. In Regime 2, HML is positive (9.48%) but with 17.72% volatility. Regime1 is significantly persistent, with an average duration of 70 months, while Regime 2 is more transient, with only 8.39-month duration. When in Regime 1, there is a small 1.4% probability to switch in Regime 2, while from Regime 2 we switch to Regime 1 with a 11.9% probability. The historical smoothed probabilities of each regime are shown in the chart below.



Data from September 2002 to July 2019. Calculation in USD.
Past performance is not a reliable indicator of future performances.

Regime 2 captures period of the US market that have seen strong but volatile performances of value stocks compared to growth stocks, mostly covering the period after severe downturns (such as late 2002, 2008/2009 and the late 2016). As of today, we are still in Regime 1.

Based on these two regimes, we can run separate regression of the three indices, and calculate the expected return of the strategy in each regime. These numbers should give guidance of what to be expected should we switch from Regime 1 to Regime 2 in the coming months.

Regime 1	Ann. Alpha	MKT	SMB	HML	MOM	R2
Shiller's CAPE US Value Index	3.08%***	0.95***	-0.2***	-0.01	0.06***	91.66%
MSCI USA GROWTH Index	-0.87%*	1.05***	-0.07***	-0.29***	0.08***	97.66%
MSCI USA Value Index	0.74%	0.94***	-0.18***	0.24***	-0.1***	96.23%

Regime 2	Ann. Alpha	MKT	SMB	HML	MOM	R2
Shiller's CAPE US Value Index	5.85%	0.94***	-0.02	-0.02	0.06	94.19%
MSCI USA GROWTH Index	0.37%	1.05***	0.08	-0.26***	0.02	98.28%
MSCI USA Value Index	-1.39%	0.98***	-0.3***	0.21***	-0.01	98.52%

Data from September 2002 to July 2019. Calculation in USD. Alpha is shown annualized. Betas are significant when the absolute value of the T-Stat is > 2.5. Data before October 2012 is based on a backtest.

Past performance is not a reliable indicator of future performances.

The regression in Regime 1 is very similar to the one we run over the entire period, because Regime 1 is by far the more persistent regime. The Shiller's strategy delivers strong and positive alpha (3.08% annualized). In Regime 2, we see that the alpha is still positive and large, but not statistically significant. This is due to the volatile nature of Regime 2 and its low frequency, which makes the estimation noisier. However, it should be noticed that in both regimes, the Shiller's strategy delivers positive alpha, although not very precise in the Regime 2. In both cases instead, the MSCI indices do not deliver positive alphas after we discount the four factors. Given these betas, and the premiums in each regime, the annualized expected performances are straightforward:

Expected Ann. Return	Regime 1	Regime 2
Shiller's CAPE US Value Index	16.48%	-3.81%
MSCI USA GROWTH Index	14.29%	-10.63%
MSCI USA Value Index	12.28%	-7.78%
MKT	13.53%	-7.40%

Data from September 2002 to July 2019. Calculation in USD. Data before October 2012 is based on a backtest.

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In both regimes, the Shiller's strategy outperforms the market (MKT factor) and the MSCI indices. Not surprisingly, in Regime 2, the MSCI USA Value Index outperforms the MSCI USA Growth Index, even if both performances are negative (and volatile). The difference between the Shiller's strategy performances and the MKT ones increases when we move from Regime 1 to Regime 2 (2.95% annually $-16.48\% - 13.53\%$ - to 3.59%). The same holds true when we compare with the MSCI USA Growth Index (from 2.19% to 6.82%), while it remains relatively stable at around 4% while comparing with the MSCI USA Value Index.

We can conclude therefore that a switch from Regime 1 to Regime 2, where Value outperforms Growth, may lead to a lower performance for the Shiller's strategy. However, since such regime usually coincides with periods following and including major volatile markets, the strategy itself is still better placed compared to both the market as well as both Value and Growth. Most likely, these conditions may be ideal for concentrated value approaches, but those may still suffer from high idiosyncratic risk. Therefore, we find little evidence that diversified value strategies, such as the MSCI USA Value Index, could outpace on average the Shiller's strategy should we switch from Regime 1 to Regime 2, at least based on the results of the last 17 years.

We complete our analysis by looking at a more complete model, where each of the Fama-French factor is modelled by a Markov Regime-switching process:

$$HML_t = \mu^{HML}(S_t) + \sigma^{HML}(S_t) * \xi_t$$

$$SMB_t = \mu^{SMB}(S_t) + \sigma^{SMB}(S_t) * \eta_t$$

$$MOM_t = \mu^{MOM}(S_t) + \sigma^{MOM}(S_t) * \vartheta_t$$

In this example we let S be a 3-state Markov chain. The results of the calibration are detailed below:

		Regime 1	Regime 2	Regime 3
Ann. Return	SMB	1.75%	-0.17%	5.31%
	HML	-0.43%	2.28%	4.49%
	MOM	8.27%	-0.17%	0.81%
Ann. Volatility	SMB	7.27%	6.27%	5.82%
	HML	8.12%	6.87%	14.01%
	MOM	9.22%	18.07%	33.59%
Avg. Duration in Months		6.60	7.09	7.54

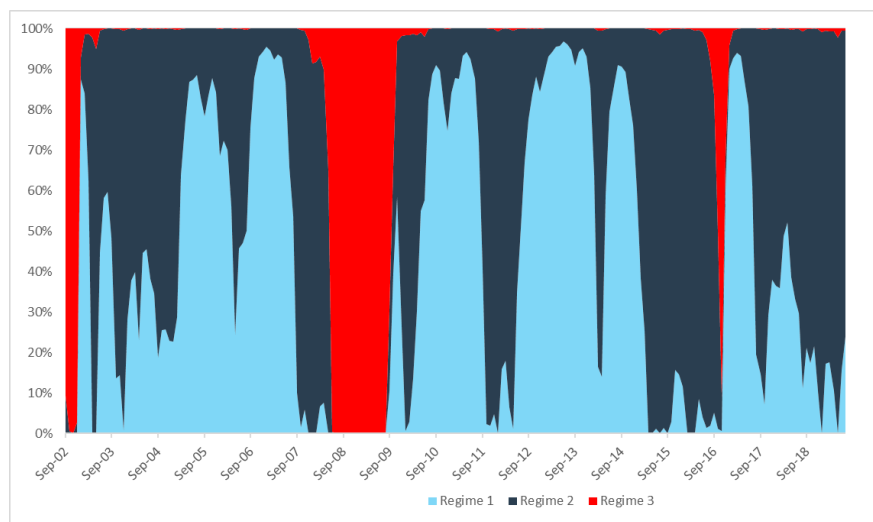
Data from September 2002 to July 2019. Calculation in USD.
Past performance is not a reliable indicator of future performances

Regime 1 seems to capture phases in the US market where both the small cap factor (SMB) and momentum (MOM) deliver positive returns, but it is mostly characterized by the strength of the latter. It is a Regime where the three factors volatilities are relatively similar within the range 7% to 9%. Regime 2 instead sees the value factor HML delivers the best results at annualized 2.28%, while the other two factors are mostly flat. In the third Regime, we see that both SMB and HML deliver positive results, while momentum is positive but close to zero, at annualized 0.81%. While Regime 1 seems to correspond to a bull market, dominated by momentum, Regime 2 picks market conditions where opportunities are found in value stocks, and Regime 3 is instead driven by small caps, end eventually small caps that are also value. The average duration of each regime is similar and around 7 months. Finally, the probability matrix associated with the hidden Markov chain and the historical smoothed probabilities are given below:

		Regime 1	Regime 2	Regime 3
Probability Matrix	Regime 1	84.8%	11.6%	11.2%
	Regime 2	15.2%	85.9%	2.1%
	Regime 3	0.0%	2.5%	86.7%

Data from September 2002 to July 2019. Calculation in USD.
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The three regimes are highly persistent, with 85% probability circa to remain in each Regime once we enter it. The main difference between Regime 3 in this specification and Regime 2 in the previous specification is the clear identification of 2002 as Regime 3 now as well as the second half of 2016.



Data from September 2002 to July 2019. Calculation in USD.
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We run again the regressions in each of the three regimes to see how the indices have been exposed to the factors.

Regime 1	Ann. Alpha	MKT	SMB	HML	MOM	R2
Shiller's CAPE US Value Index	1.17%	0.99***	-0.22***	-0.07	-0.01	93.18%
MSCI USA GROWTH Index	-0.71%	1.06***	-0.09***	-0.31***	0.06*	97.3%
MSCI USA Value Index	0.4%	0.94***	-0.17***	0.26***	-0.07*	96.73%

Regime 2	Ann. Alpha	MKT	SMB	HML	MOM	R2
Shiller's CAPE US Value Index	5.33%***	0.94***	-0.19***	-0.08	0.03	91.28%
MSCI USA GROWTH Index	-0.97%	1.05***	-0.05*	-0.28***	0.07***	97.75%
MSCI USA Value Index	0.98%	0.93***	-0.18***	0.27***	-0.08***	95.73%

Regime 3	Ann. Alpha	MKT	SMB	HML	MOM	R2
Shiller's CAPE US Value Index	3.04%	0.9***	0.01	0.03	0.06	94.19%
MSCI USA GROWTH Index	1.55%	1.07***	0.04	-0.24***	0.06	98.01%
MSCI USA Value Index	-2.11%	0.98***	-0.31***	0.16***	-0.06	98.08%

Data from September 2002 to July 2019. Calculation in USD. Alpha is shown annualized. Betas are significant when the absolute value of the T-Stat is > 2.5. Data before October 2012 is based on a backtest.

Past performance is not a reliable indicator of future performances.

In the three regimes, again, the Shiller's strategy delivers positive alpha, although in Regimes 1 and 3 these numbers are quite noisy. Based on these betas, we can once again calculate annualized expected returns in each regime:

Expected Ann. Return	Regime 1	Regime 2	Regime 3
Shiller's CAPE US Value Index	15.73%	18.05%	-5.16%
MSCI USA GROWTH Index	16.76%	12.31%	-9.66%
MSCI USA Value Index	11.93%	12.94%	-7.31%
MKT	14.64%	12.83%	-6.87%

Data from September 2002 to July 2019. Calculation in USD. Data before October 2012 is based on a backtest.

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The results are like the previous model specification: although Regime 3 may see a negative annualized performance (on average) for the Shiller's strategy, it is still outperforming the market MKT and both MSCI factor indices. We recall that Regime 3 is a volatile regime where the strongest performance drivers are small and value stocks, especially if in combination.

In conclusion, given the dynamic and top-down nature of the sector rotation implemented by the Shiller's strategy, we do not find strong evidence that a switch from a Growth-driven US market toward a more Value-driven could hurt the alpha potential of the strategy. Even if this may come at the price of a lower/negative expected performance, this seems to be linked to the global negative performance that we expect from both the market and value/growth indices. In relative terms instead, the strategy still delivers significant and positive excess returns.

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