



Factor timing – the Holy Grail of factor investing

Can we dynamically shift factor allocations with any success?

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Introduction

Factors are well understood and measurable attributes that drive active returns, and have been adopted increasingly by investors to meet investment objectives. Factors aim to deliver excess returns by extracting specific risk premia above the equity market, confirmed by numerous academic studies and performance surveys. Strategies such as Value, Momentum, Quality, Growth or Low Volatility are well-known factors that each access a distinct character, and have a well-defined role when building a portfolio.

While the long-term premium delivered from each factor is positive, it is also cyclical. The cyclicity is largely due to the different market drivers for each factor that yield outperformance during different periods. The risk of being exposed to a single factor is extended periods of poor performance, and it is therefore important to diversify exposure to factors and blend allocations across multiple factors.

In order to diversify their exposure, many practitioners employed static allocations to pre-selected factors. While this approach holds some value for investors seeking a simple solution, a natural question follows: is it possible to time one's exposures to different factors in order to add incremental returns above and beyond the premiums from a strategic allocation? In our view, that would arguably be the Holy Grail of factor investing.

Prior research

The topic of factor timing is well documented. Initial studies focussed on improving the ability to dynamically allocate to Value strategies, given that Value strategies in isolation have the potential to produce long periods of underperformance. Authors such as Arnott [1992], Fan [1995], Kao and Shumaker [1999] investigated models that forecast differences between Value and Growth strategy returns, according to measures of aggregated economic and financial conditions.

When a broader range of factors (outside of Value and Growth) became more popular, authors explored the drivers of wide-ranging factor performance, and typically split these drivers into three distinct areas of study. We highlight the key findings of each one below:

1. Economic cycle

The first performance driver, concurrent or predictive, is the relationship between factor performance and the macroeconomic cycle. Research by Ahemerkamp et al. (2012) found that business-cycle indicators have a strong predictability in Carry and Momentum strategies across asset classes. Muijsson, Fishwick and Satchell (2014) studied linkages between factors and interest rate movements, and Winkelmann et al. (2013) suggested that each factor responds differently to macroeconomic events based on fundamental characteristics.

2. Valuation

The idea behind valuation is that a factor can perform better than normal when it is cheaper than normal and vice versa. Asness et al. (2000)¹ outlined a methodology for using fundamental ratios to produce a predictive model that forecasts the performance of Value-based strategies relative to Growth counterparts. Two variables were considered for the Value and Growth portfolios: (i) Value spread: a spread in valuation multiples between the portfolios and (ii) **Earnings Growth spread**: a spread in earnings growth between the portfolios. While the **value spread** for value factors (when the spread and the factor are constructed using the same measure, like book-to-price or sales-to-price) is always over 100%, there is considerable variation through time. This Value spread idea has been used and extended by Cohen, Polk and Vuolteenaho (2003), Alighanbari et al. (2014), Asness (2015), and Arnott, and Beck, Kalesnik and West (2016).

3. Momentum/trending

Momentum strategies have outperformed across equities, fixed income and currencies due to structural investor behavioural patterns². Similarly, Momentum overlaid onto factors has performed well; as investors tend to favour a set of securities or particular factor that exhibited strong recent performance. Baker and Wurgler (2006) linked momentum to factor performance and showed that sentiment impacts factors such as Size, Volatility, Dividend Yield, Growth, and Profitability. Specifically, when sentiment is low, subsequent returns are relatively higher for small stocks, high volatility stocks, unprofitable stocks, non-dividend-paying stocks, extreme growth stocks, and distressed stocks.

Tibbs et al. (2008) investigated the momentum effect amongst style indexes and found outperformance on both absolute and risk-adjusted bases, with long minus short portfolios generating an average 9.25% annual return over a 34-year sample period. More recently, Alighanbari et al. (2014) applied momentum to a wider range of factor indexes and found outperformance over equal-weight strategies over a 40-year period, albeit with much higher relative turnover.

¹ C. Asness, J. Friedman, R. Krail, and J. Liew. A Predictive Indicator Model for Switching Between Value and Growth Strategies. *Journal of Portfolio Management*, Spring 2000.

² See Da et al. (2014), Hong et al. (2007), Grinblatt and Han (2005), Hong and Stein (1999).



Our research

We investigated factor timing opportunities in the domestic equity market by employing largely similar models as discussed above.

South African factor experience

We began our analysis by constructing simple factor portfolios based on five broad investment strategies, namely: Momentum, Value, Quality, Growth and Low Volatility. Each factor portfolio is constructed by grouping the universe into quarters based on each factor's metric³, and then equally weighting⁴ the first quartile and fourth quartile of stocks. One could also think of the first quartile as the long portfolio and fourth quartile as the short portfolio. We repeated this process on a monthly basis, and calculated out of period performance excluding any management fees, transaction costs or other expenses.

The comparison of the first and fourth quartile portfolios' performance over time created a reflection of each factor's efficacy in the South African market. It is clear that all the factors tested offer positive spreads on average over the 17-year period. Momentum in particular exhibits powerful outperformance with a quartile spread of 11.3% annualised, followed by Quality with a spread of 7.0%. Both Value and Low Volatility produce similar performance spreads whereas the Growth factor only saw a marginal outperformance. We also calculated the spread between quartile portfolio information ratios, illustrating the success of each factor on a risk-adjusted basis. Once again, Momentum, Value and Quality demonstrate powerful risk-adjusted spreads. Interestingly, Quality and Growth's short leg (Q4) contributed most to its spread in Information Ratio, intuitively suggesting that picking (or avoiding) poor quality or growth stocks is more meaningful than picking the best quality or high growth stocks.

Table 1: Back-tested performance of factor portfolios (Jan 2002 to Dec 2018)

Factor	ANNUALISED RETURNS				VOLATILITY		TRACKING ERROR		INFORMATION RATIO		
	Q1	Q4	Q1 Universe	Spread	Q1	Q4	Q1	Q4	Q1	Q4	Spread
Momentum	20.3%	9.1%	4.0%	11.3%	15.7%	17.8%	8.3%	9.4%	0.48	-0.78	1.26
Value	19.9%	13.7%	3.5%	6.2%	15.7%	14.2%	6.0%	6.7%	0.59	-0.40	0.99
Quality	18.3%	11.3%	2.0%	7.0%	14.3%	13.9%	5.1%	5.6%	0.39	-0.89	1.28
Low Vol	18.3%	12.1%	1.9%	6.2%	12.2%	20.2%	7.8%	11.9%	0.25	-0.36	0.60
Growth	16.7%	13.5%	0.4%	3.2%	14.1%	15.3%	6.0%	6.0%	0.07	-0.47	0.54

Source: Satrix calculations, March 2019

³ For Momentum we use price momentum and earnings momentum, for Quality we use Return on Equity and Accruals ratio, for Value we use a composite of PE ratio, EV to EBIT, Price to cash flow and Price to Tangible book, for Growth we use EPS growth and Sales growth, and for Low volatility we use low beta and low absolute volatility.

⁴ This excludes all elements of portfolio construction.

Factor performance, however, is time-varying. Aggregate performance over a 17-year period masks long periods of outperformance and, likely more pertinently, underperformance, as illustrated in Figure 1 which shows 12-month rolling relative returns of first quartile factor portfolios since 2002.

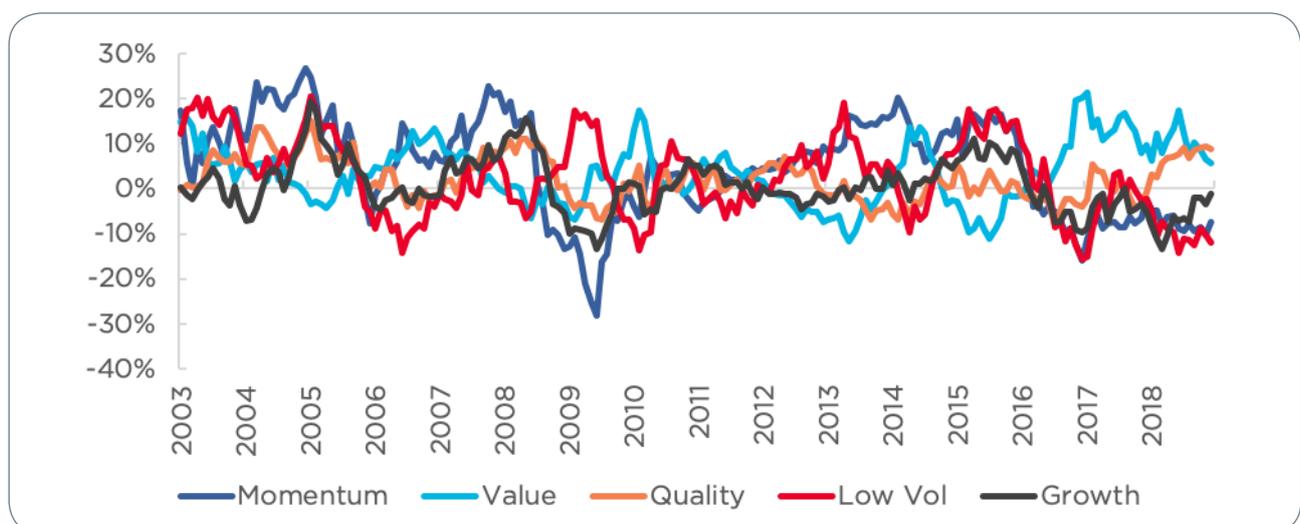
Fundamentally, these short-term performance variances are driven by ever-changing underlying drivers of factors, namely:

- 1) some compensation for exposure to risk,
- 2) investor behavioural biases, and
- 3) structural market impediments.

As these drivers shift, the return to factors impacted by these drivers will change accordingly.

The appeal of factor timing is therefore to take advantage of these relative return dispersions and allocate to better performing factors, in so doing, outperforming an equally weighted factor strategy. It is well known that Momentum performed well during 2005, 2007 and 2014, but performed poorly during 2009 and 2016. Similarly, Low Volatility was an excellent strategy to hold when all other factors failed during the Global Financial Crisis (2008 and 2009), but had not rewarded investors during the prior three years. Value on the other hand has only been in favour sporadically, but has been one of the best performing factors over the past three years.

Figure 1: 12m rolling relative returns of Q1 factor portfolios (Jan 2002 to Dec 2018)



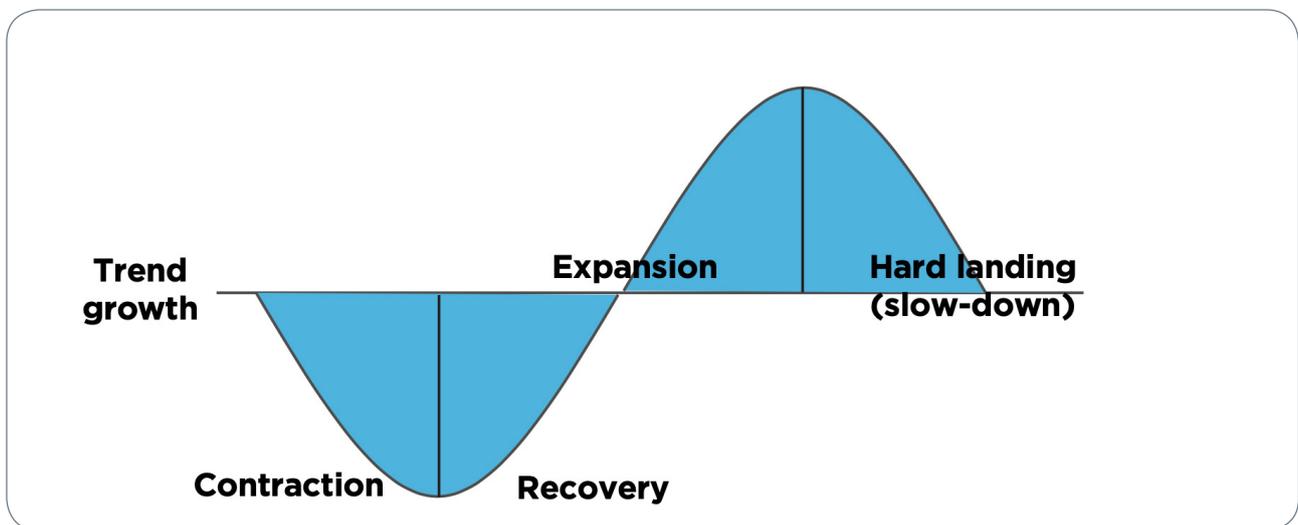
Source: Barra, Satrix calculations. March 2019



Economic cycle experience

In this section we attempt to understand how the cyclical performance in South African can be understood within the context of domestic economic cycles. Clearly there is a range of macro indicators that could be a proxy for economic cycles. To investigate this range, we used an output gap as an economic cyclical indicator, and divided this indicator into four distinct and successive phases depending on the direction of the indicator, and whether the indicator was above or below economic trend growth. These phases include **Contraction** (below trend and indicator deteriorating), **Recovery** (below trend and indicator improving), **Expansion** (above trend and indicator improving) and **Slow-down** (above trend and indicator deteriorating).

Figure 2: Stylised economic cycle using de-trended output gap



■ Source: Satrix, March 2019

Our results are fairly intuitive, and summarised below in Table 2. We not only highlight which single factors perform best and worst, but which blend of factors is optimally suited to each cycle.

Table 2: Average excess returns (relative to Capped SWIX) for factor portfolios for different South African economic cycles (2001 to 2018)

	CONTRACTION	RECOVERY	EXPANSION	HARD LANDING
Momentum	-2.0%	0.3%	5.5%	3.7%
Value	0.8%	2.4%	2.6%	1.3%
Quality	0.0%	0.6%	0.7%	2.4%
Low Vol	4.9%	-0.9%	-3.4%	2.7%
Growth	-2.3%	-0.4%	-0.6%	3.8%

■ Source: Satrix calculations, March 2019

During the **Contraction** phase, growth slows down and equities typically do poorly compared to bonds, as interest rates are cut in this phase. Low Volatility strategies are successful as investors look for defensive shares. Growth and Momentum strategies struggle given their exposure to cyclical companies.

As the economy transitions to **Recovery** and interest rate cuts take effect, equities tend to perform well compared to bonds. Within equities, investors are looking for inexpensive companies that are geared to a recovery in the business cycle, and thus Value strategies provide early cycle exposure.

Thereafter, as the economy gains traction and shifts into **Expansion**, investors maintain Value exposure, but also shift into Momentum, which represents more mid-cyclical equity strategies. This is typically the longest phase of the economic cycle, characterized by a positive but more moderate rate of growth than that experienced during the early-cycle phase. As economic activity gathers momentum, credit growth becomes strong, and profitability is healthy creating an optimal environment for Momentum in particular.

Lastly, during the **Slow-down** phase, typically the late part of the economic cycle, a distinct rotation from Value into Growth strategies occurs as the market starts to position itself for a defensive turn. Momentum still seems to perform, however having exposure to Momentum at this point can be risky.

It is important that investors who consider using an 'economic cycle' approach to tactical allocation between factor exposures, need to understand the challenges of such an approach. The relationship between factors and economic cycles, while intuitive on aggregate, can manifest in real-time with a large amount of uncertainty given the complexity of each unique cycle.



This is largely due to the time-varying nature of each cycle, where every new cycle brings market characteristics that potentially have not been brought before in historically similar phases of the cycle. Furthermore, these relationships are observed with the benefit of hindsight, and thus suffer from the age-old problem of data mining. Should investors decide to adopt a forward looking approach instead, this would then require a strong macro capability to consistently predict the approaching cycle, in order to tilt toward the favourable factor before the cycle commences. However, simulating back-tested portfolios based on economic signals is immensely difficult to implement practically.

Trending factor performance

We then tested a naïve factor timing strategy based on the historical performance of factors. In recognising that the Momentum risk premium exists within certain stocks, where stocks with positive price trends tend to produce higher returns than stocks with negative (or less positive) price trends, we cannot ignore that the very same structural behavioural phenomenon can occur with subsets of stocks with the same theme. For example, should Value stocks be in favour, the same behavioural drivers, including the herding effect, ensure that Value stocks continue to be in favour.

Using the back-tested quartile one portfolios created earlier, we calculated the 12-month performance for each factor, and used this metric as our predictive indicator. For simplicity, we narrowed our factor universe to the following three factors: Momentum, Quality and Value. This smaller universe of factors reflects a broad range of uncorrelated factor risk, and also allows for uncomplicated combinations of factor positioning.

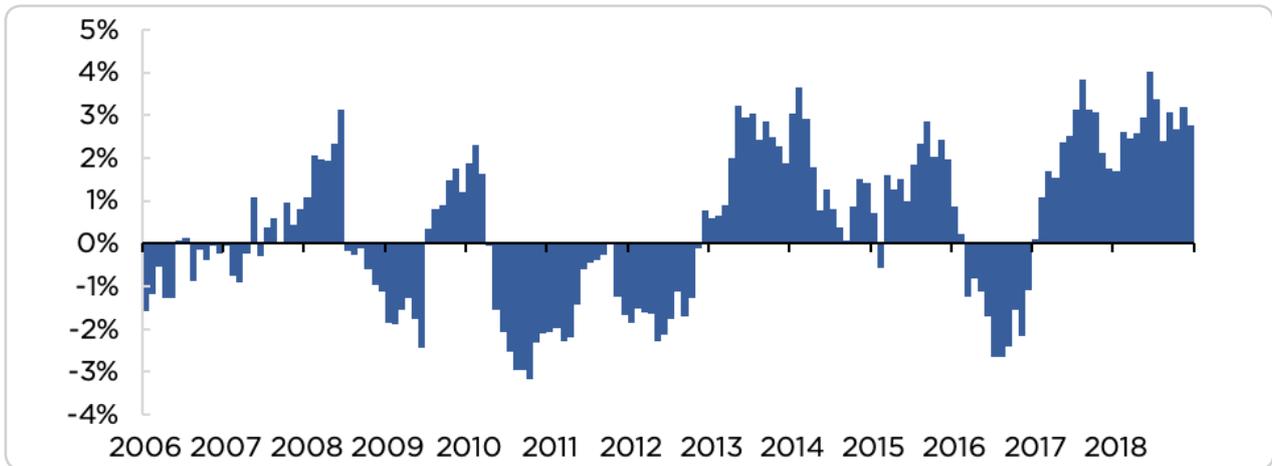
We rank each factor based on its 12-month return, and if a factor ranks one (first), we overweight the factor within an equally weighted portfolio. If a factor ranks three (last), we underweight it. Active bet sizes are 15% and are applied relative to an equal weighting of 33.3%. This approach is used to promote realistic yet straightforward portfolios. We recalculate our signal and rebalance the portfolio on a monthly basis. Given the universe of three factors, we apply a neutral weighting to the second ranked factor to balance our portfolio. This positioning is held on an out-of-sample basis, and repeated monthly.

Effectively, we are always tilting toward the best performing factor and away from the worst performing factor in anticipation that the trending, or persistence character of factor portfolios will reward us relative to our equally weighted factor benchmark.

Needless to say, our results were underwhelming. On an aggregate basis we managed to add a meagre 38 basis points of annualised returns (before costs) while using 1.57% tracking error, resulting in an information ratio of 0.24. Given the significant churn of this portfolio, we would expect that in reality the transaction costs of this strategy would wipe out much of the value add.



Figure 3: 12m rolling relative returns of Trending versus EW portfolio



■ Source: Barra, Satrrix calculations. March 2019

On a rolling basis Figure 3 identifies specific periods where this strategy failed. These periods represented regular drawdowns emanating largely from exposure to outperforming factors which suddenly corrected sharply. A culprit of this regular underperformance was the Momentum factor. This factor is well-known for its vulnerability to inflection points, and as the strategy tilts towards (or away from) Momentum, the risk is high that the Momentum factor may quickly roll over (or recover sharply). An example is 2009, where the Momentum factor ranked first on the list for 12 month returns, but quickly became the worst performing factor amidst the market correction of the global financial crisis. We cannot attribute all the blame to Momentum's weakness here, as other strategies also suffered from overcrowding after periods of stellar performance. This overcrowding produces significant risk of performance roll-over, and we conclude that this is the major challenge to a Momentum factor timing strategy.

Valuation

The next approach we investigated was Valuation. The use of valuation has been the foundation of investing for decades, with practitioners applying innumerable valuation methodologies and approaches with varied success. At the heart of this approach is comparing market values to some fundamental anchor, and assessing whether this ratio reflects an instrument, or group of instruments that is expensive or cheap.



Table 3: Price to Book aggregates of factor portfolios (Jan 2002 to Dec 2018)

	BUCKET	AVERAGE PRICE TO BOOK	VALUATION GAP BETWEEN BEST AND WORST
Value	Cheap	0.85	2.88
	Expensive	3.73	
Quality	High quality	3.11	1.98
	Poor quality	1.13	
Low Vol	Low Vol	1.99	0.66
	High Vol	1.33	
Momentum	Strong Momentum	2.20	0.59
	Weak Momentum	1.60	
Growth	High Growth	2.06	0.42
	Low Growth	1.63	

■ Source: Bloomberg, Satrix calculations; March 2019

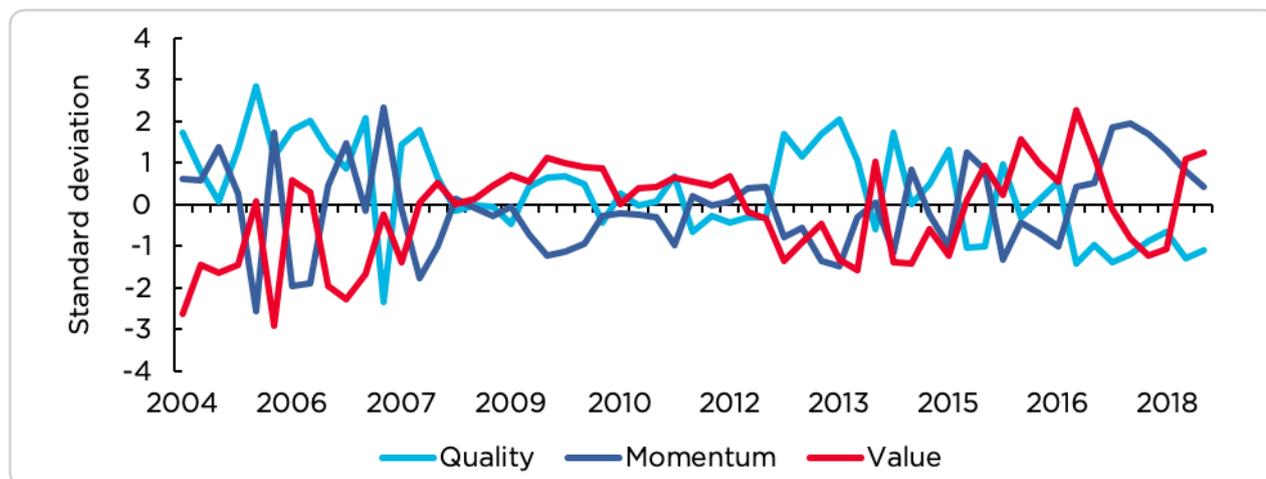
On reflection of the aggregate price to books⁶ across the factor portfolios we created since 2002, we see how the Value factor appropriately reflects an expensive and cheap sub-set of stocks with an average price to book of 3.73x and 0.85x respectively. This, of course, is largely by construction as the Value buckets were selected based on a composite of value-based metrics. Similarly the Quality factor shows high average price to books for the high quality bucket and low average price to books for the low quality bucket. We would argue this is intuitive as investors would typically attach a premium to stocks with strong quality metrics, as this often represents a market leader with high profitability and defensive characteristics. So too do we find expected valuation gaps between the best and worst buckets for Momentum, Low Volatility and Growth.

From a factor timing perspective, we will aim to overweight the factor which displays the most attractive value and underweight the factor which is displaying the most unappealing value. By consistently applying this rule through time, we hope to incrementally add value relative to an equally factor weighted portfolio. The dilemma we face however is that a comparison of absolute price to books across factor portfolios will not be successful, because the Value factor selected will be consistently overweight, given its low price to book on an absolute level. Quality will also always be positioned as underweight. To solve this challenge, we standardize the price to books relative to the five-year average price to book. To avoid hindsight bias, we used a growing window from three to five years at the start of the testing period, and thereafter a five- year rolling average. This provides a more comparable indicator to assess relative value between factors as a basis for changing allocations.

⁶ We utilised price to book as the measure for calculating the valuation for factor portfolios, as 1) price to book provided the best coverage of any valuation measure among our universe of stocks, 2) price to book represented a stable valuation ratio which was not influenced by market cycles, and 3) price to book offered the most intuitive aggregate factor valuation spreads.



Figure 4: Normalised Price to Books of Quality, Momentum and Value portfolios (Jan 2002 to Dec 2018)



Source: Satrix calculations. March 2019

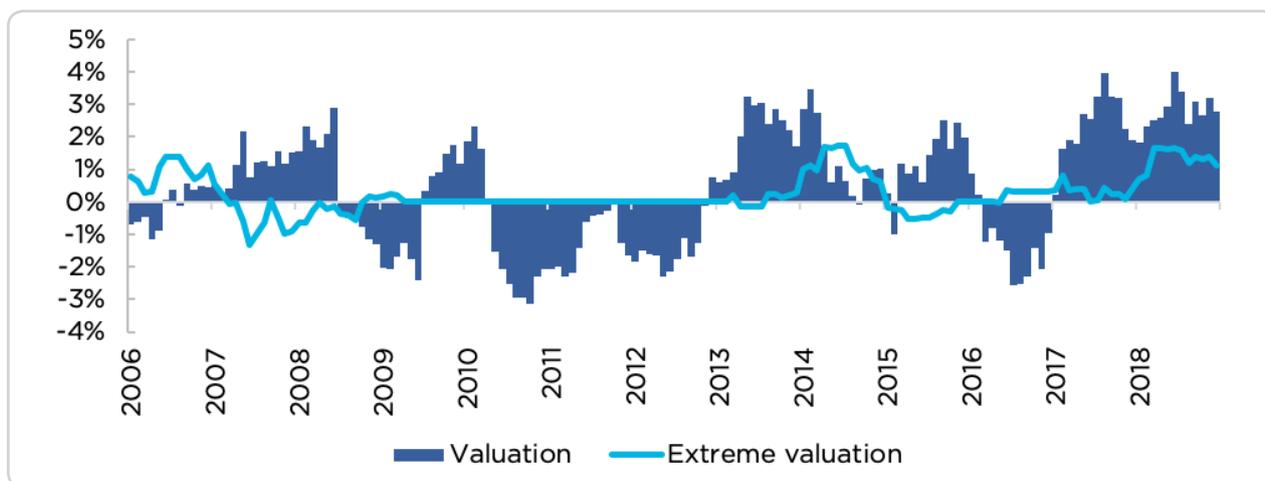
Our results show that this approach has no predictive power relative to an equally weighted factor portfolio; in fact it shows detracting marginal returns. Relative to the equally weighted factor portfolio, the valuation factor timing portfolio detracted 11bp on an annualised basis, with long periods of underperformance.

At face value this result seems surprising, as relative valuation has strong intuitive appeal. It is possible that the approach is potentially impacted by the frequency of taking positions based on valuation. Investment theory would suggest that stretched valuation can be a far stronger signal to a stock or factor's prospective returns. As Asness [2016] notes, in anything close to normal times, using value spreads to time factors is not particularly useful, and that the only thing of interest in these value spreads would be if and when we see things that are unprecedented in past experience.

Based on our suspicion that our frequency of taking positions based on valuation was too high, we decided to fix this approach by considering extreme valuations. In order to reflect an extreme valuation spread, we adjust our approach to only consider periods where the relative valuation of each factor is above or below 1.5 standard deviations. This ensures that we only allocate to factors when they appear to be extremely appealing, and not during periods where relative valuations are close as we see during the period from 2008 to 2012. During this period it is clear that one cannot with any high conviction believe that any factor is meaningfully different to any other from a valuation perspective.



Figure 5: 12m rolling relative returns of Valuation based portfolios versus EW portfolio



Source: Satrrix calculations, March 2019

The results are constructive, as we manage to extract around 25bp of positive excess returns – a meaningful improvement on our previous approach when indiscriminately allocating to cheaper factors. We also note that the tracking error of this strategy is fairly low (0.52%) which makes sense as significantly fewer factor timing tilts are taken.

Overlaying Value onto Momentum

We now turn our attention back to using Momentum as a factor timing signal. Our previous findings have shown that the Momentum factor timing signal possesses vulnerability at inflection points. In order to mitigate this vulnerability, we consider assessing whether valuation can assist us in picking up potential overcrowding positioning in factors. As an example, should Quality show consistent outperformance for an extended period and be held at an overweight position based on this trend, it is plausible to expect that Quality could become expensive, and thus vulnerable to a correction based on overcrowding. In order to mitigate this position we temper our overweight position to a neutral, as the Momentum and Valuation signal may now be offering conflicting signals. Similarly, when a factor shows weak trending characteristics, but simultaneously is offering valuation appeal, we would again neutralise this position so as not be exposed to a sharp rerating in the factor.

Figure 6: Illustrative positioning for combinations of Trend and Valuation of factor

		MOMENTUM		
		POSITIVE		WEAK
VALUATION	CHEAP	OW	N	N
		OW	N	UW
	EXPENSIVE	N	N	UW

■ Source: Satrix

The outcome of repeating our back-testing using a combination of Momentum and Valuation (as illustrated above) is positive. We are able to improve the Momentum based factor timing portfolio's information ratio from 0.24 to 0.3, effectively by only adjusting the combination of positive Momentum AND expensive valuation as well as Weak Momentum AND cheap valuation to neutral positioning. This result we believe reflects the power of the interaction between factor signals where certain vulnerabilities specific to a factor can be minimized by overlaying another factor signal and improving investment outcomes.

Employing Multi-factor timing

Previously in this study, we had been dynamically adjusting allocation to underlying single factor funds, essentially 'blending' factors on a sub-portfolio basis. This approach is often referred to as a top-down or blending approach, and is known to bring strong diversification benefits as it allocates weights to single factor strategies. As it happens, blending single factor portfolios has great value and application for clients who prioritise transparency of portfolio attribution and flexibility in allocating between factors by either timing factors or transitioning to new strategic allocations.

In contrast to this top-down approach, a multi-factor approach selects a sub-set of stocks that are favourably exposed to the weighted average of the targeted factors, resulting in a significantly higher exposure through time in one complete portfolio. Many studies have shown that a multi-factor approach improves transfer of information by finding stocks with reasonably positive exposures to multiple factors rather than stocks with very strong exposures that may simultaneously have very poor exposures to another factor. Another advantage using a multi-factor approach would be trading efficiencies. By not having to execute separately managed single factor portfolios, turnover is reduced by netting offsetting trades against each other.

Our aim in this section is to test whether we can improve our factor timing models by not dynamically applying the factor weightings to single factor portfolios, but rather by dynamically adjusting the weighted factor score to build one integrated factor portfolio.



Table 4: Performance of single versus multi-factor timing (Jan 2002 to Dec 2018)

		EQUALLY WEIGHT	TRENDING	VALUATION	TREND & VALUATION
Single factor	Ann. Return	16.30%	16.68%	16.19%	16.44%
	Excess return		0.38%	-0.11%	0.14%
	Tracking error		1.57%	1.45%	1.08%
	Information ratio		0.24	-0.08	0.13
Multi-factor	Ann. Return	16.49%	17.53%	17.71%	17.39%
	Excess return		1.04%	1.22%	0.90%
	Tracking error		2.93%	2.83%	2.41%
	Information ratio		0.36	0.43	0.37

■ Source: Bloomberg, Satrix calculations; March 2019

It is clear that by dynamically transferring the factor timing signal through the stocks instead of through the factor portfolio, we are able to generate improved outcomes, for both absolute and risk-adjusted returns. As a point of departure, the equally weighted multi-factor already provides additional returns relative to the equally weighted single factor approach, with comparative methodologies also improving on returns. A key observation here, and one that could be considered the reason for the enhanced returns, is how the multi-factor portfolios are more concentrated, resulting in higher tracking errors. This greater tracking error is clearly a function of a composite portfolio of stocks being selected as opposed to proportionate sleeves of each single factor. However, the higher returns compensate for the higher tracking error as information ratios improve as well.

Conclusion and investment implications

Our results show that factor timing using factor trending and factor valuation can enhance returns further relative to a simple static allocation towards factor portfolios. Furthermore, we have shown that applying factor timing in the multi-factor space resulted in higher outperformance and risk-adjusted performance relative to the single factor space.

These results are consistent with some of the studies that were done on the global universe.

It is important to note that no trading and market impact costs were taken into account in our research. It is therefore not clear whether the possible incremental return warrants the risk of underperformance relative to a static allocation towards factors.

While our approach does show that factor timing is possible and can add extra returns relative to static weighted factor portfolios, it is a lot less pronounced than factor investing itself, where the incremental return of a static weighted factor portfolio far exceeds that of the universe.

References:

- Ahmerkamp, J., Grant, J. and Kosowski, R. (2012). "Predictability in Carry and Momentum Strategies Across Asset Classes." SSRN Working Paper.
- Alighanbari, M. and C. Chia. (2014). "Multi-Factor Indexes Made Simple." MSCI Research Insight.
- Arnott, R. (1992). "Style Management: The Missing Element in Equity Portfolios." *Journal of Investing*.
- Arnott, R., Beck, N., Kalesnik, V., and West, J. (2016). "How Can "Smart Beta" Go Horribly Wrong?" *Fundamentals, Research Affiliates*.
- Asness, C., Friedman, J., Krail, R., and Liew, J. (2000). "Style Timing: Value versus Growth." *The Journal of Portfolio Management*.
- Asness, C., Frazzini, A., Israel, R., and Moskowitz, T. (2015). "Fact, Fiction and Value Investing," *AQR Capital Management*.
- Asness, C. (2015). "How Can a Strategy Still Work If Everyone Knows About It?" *AQR Capital Management*.
- Asness, Cliff S. (2016). "The Siren Song of Factor Timing". *Journal of Portfolio Management*.
- Asness, Cliff S. and Chandra, Swati and Ilmanen, Antti S. and Israel, Ronen. (2017). "Contrarian Factor Timing is Deceptively Difficult". *Journal of Portfolio Management*.
- Baker, M. and Wurgler, J. (2006), "Investor Sentiment and the Cross Section of Stock Returns". *The Journal of Finance*.
- Cohen, R., Polk, C., and Vuolteenaho, T. (2003). "The Value Spread." *The Journal of Finance*.
- Fan, S. (1995). "Equity Style Timing and Allocation." In R. Klein and J. Lederman, eds., *Equity Style Management*.
- Kao, D. and Shumaker, R. (1999). "Equity Style Timing." *Financial Analysts Journal*.
- Muijsson, C., Fishwick, E. and Satchell, S. (2014). "Taking the Art out of Smart Beta." Discussion paper.
- Tibbs, S., Eakins, Stanley and DeShurko, W. (2008). "Using Style Index Momentum to Generate Alpha". *Journal of Technical Analysis*.
- Winkelmann, K., Suryanarayanan, R., Hentschel, R., and Varga, K. (2013), "Macro Sensitive Portfolio Strategies: Macroeconomic Risk and Asset Cash Flows", *MSCI Market Insight*.
- Varsani, D and Vipul, J. (2018). "Adaptive Multi-Factor Allocation". *MSCI Research Insight*.

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