



Global Quantitative

Searching for Alpha: Overlaying Price Momentum and Short Interest to avoid drawdowns and improve returns

CITI'S TAKE

Price Momentum has recently suffered the worst performance drawdown since the GFC, and the fourth worst in the last 40+ years. By applying a simple double-screening process, we have found a better way to overlay Short Interest on Price Momentum to mitigate periodic drawdowns and achieve higher risk adjusted returns.

Both Price Momentum and Short Interest strategies have experienced frequent bouts of underperformance, often associated with crowded positioning, due to market regime shift and short squeeze. We explore different ways to combine the two strategies together to mitigate asymmetric downside risks.

With an intersection approach, we have found that stocks with High Short Interest and Low Momentum have consistently underperformed the market in both US and Europe. A strategy of long Low Short Interest & Low Momentum stocks and short High Short Interest & Low Momentum stocks has produced the best risk adjusted return in both regions.

The long/short strategy has outperformed both stand-alone Price Momentum and Short Interest strategies. This suggests that the so-called "following shorts" strategy should be implemented among low momentum stocks to avoid short squeezes.

Attribution analysis shows that the long/short strategy has a statistically significant 60+ bps monthly alpha, in addition to positive biases towards Value and Quality. It effectively captures the benefit of momentum reversal with less downside risk. We also provide a screen of current attractive stocks on the long side for US and Europe.

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Inherent Risk of Crash in Price Momentum and Short Interest

Price Momentum and Short Interest are two widely used investment factors, from an alpha and risk perspective. While Short Interest is considered a foremost risk and crowding indicator, Price Momentum can be an end indicator of crowding as consensus builds up. They are linked with similar behavioral finance explanations.

Performance and Risk of Price Momentum

Price Momentum is one of the most favorite stock selection factors, widely used by quants and hedge funds, as well as fundamental managers, particularly growth managers. Quantitative investors tend to focus on the 12-month or the first 11 of last 12 months price momentum factor, instead of shorter-term momentum measures, as they tend to show more persistence. Quant and many fundamental investors often think of Price Momentum as a complimentary diversifying factor to Value, partly to mitigate value traps. However, there is a continuing debate in both academia and the investment industry whether Price Momentum is a long-term risk premium or more of a tactical factor with a dynamic nature. Conceptually, many believe Momentum has a behavioral element that will inherently lead to crashes from time to time.

Figure 1. Price Momentum Performance in U.S. since 1978

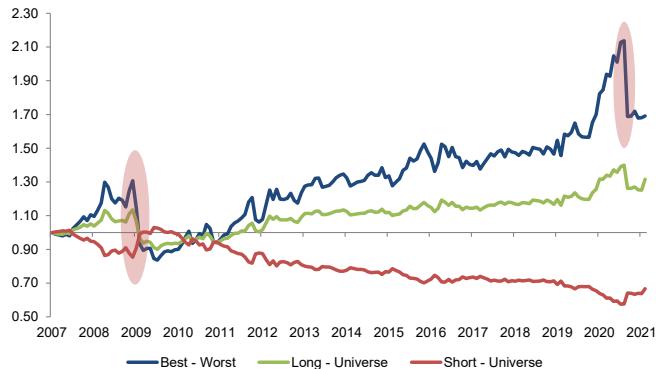


Source: Citi Research

The 43-year performance of the Price Momentum factor (First 11 of last 12 months) in Figure 1 shows the factor performed rather consistently well from 1978 to 1999. Since then, it has suffered multiple major drawdowns, with the most extreme case of more than 50% loss during the GFC period. The recent loss since late 2020 is the fourth worst in the last four decades. Even excluding the crash periods, its performance over the last 10 years has been sub-par, compared with the previous decades. We have largely attributed this to significantly increased macro risk in the Price Momentum (See [VIEWPOINT | US Quantitative Factor Profile: Increased Macro Risk for Price Momentum and Analyst Revisions](#) and [VIEWPOINT | Global Quantitative Insights: Risky Value vs. Quality Value](#)). Longer-term momentum is also closely linked to the crowded trade argument, which is of tremendous interest to a broad range of investors.

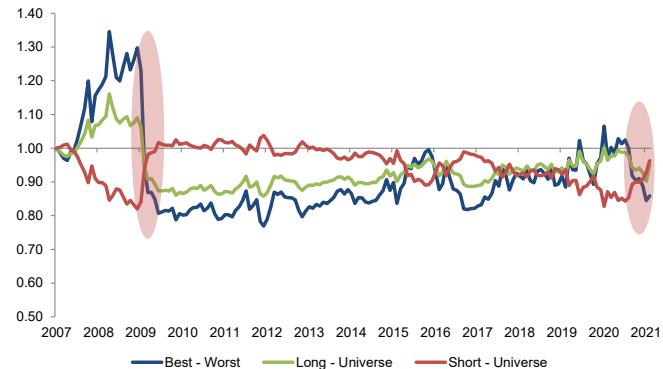
When analyzing the long and short sides (high and low Price Momentum, respectively) in US and Europe since 2007 (Figure 2 and Figure 3), they moved in opposite directions during the crash periods, amplifying the overall negative long-short performance. It rebounded more consistently in Europe after March of 2009 while the US performance has not even recovered half of the loss incurred around the GFC.

Figure 2. Europe - 12 Month Price Momentum Performance



Source: Citi Research, MSCI

Figure 3. US - 12 Month Momentum Performance



Source: Citi Research, MSCI

Performance and Risk of Short Interest

Short interest is often considered as a key indicator for a crowded trade. Our research on crowding, which uses Short Interest as a key input variable (see [VIEWPOINT | Measuring the Crowded Trade in Global Equities](#)), finds that Short Interest is a valuable risk indicator. Numerous academic researches and our previous work (See [Searching for Alpha: Factoring Short Interest: Measuring and Profiting from Information in Shorts](#)) suggest that investors often follow the crowd as shorts are seen as being instigated by the “smart money”. However, simply following short strategies may suffer from short squeezes from time to time as market dynamics change (see Figure 4 and Figure 5), somewhat similar to the risk encountered with Price Momentum strategies.

Figure 4. Europe - Short Interest Performance



Source: Citi Research

Figure 5. US - Short Interest Performance



Source: Citi Research

Short Interest Measures

The commonly used forms of Short Interest are shares available to lend, scaled by either shares outstanding (standard Short Interest measure) or trading volume (Days to Cover). We also look at the free-float adjustment (shares outstanding excluding holdings by insiders, strategic corporate owners and restrictions imposed

by government regulations) and utilization rate. The primary source of our Short Interest data is from Markit, where they survey major prime brokerage firms for the shares available to lend. In the US market, stock exchanges also release market aggregated short information, most commonly in the forms of Days to Cover or adjusted by shares outstanding. They are available twice a month, with a 10-day delay.

As shown in Figure 6, the cross-sectional rankings across these measures appear to be highly correlated over time. Even the rank correlation between Markit Short Interest and US exchange Short Interest is well above 70% over the last 14 years. For this study, we will focus on the Markit Short Interest measure adjusted for free-float with data available starting from 2007, and the US exchange released Short Interest data adjusted by shares outstanding with data available from 1995. The analysis using the US exchange released Short Interest data is based on the Russell 1000 universe of stocks while the Markit Short Interest related analysis is for the relevant MSCI standard index universe of stocks.

We wrote on Short Interest in June 2020, although we noted deteriorating performance in vanilla short interest strategies; we highlighted how the signal on its own merits further studies. (See [Searching for Alpha: Factoring Short Interest: Measuring and Profiting from Information in Shorts](#))

Figure 6. Cross-sectional Correlation between Free-Float Adjusted SI and other SI Measures



Source: Citi Research

Interaction between Short Interest and Momentum

Even though Short Interest and Price Momentum are closely linked, the rankings between Price Momentum and Short Interest (Markit data) are not highly correlated over time (Figure 7). The performance attribution analysis in Figure 8 shows that Short Interest has sizable additional alpha even after adjusting for market, size, style and momentum exposures.

Figure 7. Cross-sectional Correlation of Short Interest and Price Momentum Rankings



Source: Citi Research, Markit.

Figure 8. Return Attribution of Short Interest Strategies (Europe)

	Alpha	Market	Value	Large	Momentum
Short Interest	0.28% *	-0.063 ***	0.078	0.171 **	0.254 ***
Free Float Adjusted Short Interest	0.60% ***	-0.093 ***	0.013	0.151 **	0.313 ***
Days To Cover	0.66% ***	-0.014	0.168 ***	0.001	0.219 ***

Source: Citi Research, Markit.

Superscripts ***, **, and * refer to the 1%, 5%, and 10% levels of statistical significance, respectively.

In the following section, we explore ways to combine the two in order to mitigate the downside risks and improve overall risk-adjusted returns as stock selection strategies.

Overlaying Price Momentum with Short Interest

In our previous researches (See [What Works in Equity Markets: Single Factor or Multi-Factor Investing](#)), we have found that often it is helpful to adopt a double sorting or intersection approach to overlay factors instead of linear combination, especially when handling the tails of stock distributions and periods with high performance volatility. This approach is akin to the sequential screen process used by many fundamental investors.

Long-Only Strategy Performance

When we overlay 12-month Price Momentum with the US exchange released Short Interest data since 2007, it is interesting to note that stocks with Low Short Interest and Low Price Momentum tend to outperform the other cohorts over the last 15 years (Figure 9). When adjusted for volatility, the information ratio (IR) of the High Short Interest and Low Price Momentum intersection is significantly lower than the other combinations (Figure 10).

The low IR for high SI & low PMom combination is understandable as high SI stocks tend to be more volatile and low PMom stocks are also likely to underperform over the long-run. However, the significant outperformance of the low SI and low PMom combination is somewhat surprising as past studies tend to show that high 12-month PMom stocks are more likely to continue to outperform over the long-run. This suggests an interesting dynamic between Short Interest and Price Momentum.

Figure 9. Average Return of SI vs. Price Momentum (US, since 2007)

		Short Interest (SI)			
		Low	Mid	High	All
Price Mom (PMom)	Low	17.4%	14.0%	11.2%	13.5%
	Mid	12.6%	13.7%	10.2%	12.3%
	High	11.4%	10.2%	12.5%	11.3%
	All	13.0%	12.8%	11.4%	

Source: Citi Research

Figure 10. Information Ratio of SI vs. Price Momentum (US, since 2007)

		Short Interest (SI)			
		Low	Mid	High	All
Price Mom (PMom)	Low	0.71	0.56	0.37	0.50
	Mid	0.78	0.76	0.51	0.70
	High	0.73	0.58	0.61	0.65
	All	0.78	0.66	0.48	

Source: Citi Research

When the full Short Interest data set from 1995 is considered, the return pattern remains largely similar (Figure 11), with a noticeably better performance for the low SI & high PMom stocks prior to 2008 (Figure 15). The low SI and low PMom stocks appear to recover quickly after major market crashes, such as the GFC and the post tech bubble. However, this results in higher volatility. Overall, the low SI and high PMom stocks actually delivered the best risk adjusted return over the last 26 years. This is largely consistent with our previous research demonstrating the significantly increased influence from macro-economic risk exposures in Price Momentum (See [VIEWPOINT | US Quantitative Factor Profile: Increased Macro Risk for Price Momentum and Analyst Revisions](#)).

On other hand, the faster recovery after crashes in low SI and low PMom stocks appears to synchronize more closely with the recovery in the high SI and low PMom stocks during the same periods, suggesting that they may work better together as a long/short strategy.

Figure 11. Average Return of SI vs. Price Momentum (US, since 1995)

		Short Interest (SI)			
		Low	Mid	High	ALL
Price Mom (PMom)	Low	16.8%	13.3%	8.1%	12.1%
	Mid	14.1%	13.4%	10.4%	12.9%
	High	15.3%	14.2%	14.3%	14.6%
	ALL	14.9%	13.8%	10.9%	

Source: Citi Research

Figure 12. I.R. of SI vs. Price Momentum (US, since 1995)

		Short Interest (SI)			
		Low	Mid	High	ALL
Price Mom (PMom)	Low	0.75	0.54	0.27	0.46
	Mid	0.97	0.82	0.54	0.80
	High	1.05	0.82	0.69	0.85
	ALL	0.99	0.77	0.46	

Source: Citi Research

Figure 13. Turnover of SI vs. Price Momentum (US, since 1995)

		Short Interest (SI)		
		Low	Mid	High
Price Mom (PMom)	Low	416%	456%	373%
	Mid	439%	577%	444%
	High	275%	574%	340%
	ALL			

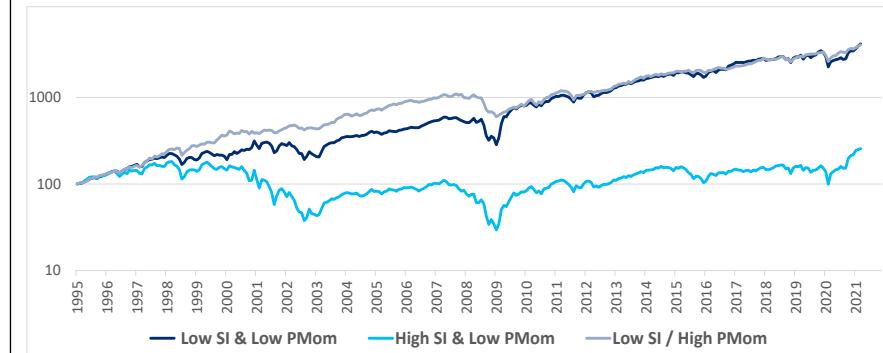
Source: Citi Research

Figure 14. # of Stocks of SI vs. Price Momentum (US, since 1995)

		Short Interest (SI)		
		Low	Mid	High
Price Mom (PMom)	Low	84	104	136
	Mid	129	110	85
	High	110	109	104
	ALL			

Source: Citi Research

Figure 15. Performance of Short Interest & Price Momentum Intersections

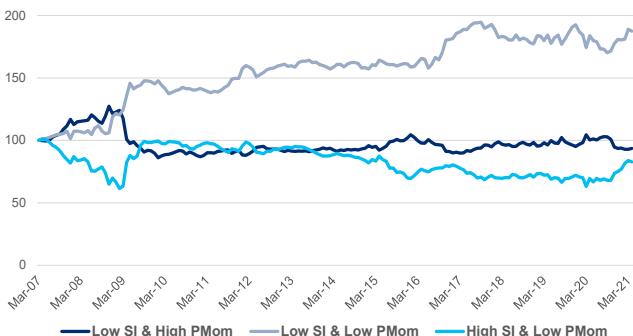


Source: Citi Research

When focusing on the Short Interest data from Markit, Figure 16 and Figure 17 show Low SI & Low PMom stocks significantly outperformed other combinations in the US, which is consistent with the results above using the Short Interest data from US exchanges. However, in Europe, the Low SI & High PMom stocks ultimately outperformed other combinations, which is more similar to the US results prior to 2007.

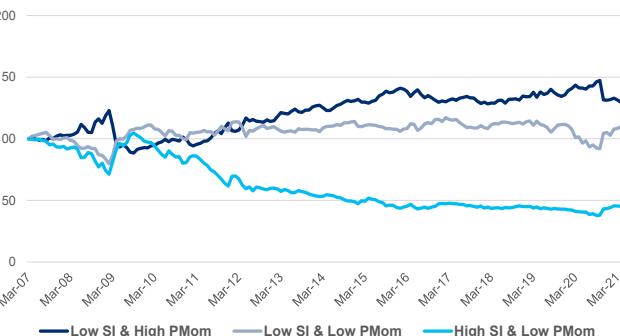
Interestingly in both regions, Low SI & High PMom stocks underperformed significantly during the few months after March of 2009 while both High SI & Low PMom and Low SI & Low PMom stocks rebounded strongly, suggesting again that Low SI & Low PMom and High SI & Low PMom may work together in a combined long / short strategy.

Figure 16. Performance of Short Interest & Price Momentum Intersections (US, Excess Returns)



Source: Citi Research, Markit

Figure 17. Performance of Short Interest & Price Momentum Intersections (Europe, Excess Returns)



Source: Citi Research, Markit

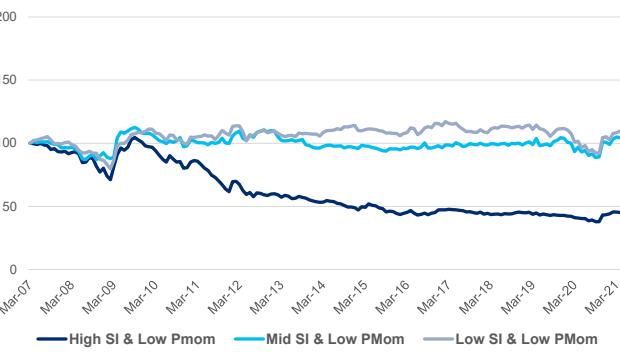
Figure 18 and Figure 19 show the performance of overlaying low Price Momentum on all three Short Interest tertiles. Consistent with the results based on the US exchange Short Interest data, within low Price Momentum stocks, low SI stocks have fairly consistently outperformed high SI stocks in both US and Europe. This suggests that the “following shorts” strategy may work better in low Price Momentum stocks.

Figure 18. US – Short Interest Tertiles & Low Momentum Long Only Performance (US, Excess Returns)



Source: Citi Research, Markit.

Figure 19. Short Interest Tertiles & Low Momentum Long Only Performance (Europe, Excess Returns)



Source: Citi Research, Markit.

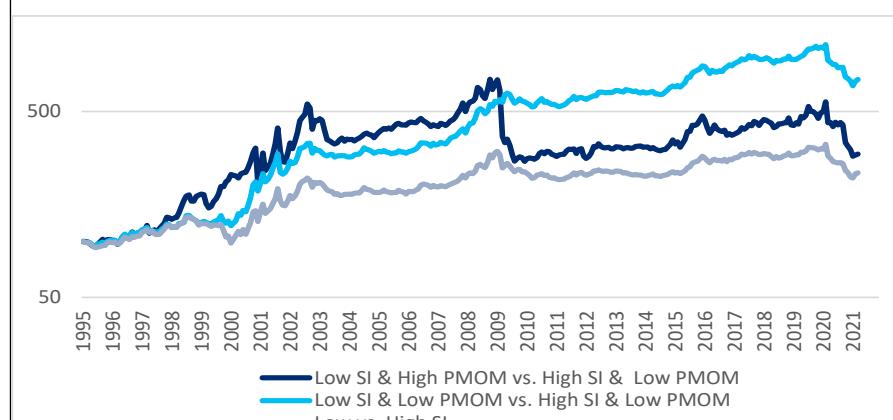
Long/Short Strategy Performance

With the intersection approach discussed in the previous section, it is more flexible and interesting to explore ways to construct long/short strategies. Even with other Price Momentum measures of past 1 month, 3 month and 6 month periods, it appears the High SI & Low PMom stocks have consistently delivered the worst performance and lowest risk-adjusted returns in both US and Europe.

In studying combining long and short sides together, in addition to analyzing the spread of long vs. short returns, we would like to identify the long/short pairs that result in high risk-adjusted returns. The performance difference between the “Low SI & High PMom vs. High SI & Low PMom” strategy and the “Low SI & Low PMom vs. High SI & Low PMom” strategy (Figure 20) clearly shows that the faster recovery of low PMom stocks after major crashes result in better overall performance of the long Low SI & Low PMOM and short High SI & Low PMOM strategy. This implies the “Low SI & Low PMom vs. High SI & Low PMom” strategy may be effectively similar to a momentum reversal strategy.

In addition, when compared with the simple “following shorts” strategy (long low SI stocks and short high SI stocks), the long Low SI & Low PMOM and short High SI & Low PMOM strategy has consistently outperformed the SI only long/short strategy (Figure 21) with more than twice the return and similar volatility. This suggests that the “following shorts” strategy can be more effectively implemented among low Price Momentum stocks. This is understandable as low momentum stocks are likely to suffer less in those short squeeze periods, which is the biggest risk for Short Interest related strategies.

Figure 20. Performance of US Long/Short Price Momentum & Short Interest Intersections



Source: Citi Research

Figure 21. Performance Summary of US Long/Short Price Momentum & Short Interest Intersections

	Low SI & High PMOM vs High SI & Low PMOM	Low SI & Low PMOM vs High SI & Low PMOM	Low SI vs High SI
Annualised Return	7.2%	8.6%	4.0%
Annualised Volatility	23.5%	13.6%	12.3%
Information Ratio	0.31	0.64	0.33

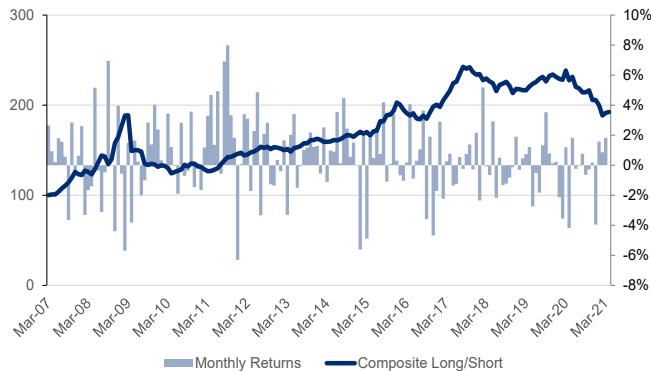
Source: Citi Research

In Figure 22 to Figure 24, we demonstrate that long Low SI & Low Mom and short High SI & Low Mom has delivered the best risk adjusted return since 2007 in both US and Europe, using the Markit Short Interest data. It is clear that using Low SI & High PMom stocks as the long side increases the volatility and drawdown significantly while reducing the returns. Figure 23 and Figure 24 show the historical performance of the “Low SI & Low Mom vs. High SI & Low Mom” strategy in US and Europe, respectively.

	Figure 22. Long/Short SI & Mom Performance Summary			
	US		Europe	
	Low SI & High PMom vs High SI & Low PMom	Low SI & Low PMom vs High SI & Low PMom	Low SI & High PMom vs High SI & Low PMom	Low SI & Low PMom vs High SI & Low PMom
Annualised Return	-2.1%	4.8%	5.2%	5.8%
Annualised Volatility	21.0%	10.9%	19.8%	8.5%
Information Ratio	-0.11	0.44	0.26	0.68
Hit Rate	55%	57%	60%	60%
Max Drawdown	64%	34%	55%	11%
Turnover (Long)	384%	456%	372%	432%
Turnover (Short)	283%	283%	312%	312%

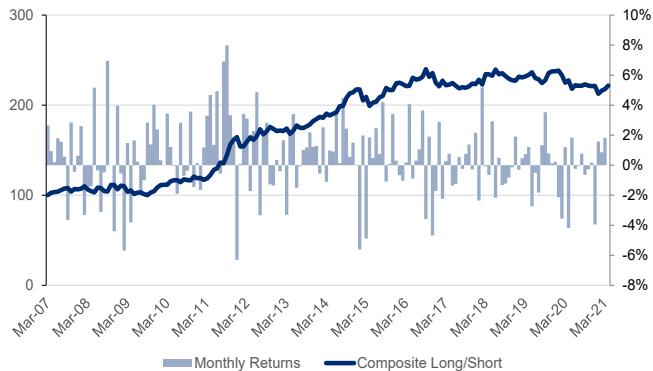
Source: Citi Research, Markit

Figure 23. US – Low SI & Low PMom vs. High SI & Low PMom Performance



Source: Citi Research, Markit

Figure 24. Europe – Low SI & Low PMom vs. High SI & Low PMom Performance



Source: Citi Research, Markit

Attribution of the Short Interest and Momentum Overlaying Strategies

In this section, we provide attribution analysis on the “Low SI & Low PMom vs. High SI & Low PMom” strategy to shed more light on their characteristics and factor risk exposures, in order to better understand the strength and weakness of the strategy. The analysis here focuses on the long / short strategy based on the US exchange released Short Interest data as it has a longer history back to 1995, except where it is clearly labeled as using Markit Short Interest data.

Characteristics of the Long / Short Strategies

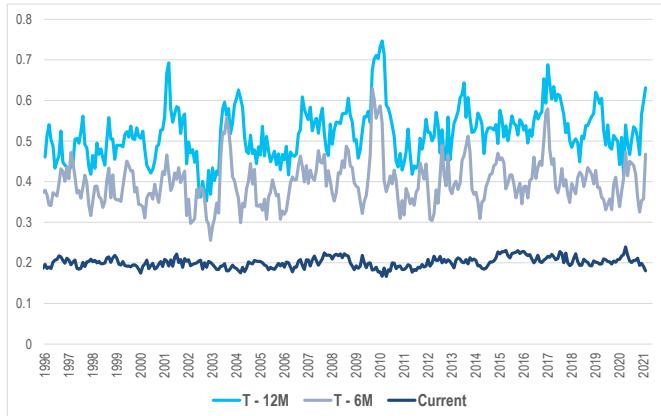
First, we analyze the momentum and short interest characteristics of both long and short sides with the focus on how they have changed over the previous 12 months. The idea is to see if these low SI & low PMom stocks are the ones that underperformed and the shorts have capitulated. They may be ripe for a rebound.

Figure 25 shows the 12-month momentum rankings of the Low SI & Low Price Momentum (long side) stocks with momentum measured at three different time points (12 months ago, 6 months ago and current), while similar data for the short side (High SI & Low PMom stocks) is in Figure 26. Clearly, stocks on both long and short sides are the ones that used to have much higher momentum, but deteriorated over time. More interestingly, the momentum ranking tends to be higher for the long side than the short side, particularly since 2007, for all three time points (Figure 27). Especially for the current momentum rankings (Figure 28), the long side is consistently higher than the short side, suggesting that the long side stocks may have bottomed out as the shorts have capitulated already while the short side continues to have low momentum as their short interest stays high.

This is confirmed (Figure 29) as the long side stocks used to have much higher short interest 12 months ago, but have gradually decreased over time. In contrast, the short side stocks used to have higher than average short interest to start with 12 months ago, and their short interests actually increased over time (Figure 30). This is consistent with the conventional wisdom of the “following shorts” strategy. In this case, the long side stocks are more likely to rebound as the market environment improves after major crashes. This suggests that the “Low SI & Low PMom vs. High SI & Low PMom” strategy is effectively a long-term momentum reversal strategy.

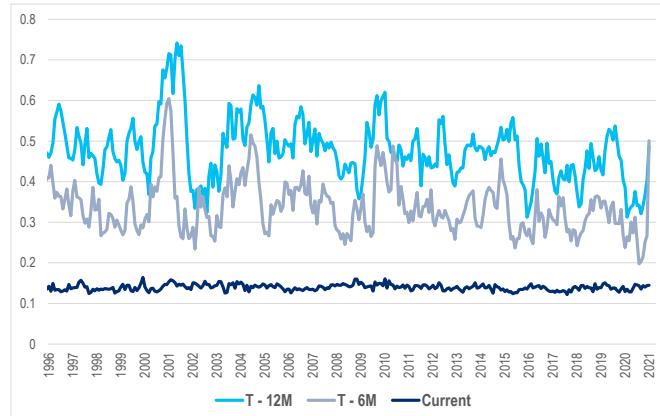
Interestingly, the long side tends to be somewhat cheaper than the short side, especially around the crisis periods (Figure 31 and Figure 32). Overall, the valuation spreads are not significantly different most of time, suggesting this strategy may be different from the traditional value strategies.

Figure 25. 12M Momentum Characteristics of Long side (Low SI & Low PMom)



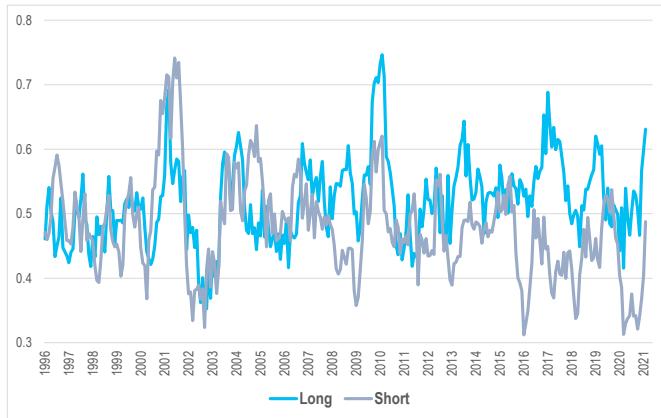
Source: Citi Research

Figure 26. 12M Momentum Characteristics of Short Side (High SI & Low PMom)



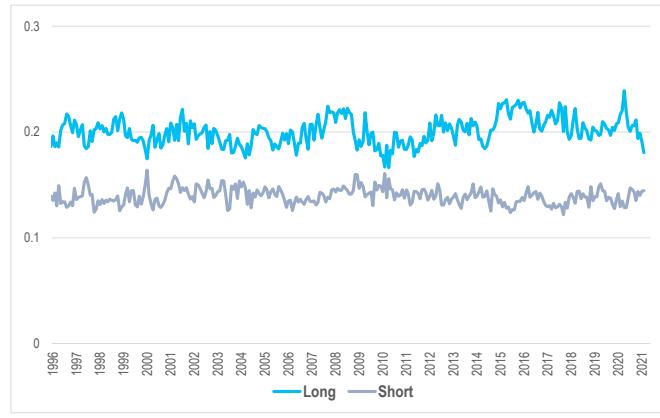
Source: Citi Research

Figure 27. 12M Lagged Momentum Characteristics of Long vs Short



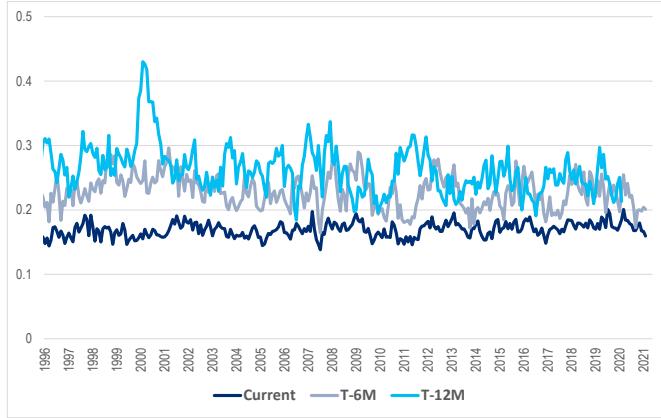
Source: Citi Research

Figure 28. Current Momentum Characteristics of Long vs Short



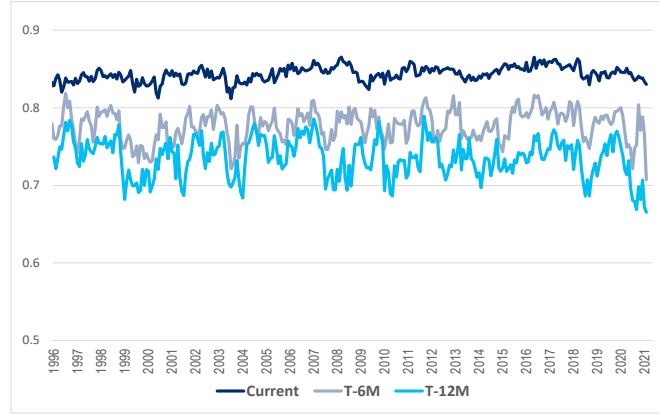
Source: Citi Research

Figure 29. Short Interest Characteristics of Long Side



Source: Citi Research

Figure 30. Short Interest Characteristics of Short Side



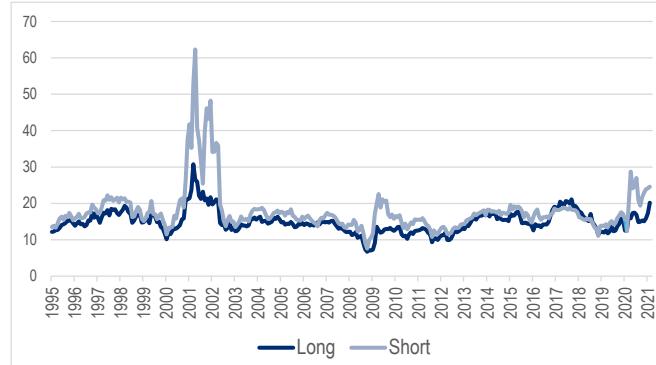
Source: Citi Research

Figure 31. P/B Ratio of Long and Short Sides



Source: Citi Research

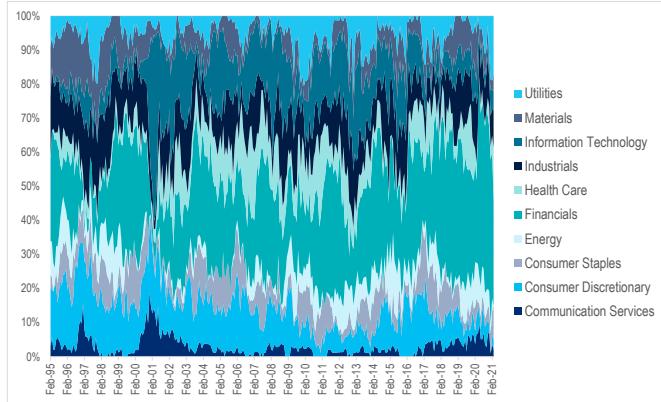
Figure 32. FY1 P/E Ratio of Long and Short Sides



Source: Citi Research

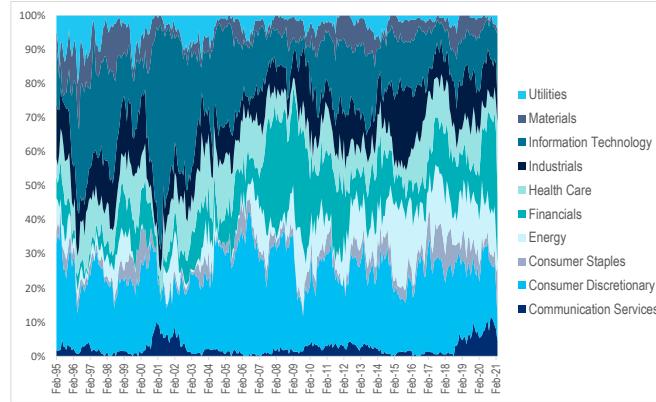
The sector distribution of the long side (Figure 33) shows that it tends to overweight Financials, particularly in recent years while the Technology weight has decreased. On other hand, the short side (Figure 34) has more stocks from the Consumer Discretionary sector over time. The concentration of Technology stocks has decreased significantly in the last few years. They are somewhat consistent with the valuation analysis above.

Figure 33. Sector Distribution of Long Side



Source: Citi Research

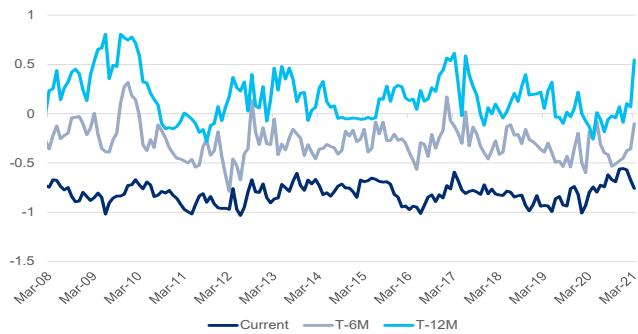
Figure 34. Sector Distribution of Short Side



Source: Citi Research

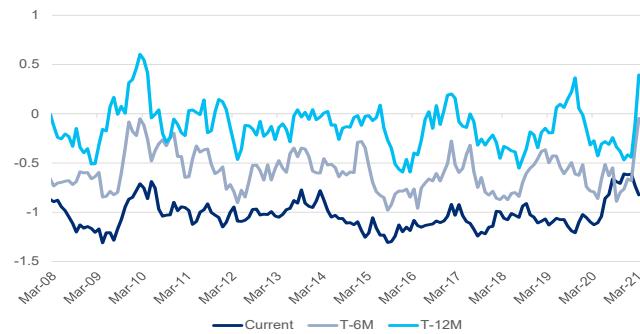
In Figure 35 to Figure 38, we show the similar momentum characteristics analysis of the long/short strategy based on the Short Interest data from Markit, which covers both US and Europe since 2007. Consistent with the previous result based on the US exchange Short Interest data, stocks from both long and short sides had higher momentum z-scores 12 months prior, and their momentum deteriorated over time. In general, the long side has higher momentum scores than the short side in both regions.

Figure 35. US – Historical Momentum Z-Scores of Long Side



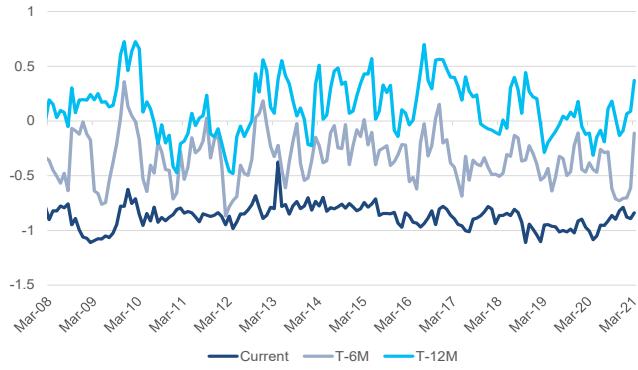
Source: Citi Research, Markit

Figure 36. US – Historical Momentum Z-Scores of Short Side



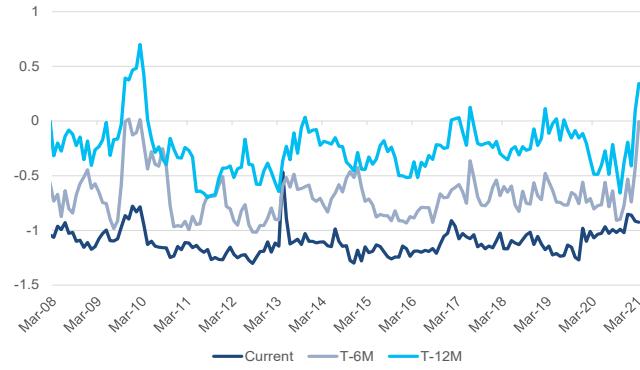
Source: Citi Research, Markit

Figure 37. Europe – Historical Momentum Z-Scores of Long Side



Source: Citi Research, Markit

Figure 38. Europe – Historical Momentum Z-Scores of Short Side



Source: Citi Research, Markit

Performance Attribution of the Long/Short Strategies

The following Fama-French risk premium performance attribution analysis shows that these long/short strategies based on both Short Interest data have most consistent and significant exposures to Value and Quality. This is in-line with the embedded sector biases in the strategies shown before. Both US results are very similar, while there are some minor differences across US and Europe.

Interestingly, their alphas are all statistically significant with a similar scale (60+ bps return per month), and it has virtually no Price Momentum exposure in US. This is understandable as the Price Momentum performance has been markedly weaker in US than in Europe since 2007. These results are consistent with the explanation that these Long/Short SI & Price Momentum intersection strategies are capturing the long-term momentum reversal benefit.

Figure 39. Factor Performance Attribution of Long/Short Strategies

	Alpha	Beta / Risk Exposures						
		Market	Value	Size	Growth	Quality	Low Risk	Price Mom
Exchange US (since 1995)	0.65% ***	-0.114 **	0.224 ***	0.156 **	-0.081	0.427 ***	0.031	0.050
Markit US (Since 2007)	0.67% ***	-0.060	0.307 ***	0.457 ***	0.338 ***	0.214 *	-0.177 *	0.017
Markit Europe (Since 2007)	0.62% ***	-0.042	0.367 ***	0.004	-0.034	0.223 ***	0.054	0.225 ***

Superscripts ***, **, and * refer to the 1%, 5%, and 10% levels of statistical significance, respectively.

Source: Citi Research, Markit

Conclusions

Both Price Momentum and Short Interest have recently suffered the worst performance drawdowns since the GFC over ten years ago. This highlights the inherent risk of periodic pullbacks of these strategies. We want to explore new ways to combine the two together to mitigate downside risk and improve returns.

In this study, we have adopted an intersection approach to analyze the interaction between the two factors. Consistent with previous studies, stocks with high Short Interest and Low Price Momentum consistently underperform other cohorts over time. More interestingly and contrary to conventional wisdom, stocks with low Short Interest and low Momentum have outperformed the market since 2007 in the U.S., while low Short Interest and high Momentum stocks have edged out the low Short Interest and low Momentum stocks slightly in Europe. However, as a long/short strategy, long low Short Interest and low Momentum stocks while short low Short Interest and high Momentum stocks has produced the best risk-adjusted return since 1995 in the US and since 2007 in Europe.

Characteristics and performance attribution analysis show that this long/short strategy captures the benefit of reversal of the low Short Interest and low Momentum stocks after the capitulation of the shorts. In particular, it mitigated the significant drawdowns incurred in Price Momentum and Short Interest strategies during the periods of so-called “junk rallies” in early 2000’s and after March of 2009. Interestingly it carries a bias towards Value and Quality, with minimal momentum exposure. More importantly, the long/short strategy has delivered 8% of annualized return after adjusting for traditional factor risk exposures in the US since 1995 and in Europe since 2007.

Below we provide a current screen of low Short Interest and low Momentum stocks with our fundamental analyst Buy rating for US (Figure 40) and Europe (Figure 41).

Figure 40. Attractive US Low SI & Low Mom Stocks with Citi Fundamental Buy Rating

RIC	Company	GICS Sector	Mkt Cap (USDm)	Price USD (16-Jun-21)	Citi Rating
AZO.N	AUTOZONE INC COM	Consumer Discretionary	29,957	1390.47	1
WMT.N	WALMART INC COM	Consumer Staples	384,314	137.15	1
PEP.OQ	PEPSICO INC COM	Consumer Staples	203,238	147.10	1
MDLZ.OQ	MONDELEZ INTL INC CL A	Consumer Staples	88,132	62.74	1
AMT.N	AMERICAN TOWER CORP NEW COM	Financials	121,190	266.53	1
ICE.N	INTERCONTINENTAL EXCHANGE IN COM	Financials	64,065	113.84	1
SBAC.OQ	SBA COMMUNICATIONS CORP NEW CL A	Financials	34,694	317.29	1
JNJ.N	JOHNSON & JOHNSON COM	Health Care	433,009	164.43	1
ABBV.N	ABBVIE INC COM	Health Care	204,052	115.53	1
ABT.N	ABBOTT LABS COM	Health Care	195,557	110.06	1
MRK.N	MERCK & CO INC COM	Health Care	193,981	76.61	1
BMY.N	BRISTOL-MYERS SQUIBB CO COM	Health Care	149,494	66.92	1
GILD.OQ	GILEAD SCIENCES INC COM	Health Care	84,444	67.33	1
BSX.N	BOSTON SCIENTIFIC CORP COM	Health Care	60,787	42.78	1
HUM.N	HUMANA INC COM	Health Care	55,234	428.12	1
VRTX.OQ	VERTEX PHARMACEUTICALS INC COM	Health Care	48,535	187.49	1
CNC.N	CENTENE CORP DEL COM	Health Care	42,318	72.62	1
BAX.N	BAXTER INTL INC COM	Health Care	41,118	81.77	1
HOLX.OQ	HOLOGIC INC COM	Health Care	15,858	61.89	1
PCAR.OQ	PACCAR INC COM	Industrials	31,716	91.36	1
MA.N	MASTERCARD INCORPORATED CL A	Information Technology	357,601	363.82	1
FIS.N	FIDELITY NATL INFORMATION SVCS COM	Information Technology	89,559	144.42	1
SSNC.OQ	SS&C TECHNOLOGIES HLDGS INC COM	Information Technology	18,682	73.04	1
EIX.N	EDISON INTL COM	Utilities	21,924	57.78	1

Source: Citi Research

Figure 41. Attractive European Low SI & Low Mom Stocks with Citi Fundamental Buy Rating

RIC	Company	GICS Sector	Mkt Cap (USDm)	Price USD (16-Jun-21)	Citi Rating
ULVR.L	UNILEVER PLC ORD GBP0.031111	Consumer Staples	160,409	61.31	1
BATS.L	BRIT AMER TOBACCO ORD GBP0.25	Consumer Staples	91,423	39.84	1
RKT.L	RECKITT BENCK GRP ORD GBP0.10	Consumer Staples	66,673	93.42	1
SHBa.ST	SVENSKA HANDELSBKN SER'A'NPV	Financials	21,968	11.30	1
LEGn.DE	LEG IMMOBILIEN SE NPV	Financials	10,677	148.09	1
PHG.AS	KONINKLIJKE PHILIP EURO0.20	Health Care	49,669	54.14	1
GMAB.CO	GENMAB AS DKK1	Health Care	29,054	442.76	1
UCB.BR	UCB NPV	Health Care	20,159	103.64	1
HIK.L	HIKMA PHARMACEUTIC ORD GBP0.10	Health Care	8,200	35.43	1
REL.L	RELX PLC GBP0.1444	Industrials	53,006	27.42	1
EXPN.L	EXPERIAN ORD USD0.10	Industrials	36,090	39.07	1
RTO.L	RENTOKIL INITIAL ORD GBP0.01	Industrials	13,067	7.03	1
FOUG.PA	EIFFAGE EUR4	Industrials	11,100	110.60	1
WLN.PA	WORLDSLNE EUR0.68	Information Technology	27,370	97.74	1
SGE.L	SAGE GROUP GBP0.01051948	Information Technology	10,269	9.60	1
NG.L	NATIONAL GRID ORD GBP0.12431289	Utilities	46,703	13.14	1

Source: Citi Research

Previously Published Research

Figure 42. Research Reports (since 2009)

Report	Date Published
Searching for Alpha: Pairs Trading – Applying Machine Learning to Pairs Trading	29-Mar-21
Regime Modelling using Futures Positioning: Futures vs. Cash – A Distinct but Meaningful Relationship	09-Mar-21
ESG Insights: The ESG 'Premium' – How does ESG compare to other Factors?	18-Feb-21
Searching for Alpha: Asia Earnings Surprise – Predicting Asia Earnings Surprises	01-Feb-21
ESG Insights: Where Machines do it Better – Inferred ESG Ratings Data	14-Jan-21
Searching for Alpha: China A Alpha – Smoothing Price Momentum	30-Oct-20
Under the Microscope: Overlapping Momentum	16-Oct-20
Equity Markets Positioning Model – Introducing the EMP	14-Sep-20
Searching for Alpha: Combining ESG and Risk Premia – A Double Screen Approach	11-Sep-20
Searching for Alpha: Factoring Short Interest – Measuring and Profiting from Information in Shorts	08-Sep-20
Searching for Alpha: Machine Learning – Attributing Higher-Order Interactions: SHAP Value as Factor Selection Criterion	28-May-20
Searching for Alpha: Machine Learning – Leveraging Return Forecasts	28-Feb-20
Searching for Alpha: China A Alpha - Sector-relative Value Is Powerful, Choose Sector Mappings Wisely	21-Feb-20
Searching for Alpha: Machine Learning – Beyond Random Forests for Stock Selection	03-Oct-19
Searching for Alpha: Earnings Surprise: Managing Expectations	23-Sep-19
Searching for Alpha: Machine Learning – Interpreting Machine Learning Predictions	05-Mar-19
Searching for Alpha: GAAP vs. Non-GAAP - Which Earnings does the Market Price?	07-Feb-19
Searching for Alpha: Style Crowding in Asia - Getting Ahead of the Crowd	21-Nov-18
Searching for Alpha: Earnings Surprise – Using Machine Learning to Forecast Earnings Surprises & Returns	17-Sep-18
Searching for Alpha: The ESG Edge – A Step Forward	13-Sep-18
Searching for Alpha: Machine Learning – Interacting Machine Learning and Factors	03-Sep-18
Measuring the Crowded Trade: Introduction to our Crowding Composite for Individual Stocks	03-May-18
Searching for Alpha: Profiting from Capex – Look to Capex Announcements	14-Mar-18
Searching for Alpha: Tactical Style Rotation – Using Risk and Return to Manage Style Exposure	07-Sep-17
Searching for Alpha: Big Data – Navigating New Alternative Datasets	10-Mar-17
Searching for Alpha: Betting Against Accurate Beta	13-Feb-17
Searching for Alpha: Competitive Advantage – Survival of the Fittest	19-Sep-16
Searching for Alpha: Financial Strength Redux	09-Sep-16
Searching for Alpha: Dynamic Style Weighting – Risk-Based Equity Style Allocation	14-Apr-16
No Shorts Please: Long-Only Pure Style Portfolios	04-Mar-16
Industry Alpha insights: Banks – One Size Does Not Fit All	18-Feb-16
Under the Microscope: Stock Momentum Conflation	21-Sep-15
Searching for Alpha: Macro Moves Markets	15-Sep-15
Searching for Alpha: Style Performance, Trading Volumes and Investor Agreement	23-Mar-15
World Radar Screen: Refining Our Global Search for Alpha	13-Mar-15
Searching for Alpha: Networking with Analysts: Modelling Analyst Forecast Dependence	18-Feb-15
The Rise of Low Risk Investing: Is it Getting Crowded Out There	01-Oct-14
Under the Microscope: Five Innovations in Momentum Investing	27-Mar-14
Searching for Alpha: Timing Price Momentum	07-Mar-14
Equity Risk Premia Investing: A New Methodology For Monitoring Style Performance	27-Nov-13
Stock Market Country Selection: Changes to a Well Established Model	23-Jul-13
Searching for Alpha: Digging for Dividends – QUARI Quality with A Reliable Income	02-Jul-13
Global Theme Machine: An Objective Way of Identifying Attractive Investment Themes	24-Jun-13
Searching for Alpha: Purifying Analyst Recommendations – Removing Beta to get to the Alpha	25-Mar-13
Searching for Alpha: Tangible Benefits of Intangibles – Brand, Respect & Intellectual Capital	06-Nov-12
Low-Risk Portfolio Strategies: Sharpe Ratio Maximisation and Multi-Asset Applications	09-Mar-12
Macro Risk and Style Rotation: A Guide Rather than a Prescription	28-Feb-12
Searching for Alpha: Accruals Volatility – A New Approach to Quality Investing	14-Sep-11
Industry Alpha Insights: Four Approaches to Tactical Industry Selection	24-Aug-11
Industry Alpha Insights: Quantifying Industry Specific Fundamentals	17-Mar-11
Low-Risk Equity Portfolios: More than just Minimum Variance	18-Nov-10
Under the Microscope: Measuring Systemic Risk – The Absorption Ratio	15-Nov-10
Under the Microscope: Optionality in Valuation	14-Jun-10
Searching for Alpha: Earnings Surprise – Still Profiting from Surprises	31-Mar-10
Searching for Alpha: Optimising Style Rotation Strategies	15-Oct-09

Source: Citi Research

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Appendix A-1

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Data current as of 31 Mar 2021	12 Month Rating			Catalyst Watch		
	Buy	Hold	Sell	Buy	Hold	Sell
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% of companies in each rating category that are investment banking clients	64%	64%	55%	67%	62%	69%
Citi Research Quantitative World Radar Screen Model Coverage	30%	40%	30%			
% of companies in each rating category that are investment banking clients	42%	33%	29%			
Citi Research Quantitative Latam Radar Screen Model Coverage	21%	59%	20%			
% of companies in each rating category that are investment banking clients	83%	66%	61%			
Citi Research Quantitative Asia Radar Screen Model Coverage	20%	60%	20%			
% of companies in each rating category that are investment banking clients	42%	29%	17%			
Citi Research Quantitative Australia Radar Screen Model Coverage	65%	0%	35%			
% of companies in each rating category that are investment banking clients	48%	0%	30%			

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