

Measuring the Crowded Trade in Global Equities

Crowding remains confused amid the market volatility

CITI'S TAKE

The most crowded Quant factors remained mostly stable even as equity market and factor volatility increased sharply throughout the regions. The diverging views between macro factors and what the market was pricing indicates a high degree of uncertainty among investors, leading to a stall in trends that were emerging earlier this year. Despite the risk aversion in the markets, Energy and Value oriented stocks remain among the more crowded while Growth/higher valuation stocks shifted lower in the crowding ranks. With the continued uncertainty surrounding the Russia / Ukraine conflict, the lack of consensus will make it difficult for trends to emerge in the near term.

What's new with the crowd — The most crowded stocks underperformed across most regions, except in the US where it was mostly flat. Price Momentum replaces Earnings Momentum as the most crowded Quant style in Australia. Defensives have been near the bottom for some time but their crowding scores are ticking higher.

Sector crowding — Energy and Materials are among the most crowded sectors across the US, Europe, Japan, and Australia. In Asia ex Japan, Energy is becoming increasingly crowded but remains near the median this month. Crowding in the Technology sector continues to decline in the US and Europe but remains among the top three crowded sectors across much of Asia.

Stocks to focus on — We overlay the Crowding Composite on the Citi Research Catalyst Watch system to help identify non-consensus calls.

Figure 1. Citi Research Catalyst Watch with High/Low Crowding Scores

RIC	Company Name	Region	Price (4-Mar-22)	Citi Rating	Start Date	Expiry Date/Close Date	Call Direction	Crowding Composite
Upside Citi Catalyst Watch with Low Crowding Score (< 0.25)								
DISH.O	DISH NETWORK CORPORATION CL A	US	30.16	1	25-Feb-22	27-Mar-22	UPSIDE	2.6%
EMBRACb.ST	EMBRACER GROUP AB SER B NPV	Europe	7.01	1	13-Jan-22	14-Apr-22	UPSIDE	5.0%
GGAS.BO	GUJARAT GAS LTD INR2 (POST SUBD)	AxJ	6.91	1	7-Jan-22	7-Apr-22	UPSIDE	6.3%
HPCL.BO	HINDUSTAN PETROL INR10	AxJ	3.72	1	9-Feb-22	10-May-22	UPSIDE	7.0%
AZN.L	ASTRAZENECA ORD USD0.25	Europe	114.80	1	16-Dec-21	16-Mar-22	UPSIDE	17.3%
DHER.DE	DELIVERY HERO SE NPV	Europe	44.21	1	28-Feb-22	29-May-22	UPSIDE	17.8%
GLPG.AS	GALAPAGOS NV NPV	Europe	60.66	1H	27-Jan-22	27-Apr-22	UPSIDE	20.3%
UAL.O	UNITED AIRLIS HLDGS INC COM	US	36.71	1	27-Jan-22	27-Apr-22	UPSIDE	22.3%
Downside Citi Catalyst Watch with High Crowding Score (> 0.75)								
FLTRF.L	FLUTTER ENTERTAINM ORD EUR0.09 (CDI)	Europe	105.82	1	11-Jan-22	11-Apr-22	DOWNSIDE	90.0%
ENT.L	ENTAIN PLC ORD EUR0.01	Europe	19.73	1	11-Jan-22	11-Apr-22	DOWNSIDE	88.7%

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Source: Citi Research, FactSet, Thomson Reuters, I/B/E/S, Compustat

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March Insights on the Crowd

The most crowded Quant factors remained mostly stable even as equity market volatility increased sharply throughout the regions. Investors became distinctly risk averse as the conflict in Eastern Europe deteriorated with macro factors remaining the key driver of stock returns. The diverging views between macro factors and what the market was pricing indicates a high degree of uncertainty among investors, leading to a stall in trends that were emerging earlier this year. This is also evident among the shrinking correlations between most quant factors, even as the market remains volatile. Considering the equity and commodity market volatility, the crowd was mostly consistent from the prior month, albeit with some sector score changes due to rising oil and other commodity prices.

Across many regions, Energy and Value oriented sectors remain among the most crowded while Growth and high valuation stocks shifted lower in the crowding ranks. Although defensives have been near the bottom for some time, they are ticking higher. In Asia ex Japan, Energy moved higher towards the median while it remains among the top three crowded sectors in Australia. Another notable move is Materials moving higher in crowding ranks for the US, Europe and Asia ex Japan.

Crowding in the Technology sector continues to decline in the US and Europe where it now sits in the middle of the pack. Across much of Asia, Technology remains among the top three crowded sectors, but it is among the least crowded sectors in Australia.

Figure 2. Global Crowding Summary

Region	Most Crowded Style	
	February	March
Asia ex Japan	Quality	Quality
Australia	Earnings Momentum	Price Momentum
Europe	Earnings Momentum	Earnings Momentum
Japan	Earnings Momentum	Earnings Momentum
US	Low Beta	Low Beta

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Source: Citi Research

Global Crowding Report

Our Global Crowding report combines Citi's global quant crowding coverage into one document for ease of use. In this document, readers will find our [Global Catalyst Watch Overlay](#), [Region Focus: US](#), [Region Focus: Europe](#), and [Region Focus: Asia Pacific](#). Details of the methodology are provided in the last section. For the complete list of crowding scores for the broad range of global stocks, please see:

[Citi Quant Crowding Composite \(Excel\)](#)

Measuring the Crowd

Over the last few years, we have developed a framework to evaluate crowdedness in stocks. The key consideration is to measure crowding across various major type of investors, from quants, fundamentals, hedge funds and multi-strat macro funds.

Our crowding score is composed of five key metrics:

- the most crowded quant factor ranking (region specific)
- historical relative valuation
- short interest
- concentration of sell-side analyst ratings
- macro risk contribution in individual stocks

First developed for the [US market in 2018](#) and having since widened our coverage to include Europe and Asia, our crowding composite is intended to provide investors with a more robust analysis of risk/reward.

Conventional thinking is to avoid buying crowded stocks (high crowding composite), as they may become harder to attract marginal investors, while stocks that are less crowded are prone to react more positively to fundamental catalysts, as they can attract a larger set of new investors. However, we do not intend the crowding composite to be a buy/sell signal by itself and do not recommend that investors rely on a crowding composite score as the sole factor in making an investment decision, but rather consider it as one of the factors among many. Accordingly, investors should consider other fundamental or quantitative factors in evaluating the expected performance of a particular company and then consider the crowding composite score as an additional measure of possible investment risk.

Note: Pricing and ratings included in the tables of this report are current as of March 4, 2022. They are for illustrative purposes only and do not reflect the most recent Citi fundamental ratings.

Global Overlay of Crowding with Citi Research Catalyst Watch

The Catalyst Watch system allows our fundamental analysts to provide tactical insights around events while maintaining a 12-month rating and target price. Analysts can highlight catalysts 30 or 90 days out and offer a view on how the shares will trade around the event (upside or downside) in the context of their longer-term ratings. Calls expire automatically at the 30- or 90-day mark or can be closed ahead of time by the analyst. As shares rarely trade in a straight line, the Catalyst Watch system is a helpful tool for analysts to add value for investors around near-term volatility. The catalyst associated with each stock below is accessible on Citi Velocity.

In Figure 3 we overlay the Crowding Composite on the Citi Research Catalyst Watch system. Stocks with a downside catalyst that are deemed more crowded may have more difficulty finding marginal investors and are subject to greater risk if a negative inflection emerges. To the contrary, stocks with an upside catalyst that are less crowded could react more positively to constructive fundamental catalysts.

Figure 3. Citi Research Catalyst Watch with Crowding Composite (Sorted by Expiry Date)

Primary Analyst	Company Name	Country	RIC	Sector	Price (4-Mar-22)	Citi Rating	Start Date	Expiry Date/ Close Date	Time Frame (Days)	Call Direction	Crowding Composite
Andrew Baum	ASTRAZENECA ORD USD0.25	United Kingdom	AZN.L	Health Care	114.80	1	16-Dec-21	16-Mar-22	90	UPSIDE	17.3%
Xiaopo Wei	LI NING CO LTD HKD0.1	China H	2331.HK	Consumer Discretionary	9.42	1	13-Feb-22	16-Mar-22	30	UPSIDE	100.0%
Ryan Winipta	VALE INDONESIA TBK IDR25	Indonesia	INCO.JK	Materials	0.38	2	13-Feb-22	16-Mar-22	30	UPSIDE	88.6%
Xiaopo Wei	TOPSPORTS INTERNAT HKD0.000001	China H	6110.HK	Consumer Discretionary	0.97	1	13-Feb-22	16-Mar-22	30	UPSIDE	59.1%
Hidemaru Yamaguchi	DAIICHI SANKYO COM NPV	Japan	4568.T	Health Care	22.41	1	17-Dec-21	17-Mar-22	90	UPSIDE	89.2%
Gabriel M Adler	CONTINENTAL AG ORD NPV	Germany	CONG.DE	Consumer Discretionary	67.98	2	17-Feb-22	19-Mar-22	30	DOWNSIDE	33.7%
Sathish B Sivakuma	DEUTSCHE LUFTHANSA ORD NPV (REGD)(VINK)	Germany	LHAG.DE	Industrials	6.32	1	17-Feb-22	19-Mar-22	30	UPSIDE	31.2%
Sathish B Sivakuma	INTL CONS AIRLINE ORD EUR0.10 (CDI)	United Kingdom	ICAG.L	Industrials	1.63	1	17-Feb-22	19-Mar-22	30	UPSIDE	38.2%
Arthur Truslove	EUROFINS SCIENTIFI EUR0.01	France	EUFL.PA	Health Care	96.45	2	17-Feb-22	19-Mar-22	30	UPSIDE	48.6%
Simon Hales	BRIT AMER TOBACCO ORD GBP0.25	United Kingdom	BATS.L	Consumer Staples	40.73	1	20-Dec-21	20-Mar-22	90	UPSIDE	52.7%
Amit Lahoti	GEM DIAMONDS ORD USD0.01 (DI)	United Kingdom	GEMD.L	Materials	0.63	1	18-Feb-22	20-Mar-22	30	UPSIDE	68.5%
Michael Rollins	DISH NETWORK CORPORATION CL A	United States	DISH.O	Communication Services	30.16	1	25-Feb-22	27-Mar-22	30	UPSIDE	2.6%
Arthur Truslove	INTERTEK GROUP ORD GBP0.01	United Kingdom	ITRK.L	Industrials	65.08	1	25-Feb-22	27-Mar-22	30	UPSIDE	54.0%
David Lebowitz	ASCENDIS PHARMA A/S SPONSORED ADR	United States	ASND.O	Health Care	104.53	1H	28-Feb-22	30-Mar-22	30	UPSIDE	51.8%
David Lebowitz	ASCENDIS PHARMA A/S SPONSORED ADR	United States	ASND.O	Health Care	104.53	1H	28-Feb-22	30-Mar-22	30	UPSIDE	37.4%
Peter Verdult	NOVO NORDISK A/S SER'B'DKK0.2	Denmark	NOVOB.CO	Health Care	103.02	1	2-Mar-22	1-Apr-22	30	UPSIDE	34.6%
Justin Rama	ADARO ENERGY TBK IDR100	Indonesia	ADRO.JK	Energy	0.21	1	3-Mar-22	2-Apr-22	30	UPSIDE	55.7%
Anthony Pettinari	EVERY DENNISON CORP COM	United States	AVY.N	Materials	167.59	1	4-Jan-22	4-Apr-22	90	UPSIDE	72.8%
Christian Wetherbee	FORTRESS TRANS INFRST INVS L COM REP LTD LIAE	United States	FTAL.N	Industrials	22.08	1	6-Jan-22	6-Apr-22	90	UPSIDE	77.9%
Atif Malik	NVIDIA CORPORATION COM	United States	NVDA.O	Information Technology	229.36	1	7-Jan-22	7-Apr-22	90	UPSIDE	91.6%
Angela Hsu	ECLAT TEXTILE CO TWD10	Taiwan	1476.TW	Consumer Discretionary	19.62	1	8-Jan-22	7-Apr-22	90	UPSIDE	99.6%
Saurabh Handa	GUJARAT GAS LTD INR2 (POST SUBD)	India	GGAS.BO	Utilities	6.91	1	7-Jan-22	7-Apr-22	90	UPSIDE	6.3%
Michael Rollins	AT&T INC COM	United States	T.N	Communication Services	23.87	1	10-Jan-22	10-Apr-22	90	UPSIDE	53.6%
Michael Rollins	SWITCH INC CL A	United States	SWCH.N	Information Technology	27.43	1	10-Jan-22	10-Apr-22	90	UPSIDE	99.4%
Andrew Kaplowitz	GENERAL ELECTRIC CO COM	United States	GE.N	Industrials	89.14	1	10-Jan-22	10-Apr-22	90	UPSIDE	58.1%
Michael Rollins	CROWN CASTLE INTL CORP NEW COM	United States	CCN.L	Real Estate	179.10	1	10-Jan-22	10-Apr-22	90	UPSIDE	90.9%
Peter Verdult	UCB NPV	Belgium	UCB.BR	Health Care	105.82	2	10-Jan-22	10-Apr-22	90	DOWNSIDE	23.8%
Simon Hales	CARLSBERG SER'B'DKK20	Denmark	CARLB.CO	Consumer Staples	124.16	1	10-Jan-22	11-Apr-22	90	UPSIDE	61.0%
Monique Pollard	ENTAIN PLC ORD EUR0.01	United Kingdom	ENT.L	Consumer Discretionary	19.73	1	11-Jan-22	11-Apr-22	90	DOWNSIDE	88.7%
Monique Pollard	FLUTTER ENTERTAINM ORD EUR0.09 (CDI)	United Kingdom	FLTRF.L	Consumer Discretionary	105.82	1	11-Jan-22	11-Apr-22	90	DOWNSIDE	90.0%
Thomas A Singlehurst	EMBRACER GROUP AB SER'B'NPV	Sweden	EMBRACB.ST	Communication Services	7.01	1	13-Jan-22	14-Apr-22	90	UPSIDE	5.0%
Atul Tiwari	LARSEN & TOUBRO INR2	India	LART.BO	Industrials	22.40	1	14-Jan-22	14-Apr-22	90	UPSIDE	96.0%
Raashi Chopra	COAL INDIA LTD INR10	India	COAL.BO	Energy	2.37	2	14-Jan-22	14-Apr-22	90	DOWNSIDE	36.3%
Georgios Ierodiakon	DEUTSCHE TELEKOM NPV(REGD)	Germany	DTEGn.DE	Communication Services	16.78	1	17-Jan-22	17-Apr-22	90	UPSIDE	38.1%
Cedric Besnard	RECKITT BENCK GRP ORD GBP0.10	United Kingdom	RKT.L	Consumer Staples	76.45	1	17-Jan-22	18-Apr-22	90	UPSIDE	47.7%
Andrew Kaplowitz	JACOBS ENGR GROUP INC COM	United States	J.N	Industrials	127.96	1	21-Jan-22	21-Apr-22	90	UPSIDE	97.9%
Neena Bhirrito-Garg	KODIAK SCIENCES INC COM	United States	KOD.O	Health Care	7.70	2H	26-Jan-22	26-Apr-22	90	DOWNSIDE	5.6%
Andrew Schmidt	BTRS HOLDINGS INC COM CL A	United States	BTRS.O	Information Technology	6.17	1	26-Jan-22	26-Apr-22	90	UPSIDE	99.3%
Stephen Trent	UNITED AIRLS HLDGS INC COM	United States	UAL.O	Industrials	36.71	1	27-Jan-22	27-Apr-22	90	UPSIDE	22.3%

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Source: Citi Research, FactSet, Compustat, Thomson Reuters IBES

Figure 4. Citi Research Catalyst Watch with Crowding Composite (Sorted by Expiry Date) Contd.

Primary Analyst	Company Name	Country	RIC	Sector	Price (4-Mar-22)	Citi Rating	Start Date	Expiry Date/ Close Date	Time Frame (Days)	Call Direction	Crowding Composite
Peter Verdult	GALAPAGOS NV NPV	Belgium	GLPG.AS	Health Care	60.66	1H	27-Jan-22	27-Apr-22	90	UPSIDE	20.3%
Peter Verdult	BAYER AG NPV (REGD)	Germany	BAYGn.DE	Health Care	55.91	1	31-Jan-22	1-May-22	90	UPSIDE	48.2%
Hidemaru Yamaguchi	JCR PHARMACEUTICAL NPV	Japan	4552.T	Health Care	17.38	1	31-Jan-22	1-May-22	90	UPSIDE	26.8%
Azzurra Guelfi	POSTE ITALIANE SPA NPV	Italy	PST.MI	Financials	9.92	1H	2-Feb-22	3-May-22	90	UPSIDE	78.9%
Antonella Bianchessi	IBERDROLA SA EUR0.75	Spain	IBE.MC	Utilities	9.79	1	4-Feb-22	5-May-22	90	UPSIDE	61.5%
Saurabh Handa	OIL & NATURAL GAS INR5	India	ONGC.BO	Energy	2.16	3	3-Feb-22	5-May-22	90	DOWNSIDE	67.2%
William R Katz	CARLYLE GROUP INC COM	United States	CG.O	Financials	43.64	1	7-Feb-22	8-May-22	90	UPSIDE	79.2%
Saurabh Handa	HINDUSTAN PETROL INR10	India	HPCL.BO	Energy	3.72	1	9-Feb-22	10-May-22	90	UPSIDE	7.0%
Raashi Chopra	NMDC LTD INR1	India	NMDC.BO	Materials	1.94	1	9-Feb-22	10-May-22	90	UPSIDE	74.2%
Atif Malik	TERADYNE INC COM	United States	TER.O	Information Technology	111.75	1	15-Feb-22	16-May-22	90	UPSIDE	37.4%
Hidemaru Yamaguchi	HEALIOS KK NPV	Japan	4593.T	Health Care	9.97	1H	15-Feb-22	16-May-22	90	UPSIDE	45.4%
Saurabh Handa	INDRAPRASTHA GAS INR2 (POST SUBDIVISION)	India	IGAS.BO	Utilities	4.34	1	17-Feb-22	18-May-22	90	UPSIDE	35.1%
Atul Tiwari	PHOENIX MILLS INR2	India	PHOE.BO	Real Estate	12.29	1	18-Feb-22	19-May-22	90	UPSIDE	87.0%
Hidemaru Yamaguchi	TAKARA BIO INC NPV	Japan	4974.T	Health Care	19.55	1	21-Feb-22	22-May-22	90	UPSIDE	38.1%
Michelle Ma	PING AN INSURANCE 'H' CNY1	China H	2318.HK	Financials	7.43	1	24-Feb-22	25-May-22	90	DOWNSIDE	66.8%
Michelle Ma	PING AN INSURANCE 'A' CNY1	China A	601318.SS	Financials	7.93	1	24-Feb-22	25-May-22	90	DOWNSIDE	44.7%
Justian Rama	INDO TAMBANGRAY IDR500	Indonesia	ITMG.JK	Energy	2.03	1	23-Feb-22	25-May-22	90	UPSIDE	50.0%
David Lebowitz	ALNYLAM PHARMACEUTICALS INC COM	United States	ALNY.O	Health Care	164.44	1H	28-Feb-22	29-May-22	90	UPSIDE	88.5%
David Lebowitz	IONIS PHARMACEUTICALS INC COM	United States	IONS.O	Health Care	32.30	3H	28-Feb-22	29-May-22	90	DOWNSIDE	35.7%
David Lebowitz	SCHRODINGER INC COM	United States	SDGR.O	Health Care	32.28	1H	28-Feb-22	29-May-22	90	UPSIDE	42.4%
David Lebowitz	BLUEPRINT MEDICINES CORP COM	United States	BPMC.O	Health Care	57.04	2H	28-Feb-22	29-May-22	90	DOWNSIDE	43.7%
Monique Pollard	DELIVERY HERO SE NPV	Germany	DHER.DE	Consumer Discretionary	44.21	1	28-Feb-22	29-May-22	90	UPSIDE	17.8%
Joanne Wuensch	DEXCOM INC COM	United States	DXCM.O	Health Care	432.06	1	1-Mar-22	30-May-22	90	UPSIDE	57.1%
Georgios Ierodiakon	CELLNEX TELECOM SA EUR0.25	Spain	CLNX.MC	Communication Services	44.84	2	1-Mar-22	30-May-22	90	UPSIDE	59.6%
Paul Hwang	CHEIL WORLDWIDE KRW200	South Korea	030000.KS	Communication Services	19.13	1	3-Mar-22	2-Jun-22	90	UPSIDE	73.0%

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Region Focus: US

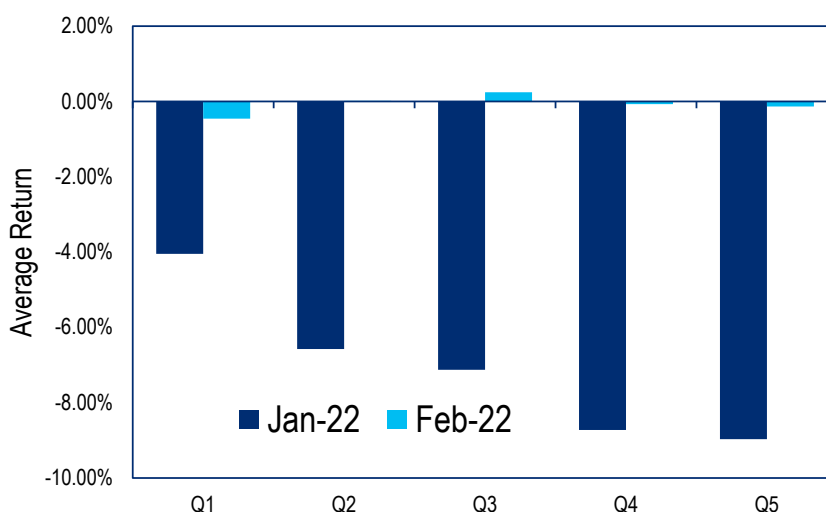
Crowds stand still amid the conflict in Eastern Europe

Performance along crowding was flat last month as the equity market is not overly crowded compared to the past few years, while investors assess various macro risks amidst the conflict in Eastern Europe and uncertainty around Fed hiking pace. Our equity implied factors indicate diverging views across equity, bond, and commodity markets, where traditional stock fundamental/economic relationships are not holding up. These divergences and heightened volatility have made it difficult for any performance trend to emerge from the crowd. The crowd has not shifted much either through the end of February. While Low Beta remains the most crowded factor, Quality stocks are not crowded as they are not very expensive and have normal levels of macro exposures.

At the beginning of this month, Financials and Real Estate remain the most crowded sectors as Value outperformed recently. Technology registered another decline in its overall crowding score, switching ranks with Materials, which has become the fourth most crowded sector. The crowding score for Consumer Staples ticked higher and it moved out of the bottom three least crowded sectors.

In light of the extreme geopolitical risk and oil/commodity market volatility, near-term we continue to advise overweight Price Momentum and Earnings Revisions as they carry much less macro exposures (see [US Quant Insights](#)).

Figure 5. Average of Return % by Crowding Quintile



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Source: Citi Research

Figure 6. Average Crowding Score Change at Sector Level

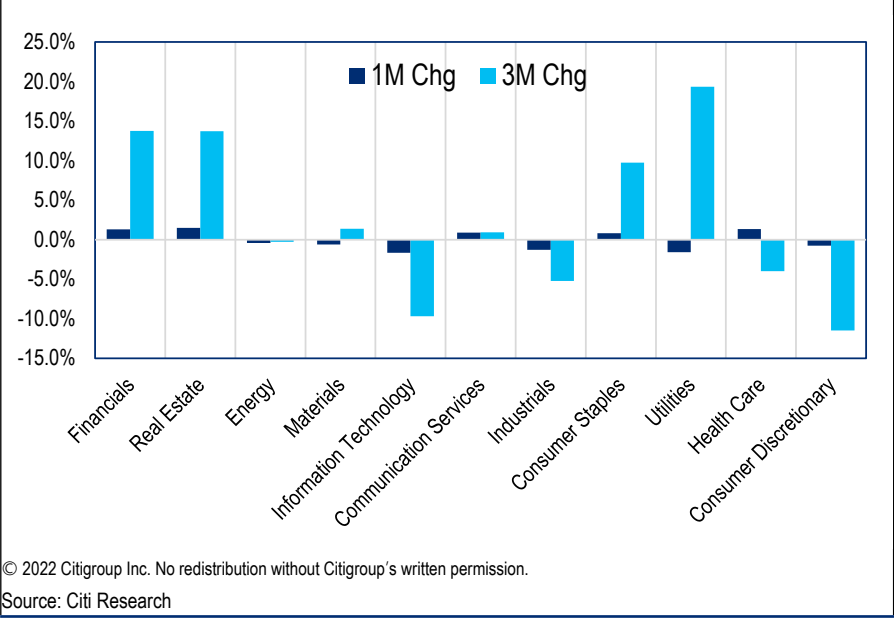


Figure 7. Sector Aggregate Crowding Score Ranks

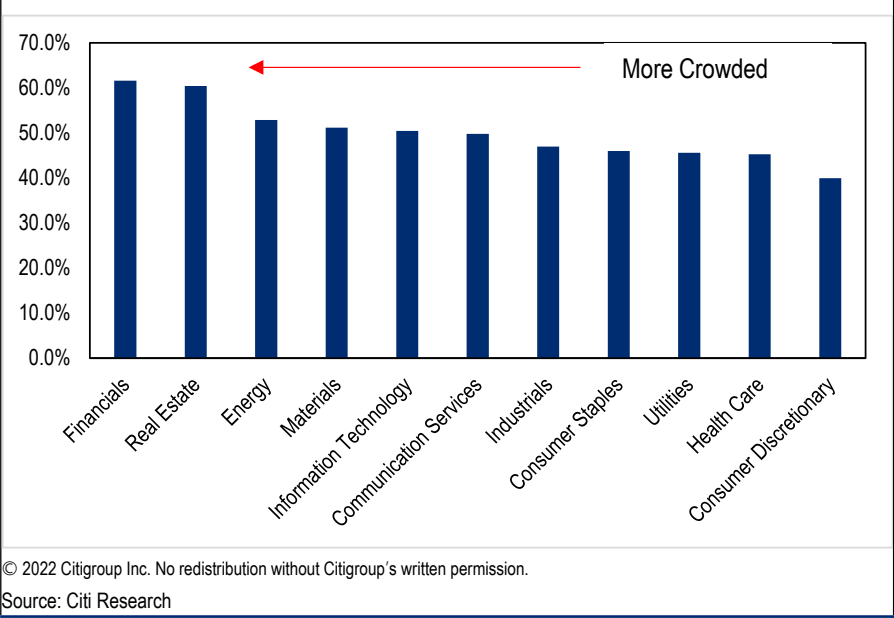


Figure 8. Crowding Change by Industry Group (equal-weighted average of stock scores)

GICS Industry Group	February	March	1M Chg	3M Chg
Banks	66.5%	69.3%	2.8%	22.3%
Health Care Equipment & Services	44.1%	46.5%	2.4%	-1.5%
Real Estate	59.0%	60.4%	1.5%	13.7%
Food Beverage & Tobacco	45.6%	47.7%	1.5%	13.1%
Media & Entertainment	49.9%	51.0%	1.1%	-1.6%
Food & Staples Retailing	44.9%	45.9%	1.0%	9.5%
Pharmaceuticals, Biotechnology & Life Sciences	44.0%	44.7%	0.8%	-5.1%
Insurance	50.7%	51.1%	0.4%	14.1%
Consumer Services	53.0%	53.2%	-0.2%	-0.3%
Telecommunication Services	44.8%	44.6%	-0.2%	11.9%
Consumer Durables & Apparel	35.3%	35.0%	-0.3%	-16.6%
Energy	53.3%	52.9%	-0.4%	-0.3%
Semiconductors & Semiconductor Equipment	55.3%	54.8%	-0.5%	-14.6%
Materials	51.8%	51.2%	-0.6%	1.4%
Technology Hardware & Equipment	45.0%	44.3%	-0.7%	-7.2%
Household & Personal Products	43.0%	42.1%	-0.9%	1.7%
Retailing	33.8%	33.2%	-1.0%	-17.5%
Capital Goods	49.1%	47.9%	-1.2%	-6.4%
Commercial & Professional Services	48.8%	47.6%	-1.2%	-2.2%
Diversified Financials	52.6%	51.1%	-1.5%	-4.1%
Utilities	47.1%	45.6%	-1.6%	19.3%
Transportation	43.3%	41.8%	-1.8%	-4.5%
Automobiles & Components	37.4%	34.8%	-2.6%	-13.2%
Software & Services	55.0%	52.3%	-2.6%	-9.4%

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Source: Citi Research

Crowding Quant + Fundamental

What is the Crowd missing?

In Figure 9, we show a screen of the most and least crowded stocks in the US combined with our analyst recommendations to help identify stocks that could exhibit significant downside risk or upside potential. We encourage you to speak with our fundamental analysts to help understand the catalysts for each of these stocks and what the crowd might be missing.

Figure 9. Citi Ratings and Crowding Scores (Top/Bottom Decile)

RIC	Company Name	Gics Industry Group	Mkt Cap (USDm)	Price (4-Mar-22)	Citi Rating	Crowding Composite	Prior Month Crowding Composite	Monthly Change
Least Crowded Stocks (Crowding Composite < 0.10) with a Citi Buy Rating								
NFLX.O	NETFLIX INC COM	Media & Entertainment	160,595	361.73	1	2.0%	22.0%	-20.0%
CLR.N	CONTINENTAL RES INC COM	Energy	22,186	60.90	1	4.9%	7.6%	-2.6%
K.N	KELLOGG CO COM	Food Beverage & Tobacco	22,093	64.95	1	7.7%	9.8%	-2.1%
PARA.O	PARAMOUNT GLOBAL CLASS B COM	Media & Entertainment	20,710	34.07	1	7.3%	16.6%	-9.4%
AVTR.N	AVANTOR INC COM	Pharmaceuticals, Biotechnology & Life Sciences	20,196	33.11	1	6.0%	5.9%	0.1%
ROKU.N	ROKU INC COM CL A	Media & Entertainment	14,469	121.50	1	5.8%	8.6%	-2.8%
CHRW.O	C H ROBINSON WORLDWIDE INC COM NEW	Transportation	13,714	106.48	1	4.4%	6.4%	-2.0%
LOGI.O	LOGITECH INTL S A SHS	Technology Hardware & Equipment	12,114	73.21	1	3.7%	7.0%	-3.3%
TAP.N	MOLSON COORS BEVERAGE CO CL B	Food Beverage & Tobacco	10,204	50.87	1	3.8%	2.0%	1.8%
UHS.N	UNIVERSAL HLTH SVCS INC CL B	Health Care Equipment & Services	10,096	149.46	1	5.0%	2.7%	2.3%
NRG.N	NRG ENERGY INC COM NEW	Utilities	9,095	37.56	1	4.8%	3.5%	1.3%
DISH.O	DISH NETWORK CORPORATION CL A	Media & Entertainment	8,764	30.16	1	2.6%	1.9%	0.7%
DKNG.O	DRAFTKINGS INC COM CL A	Consumer Services	8,456	20.69	1	3.7%	10.9%	-7.2%
PAA.O	PLAINS ALL AMERN PIPELINE L UNIT LTD PARTN	Energy	7,657	10.86	1	9.9%	12.4%	-2.5%
WU.N	WESTERN UN CO COM	Software & Services	6,989	17.76	1	9.6%	8.5%	1.1%
TXG.O	10X GENOMICS INC CL A COM	Pharmaceuticals, Biotechnology & Life Sciences	6,509	69.77	1H	8.9%	12.5%	-3.6%
LAZR.O	LUMINAR TECHNOLOGIES COM CL A	Automobiles & Components	3,421	13.56	1H	9.2%	10.7%	-1.5%
BYND.O	BEYOND MEAT INC COM	Food Beverage & Tobacco	2,740	43.18	1	1.8%	2.5%	-0.7%
TRIP.O	TRIPADVISOR INC COM	Media & Entertainment	2,716	21.58	1	7.9%	27.7%	-19.8%
LBRT.N	LIBERTY OILFIELD SVCS INC COM CL A	Energy	2,600	14.16	1	9.7%	47.5%	-37.8%
WWE.N	WORLD WRESTLING ENTMT INC CL A	Media & Entertainment	2,569	58.69	1	2.1%	1.5%	0.6%
URBN.O	URBAN OUTFITTERS INC COM	Retailing	2,442	25.32	1	6.0%	5.6%	0.4%
TDS.N	TELEPHONE & DATA SYS INC COM NEW	Telecommunication Services	1,926	17.96	1	1.7%	2.0%	-0.3%
ENDP.O	ENDO INTL PLC SHS	Pharmaceuticals, Biotechnology & Life Sciences	549	2.35	1	5.2%	8.2%	-2.9%
PASG.O	PASSAGE BIO INC COM	Pharmaceuticals, Biotechnology & Life Sciences	159	2.93	1H	9.1%		
ARDX.O	ARDELYX INC COM	Pharmaceuticals, Biotechnology & Life Sciences	120	0.92	1H	3.9%	4.5%	-0.6%
Most Crowded Stocks (Crowding Composite > 0.90) with a Citi Sell/Neutral Rating								
KO.N	COCA-COLA CO COM	Food Beverage & Tobacco	271,271	62.57	2	93.0%	94.6%	-1.6%
COST.O	COSTCO WHSL CORP NEW COM	Food & Staples Retailing	232,943	525.50	2	95.3%	96.2%	-0.8%
QCOM.O	QUALCOMM INC COM	Semiconductors & Semiconductor Equipment	182,867	162.26	2	91.0%	92.8%	-1.8%
ZTS.N	ZOETIS INC CL A	Pharmaceuticals, Biotechnology & Life Sciences	92,903	196.84	2	91.8%	98.5%	-6.7%
BX.N	BLACKSTONE INC COM	Diversified Financials	84,859	121.16	2	96.3%	97.0%	-0.6%
BKNG.O	BOOKING HOLDINGS INC COM	Consumer Services	81,164	1985.04	2	92.2%	93.3%	-1.1%
KDP.O	KEURIG DR PEPPER INC COM	Food Beverage & Tobacco	55,138	38.88	2	93.2%	93.7%	-0.5%
SNAP.N	SNAP INC CL A	Media & Entertainment	45,331	33.09	2	95.7%	96.5%	-0.8%
ORLY.O	OREILLY AUTOMOTIVE INC COM	Retailing	44,895	674.09	2	95.2%	95.5%	-0.3%
JCI.N	JOHNSON CTLS INTL PLC SHS	Capital Goods	44,209	62.92	2	98.3%	98.3%	0.0%
MCHP.O	MICROCHIP TECHNOLOGY INC. COM	Semiconductors & Semiconductor Equipment	37,674	67.76	2	93.7%	94.4%	-0.7%
EXR.N	EXTRA SPACE STORAGE INC COM	Real Estate	26,950	200.89	2	90.4%	90.7%	-0.3%
AEM.N	AGNICO EAGLE MINES LTD COM	Materials	25,690	56.49	2	92.5%	35.1%	57.4%
BIP.N	BROOKFIELD INFRAST PARTNERS LP INT UNIT	Utilities	18,214	59.68	2	93.6%	88.2%	5.4%
CPT.N	CAMDEN PPTY TR SH BEN INT	Real Estate	17,828	172.37	2	96.8%	98.7%	-1.9%
PEAK.N	HEALTHPEAK PROPERTIES INC COM	Real Estate	17,775	32.96	2	90.5%	72.0%	18.5%
ELS.N	EQUITY LIFESTYLE PPTYS INC COM	Real Estate	14,445	77.69	2	95.5%	80.9%	14.6%
NI.N	NISOURCE INC COM	Utilities	12,356	30.48	2	94.3%	92.2%	2.1%
CUBE.N	CUBESMART COM	Real Estate	11,485	51.27	2	93.3%	92.7%	0.6%
IRT.N	INDEPENDENCE RLTY TR INC COM	Real Estate	5,876	26.59	2	100.0%	100.0%	0.0%
NSA.N	NATIONAL STORAGE AFFILIATES COM SHS BEN IN	Real Estate	5,673	62.21	2	92.2%	91.5%	0.7%
VLY.O	VALLEY NATL BANCORP COM	Banks	5,630	13.36	2	93.5%	92.8%	0.7%
EVA.N	ENVIVA INC COM UNIT	Energy	5,278	79.30	2	94.0%	85.9%	8.1%
CCMP.O	CMC MATERIALS INC COM	Semiconductors & Semiconductor Equipment	5,095	178.30	2	90.4%	89.3%	1.0%
REGLO	RENEWABLE ENERGY GROUP INC COM NEW	Energy	3,071	61.04	2	96.6%	68.9%	27.6%
HCC.N	WARRIOR MET COAL INC COM	Materials	1,975	38.35	2H	91.6%	88.6%	3.0%
GLNG.O	GOLAR LNG LTD SHS	Energy	1,945	17.98	2H	99.1%	98.6%	0.6%
PLYA.O	PLAYA HOTELS & RESORTS NV SHS	Consumer Services	1,489	8.98	2	95.6%	93.5%	2.1%
ECVT.N	ECOVYST INC COM	Materials	1,475	10.67	2	99.3%	98.6%	0.7%

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Source: Citi Research

For illustrative purposes, in Figure 10 we provide the Crowding Composite for the five largest stocks by market capitalization within each sector of the broad U.S. universe that have a Citi rating.

Figure 10. Crowding Composite for Top Five Market Cap Stocks by Sector

RIC	Company	GICS Sector	Mkt Cap (USDm)	Price USD (4-Mar-22)	Citi Rating	Crowding Composite	Quant Crowded Factor	Hist Relative Valuation	Hist Relative Short Interest	Consensus Rating Skewness	Macro Risk Contribution
GOOGL.O	ALPHABET INC CL C	Communication Services	834,058	2642.44		89.4%	58.4%	57.4%	64.2%	100.0%	51.0%
GOOGL.O	ALPHABET INC CL A	Communication Services	793,430	2638.13	2	75.7%	58.3%	56.4%	31.8%	99.9%	53.1%
FB.O	META PLATFORMS INC CL A	Communication Services	461,955	200.06	2	5.7%	37.1%	4.9%	11.1%	66.3%	44.3%
DIS.N	DISNEY WALT CO COM	Communication Services	256,199	140.72	1	88.3%	49.0%	57.7%	68.3%	80.7%	72.4%
VZ.N	VERIZON COMMUNICATIONS INC COM	Communication Services	231,342	55.11	2	2.9%	94.2%	11.4%	2.5%	17.4%	22.5%
AMZN.O	AMAZON COM INC COM	Consumer Discretionary	1,482,172	2912.82	1	49.0%	53.9%	5.3%	39.2%	100.0%	58.5%
TSLA.O	TESLA INC COM	Consumer Discretionary	866,379	838.29	3	31.8%	9.9%	44.0%	95.6%	17.3%	61.6%
HD.N	HOME DEPOT INC COM	Consumer Discretionary	338,605	324.26	1	83.9%	59.5%	67.2%	50.6%	64.8%	74.7%
MCD.N	MCDONALDS CORP COM	Consumer Discretionary	175,345	235.81	2	87.8%	86.5%	80.0%	12.6%	78.7%	68.8%
NKE.N	NIKE INC CL B	Consumer Discretionary	167,423	131.18	2	89.9%	64.5%	66.7%	82.8%	71.6%	46.9%
WMT.N	WALMART INC COM	Consumer Staples	396,165	142.82	1	82.6%	89.2%	44.8%	85.8%	80.9%	12.5%
PG.N	PROCTER AND GAMBLE CO COM	Consumer Staples	371,881	155.14	2	84.4%	92.4%	80.8%	67.0%	36.1%	41.6%
KO.N	COCA-COLA CO COM	Consumer Staples	271,271	62.57	2	93.0%	84.6%	63.5%	65.0%	70.3%	60.1%
COST.O	COSTCO WHSL CORP NEW COM	Consumer Staples	232,943	525.50	2	95.3%	84.4%	81.0%	84.8%	50.1%	53.6%
PEP.O	PEPSICO INC COM	Consumer Staples	229,307	165.75	1	58.4%	85.0%	55.7%	27.4%	35.9%	68.1%
XOM.N	EXXON MOBIL CORP COM	Energy	356,003	84.09	2	65.1%	53.1%	34.8%	75.2%	26.4%	92.2%
CVX.N	CHEVRON CORP NEW COM	Energy	308,979	158.65	2	68.7%	54.9%	40.3%	45.3%	58.1%	88.4%
COP.N	CONOCOPHILLIPS COM	Energy	130,304	100.27	1	89.7%	35.3%	35.3%	74.6%	93.0%	93.7%
ENB.TO	ENBRIDGE INC COM	Energy	90,551	44.69	1	71.4%	69.7%	65.9%	25.8%	66.3%	64.7%
EOG.N	EOG RES INC COM	Energy	69,519	118.75	1	77.8%	18.9%	35.0%	74.3%	79.3%	96.0%
BRKa.N	BERKSHIRE HATHAWAY INC DEL CL B NEW	Financials	420,083	325.34		58.7%	76.6%	69.9%	44.6%	14.7%	67.1%
JPM.N	JPMORGAN CHASE & CO COM	Financials	396,858	134.40	2	77.2%	55.2%	49.5%	63.1%	35.5%	99.2%
BAC.N	BNK OF AMERICA CORP COM	Financials	330,458	40.95	1	88.9%	35.8%	73.4%	76.2%	45.3%	99.0%
WFC.N	WELLS FARGO CO NEW COM	Financials	186,112	48.79	2	75.2%	51.0%	58.8%	25.0%	72.0%	91.6%
MS.N	MORGAN STANLEY COM NEW	Financials	153,833	86.36	1	81.5%	32.0%	75.7%	46.4%	58.0%	98.8%
UNH.N	UNITEDHEALTH GROUP INC COM	Health Care	469,179	498.65		94.6%	72.9%	76.1%	79.6%	92.7%	28.4%
JNJ.N	JOHNSON & JOHNSON COM	Health Care	445,609	169.48	1	75.5%	82.9%	37.9%	80.0%	56.6%	41.8%
PFE.N	PFIZER INC COM	Health Care	273,576	48.65	2	47.3%	80.8%	18.5%	83.7%	37.2%	34.5%
ABBV.N	ABBVIE INC COM	Health Care	266,304	150.56	1	73.8%	79.0%	13.4%	79.3%	85.9%	38.2%
LLY.N	ELI LILLY & CO COM	Health Care	250,344	262.87	1	82.2%	93.0%	87.4%	45.8%	64.9%	20.8%
UNP.N	UNION PAC CORP COM	Industrials	168,542	264.63	1	49.2%	51.2%	79.0%	2.7%	71.9%	52.3%
UPS.N	UNITED PARCEL SERVICE INC CL B	Industrials	154,122	210.39	1	18.6%	54.9%	13.8%	57.0%	50.2%	27.6%
RTX.N	RAYTHEON TECHNOLOGIES CORP COM	Industrials	148,621	99.59		86.4%	40.0%	79.1%	28.7%	85.9%	88.8%
HON.O	HONEYWELL INTL INC COM	Industrials	128,543	187.43	1	74.6%	54.0%	64.3%	57.0%	36.4%	85.6%
LMT.N	LOCKHEED MARTIN CORP COM	Industrials	124,767	458.15		4.1%	77.9%	11.8%	2.1%	27.0%	38.1%
AAPL.O	APPLE INC COM	Information Technology	2,662,843	163.17	1	94.1%	48.6%	89.1%	50.4%	89.9%	70.0%
MSFT.O	MICROSOFT CORP COM	Information Technology	2,173,042	289.86	1	95.0%	69.6%	76.6%	56.2%	99.4%	50.2%
NVDA.O	NVIDIA CORPORATION COM	Information Technology	573,400	229.36	1	91.6%	34.8%	78.8%	83.7%	86.9%	54.1%
V.N	VISA INC COM CL A	Information Technology	332,166	200.29	1	84.6%	68.9%	60.9%	30.3%	98.9%	59.9%
MA.N	MASTERCARD INCORPORATED CL A	Information Technology	320,748	330.76	1	93.6%	56.7%	64.7%	43.6%	98.9%	82.2%
LIN.N	LINDE PLC SHS	Materials	142,894	281.43	1	93.3%	71.2%	27.2%	78.5%	81.6%	86.5%
FCX.N	FREEMONT-MCMORAN INC CL B	Materials	72,899	50.11	1	78.6%	12.3%	64.0%	80.3%	54.0%	94.4%
SHW.N	SHERWIN WILLIAMS CO COM	Materials	67,304	258.49	2	56.7%	51.3%	80.5%	34.5%	32.0%	71.2%
SCCO.N	SOUTHERN COPPER CORP COM	Materials	59,218	76.60	2	69.3%	77.6%	50.7%	68.8%	0.4%	90.8%
NEM.N	NEWMONT CORP COM	Materials	58,867	74.28	1	54.1%	96.3%	54.0%	16.5%	35.9%	62.6%
PLD.PH	PROLOGIS INC. COM	Real Estate	111,622	150.84	1	99.1%	73.2%	79.4%	87.8%	78.3%	74.6%
AMT.N	AMERICAN TOWER CORP NEW COM	Real Estate	108,628	238.28	1	84.9%	92.0%	33.7%	76.6%	44.3%	72.8%
CCL.N	CROWN CASTLE INTL CORP NEW COM	Real Estate	77,410	179.10	1	90.9%	88.4%	36.9%	96.7%	37.2%	75.5%
PSA.N	PUBLIC STORAGE COM	Real Estate	66,212	377.36	1	96.4%	96.4%	82.8%	94.4%	36.6%	50.2%
EQIX.O	EQUINIX INC COM	Real Estate	65,403	720.92	1	86.8%	92.1%	52.2%	53.8%	58.1%	67.3%
NEE.N	NEXTERA ENERGY INC COM	Utilities	157,432	80.21		94.0%	94.0%	75.2%	38.6%	71.8%	68.3%
DUK.N	DUKE ENERGY CORP NEW COM NEW	Utilities	80,983	105.26		89.6%	95.3%	59.4%	92.8%	26.5%	57.6%
AEP.O	AMERICAN ELEC PWR CO INC COM	Utilities	48,571	96.33	2	47.2%	95.2%	42.3%	7.4%	54.1%	55.4%
SRE.N	SEMPRA COM	Utilities	47,954	151.92	2	86.5%	86.5%	26.3%	89.7%	57.7%	62.3%
EXC.O	EXELON CORP COM	Utilities	43,320	44.28		45.4%	91.9%	79.3%	0.0%	37.2%	43.1%

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Source: Citi Research, FactSet, Compustat, Thomson Reuters IBES

In Figure 11 and Figure 12, we provide the top 50 stocks with the largest monthly increase and decrease in the Crowding Composite, respectively.

Figure 11. Top 50 Stocks with the Largest Increase in Crowding Composite (Monthly Change)

RIC	Company	GICS Sector	Mkt Cap (USDm)	Price USD (4-Mar-22)	Citi Rating	Crowding Composite Rank	Prior Crowding Composite Rank	Change in Crowding Composite
FIBK.OQ	FIRST INTST BANC SYSTEM INC COM CL A	Financials	3,397	38.52		73.3%	9.5%	63.8%
EPM.A	EVOLUTION PETE CORP COM	Energy	266	7.89		87.0%	27.6%	59.3%
AEM.N	AGNICO EAGLE MINES LTD COM	Materials	25,690	56.49	2	92.5%	35.1%	57.4%
RS.N	RELIANCE STEEL & ALUMINUM CO COM	Materials	11,654	188.86	1	94.2%	45.4%	48.8%
SSD.N	SIMPSON MFG INC COM	Industrials	5,091	117.42		74.6%	26.1%	48.5%
WBS.N	WEBSTER FINL CORP COM	Financials	10,048	55.95		95.2%	50.0%	45.2%
ONB.OQ	OLD NATL BANCORP IND COM	Financials	5,155	17.46		80.9%	35.7%	45.2%
FWONA.O	LIBERTY MEDIA CORP DEL COM C SIRIUSXM	Communication Services	10,394	46.82		85.9%	40.8%	45.1%
FVCB.OQ	FVCBANKCORP INC COM	Financials	288	21.06		78.5%	33.5%	45.0%
BAH.N	BOOZ ALLEN HAMILTON HLDG COR CL A	Industrials	11,504	86.33		53.4%	10.8%	42.5%
ALKS.O	ALKERMES PLC ORD	Health Care	3,754	23.18	2	45.1%	5.1%	40.0%
MNMD.OQ	MIND MEDICINE MINDMED INC COM SUB VTG	Health Care	478	1.05		67.7%	28.7%	39.1%
ORGS.OQ	ORGENESIS INC COM NEW	Health Care	87	3.57		48.7%	10.4%	38.2%
RPT.N	RPT REALTY SH BEN INT	Real Estate	1,143	13.48		82.9%	44.7%	38.2%
ORL.N	OLD REP INTL CORP COM	Financials	8,121	26.40		81.6%	43.7%	37.9%
DISCA.O	DISCOVERY INC COM SER C	Communication Services	8,851	26.81		40.8%	4.2%	36.6%
FOE.N	FERRO CORP COM	Materials	1,811	21.66		80.7%	45.2%	35.5%
BKR.O	BAKER HUGHES COMPANY CL A	Energy	31,670	33.22	1	85.8%	50.9%	34.9%
NCMI.O	NATIONAL CINEMEDIA INC COM	Communication Services	217	2.67		81.4%	46.5%	34.9%
SDGR.O	SCHRODINGER INC COM	Health Care	1,997	32.28	1H	42.4%	8.1%	34.3%
ATLO.OQ	AMES NATL CORP COM	Financials	218	24.01		91.0%	56.9%	34.1%
MGI.OQ	MONEYGRAM INTL INC COM NEW	Information Technology	972	10.71		71.9%	38.0%	33.9%
OPI.OQ	OFFICE PPTYS INCOME TR COM SHS BEN INT	Real Estate	1,228	25.35		43.0%	9.2%	33.8%
CCO.N	CLEAR CHANNEL OUTDOOR HLDGS COM	Communication Services	1,659	3.52	2	63.2%	29.7%	33.6%
BUSE.OQ	FIRST BUSEY CORP COM NEW	Financials	1,483	26.83		71.1%	39.1%	32.0%
LNTH.OQ	LANTHEUS HLDGS INC COM	Health Care	3,544	52.30		44.7%	13.1%	31.6%
VRS.N	VERSO CORP CL A	Materials	777	26.65		60.7%	29.1%	31.6%
ARQT.OQ	ARCUTIS BIOTHERAPEUTICS INC COM	Health Care	846	16.79		56.9%	25.9%	31.0%
ALG.N	ALAMO GROUP INC COM	Industrials	1,709	143.20		81.1%	50.1%	30.9%
STFC.O*Q22	STATE AUTO FINL CORP COM	Financials	2,315	52.01		93.9%	63.6%	30.3%
VIRT.O	VIRTU FINL INC CL A	Financials	3,819	35.11	2	78.9%	49.1%	29.8%
BY.N	BYLINE BANCORP INC COM	Financials	1,030	27.32		82.3%	52.7%	29.6%
SREV.OQ	SERVICESOURCE INTL INC COM	Information Technology	128	1.29		79.1%	49.5%	29.6%
IIN.OQ	INTRICON CORP COM	Health Care	221	23.88		47.3%	18.0%	29.2%
WTS.N	WATTS WATER TECHNOLOGIES INC CL A	Industrials	3,959	143.54		58.0%	30.1%	27.9%
FSP.A	FRANKLIN STR PPTYS CORP COM	Real Estate	602	5.79		39.3%	11.4%	27.9%
REGI.O	RENEWABLE ENERGY GROUP INC COM NEW	Energy	3,071	61.04	2	96.6%	68.9%	27.6%
ALLY.N	ALLY FINL INC COM	Financials	14,924	44.79	1	88.7%	61.1%	27.5%
KTOS.OQ	KRATOS DEFENSE & SEC SOLUTIONS COM NEW	Industrials	2,493	20.00		69.8%	42.3%	27.5%
NOTV.OQ	INOTIV INC COM	Health Care	611	23.99		32.6%	5.1%	27.4%
SNEX.OQ	STONEX GROUP INC COM	Financials	1,518	75.42		80.6%	53.4%	27.2%
MGPI.OQ	MGP INGREDIENTS INC NEW COM	Consumer Staples	1,764	80.33		29.4%	2.3%	27.2%
FUNC.OQ	FIRST UTD CORP COM	Financials	143	21.65		94.1%	67.0%	27.1%
MERC.OQ	MERCER INTL INC COM	Materials	852	12.90		34.6%	7.6%	27.0%
MDT.N	MEDTRONIC PLC SHS	Health Care	145,302	108.31	1	74.0%	47.1%	27.0%
TT.N	TRANE TECHNOLOGIES PLC SHS	Industrials	35,337	151.31	1	71.7%	44.9%	26.8%
SPLK.O	SPLUNK INC COM	Information Technology	20,493	129.06	2	84.3%	58.0%	26.3%
DAL.N	DELTA AIR LINES INC DEL COM NEW	Industrials	22,090	34.52	1	69.2%	42.9%	26.3%
RL.N	RALPH LAUREN CORP CL A	Consumer Discretionary	5,371	116.05	1	41.7%	15.7%	26.0%
BL.OQ	BLACKLINE INC COM	Information Technology	4,143	69.94		76.0%	50.2%	25.8%

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Source: Citi Research, FactSet, Compustat, Thomson Reuters IBES

Figure 12. Top 50 Stocks with the Largest Decrease in Crowding Composite (Monthly Change)

RIC	Company	GICS Sector	Mkt Cap (USDm)	Price USD (4-Mar-22)	Citi Rating	Crowding Composite Rank	Prior Crowding Composite Rank	Change in Crowding Composite
QMCO.OQ	QUANTUM CORP COM NEW	Information Technology	161	2.67		25.4%	90.6%	-65.2%
LRMR.OQ	LARIMAR THERAPEUTICS INC COM	Health Care	71	4.00		6.8%	70.5%	-63.8%
TWTR.N	TWITTER INC COM	Communication Services	26,733	33.39	2	3.9%	64.7%	-60.7%
EEFT.O	EURONET WORLDWIDE INC COM	Information Technology	5,294	103.48	1	27.5%	84.6%	-57.1%
NS.N	NUSTAR ENERGY LP UNIT COM	Energy	1,855	16.85	1	30.7%	82.0%	-51.2%
PYPL.O	PAYPAL HLDGS INC COM	Information Technology	116,396	99.91	1	41.8%	90.5%	-48.7%
EPAM.N	EPAM SYS INC COM	Information Technology	11,292	198.52	1H	20.5%	68.0%	-47.5%
PROQR.O	PROQR THERAPEUTICS N V SHS EURO	Health Care	64	0.90	2H	13.5%	60.3%	-46.8%
APD.N	AIR PRODS & CHEMS INC COM	Materials	50,647	228.43	2	30.1%	76.9%	-46.8%
KRG.N	KITE RLTY GROUP TR COM	Real Estate	4,959	22.65	2	49.4%	94.1%	-44.7%
BBWI.N	BATH & BODY WORKS INC COM	Consumer Discretionary	12,840	49.82	1	43.6%	87.3%	-43.7%
VRT.N	VERTIV HOLDINGS CO COM CL A	Industrials	3,974	10.57	1H	52.8%	96.4%	-43.5%
G.N	GENPACT LIMITED SHS	Information Technology	7,766	41.94	1	33.4%	76.8%	-43.4%
BMJ.N	BRISTOL-MYERS SQUIBB CO COM	Health Care	151,185	69.36	1	10.5%	53.8%	-43.3%
ZDGE.A	ZEDGE INC CL B	Communication Services	79	5.68		22.5%	65.2%	-42.7%
JYNT.OQ	JOINT CORP COM	Health Care	506	35.09		35.1%	77.8%	-42.7%
SPOK.OQ	SPOK HOLDINGS INC COM	Communication Services	176	8.93		40.3%	82.6%	-42.3%
WTM.N	WHITE MTNS INS GROUP LTD COM	Financials	3,171	1056.57		11.1%	51.8%	-40.6%
EXC.O	EXELON CORP COM	Utilities	43,320	44.28		45.4%	85.4%	-40.1%
SU.TO	SUNCOR ENERGY INC NEW COM	Energy	45,192	31.46	2	12.0%	52.0%	-40.0%
TELA.OQ	TELA BIO INC COM	Health Care	185	12.75		16.8%	56.5%	-39.7%
NECB.OQ	NORTHEAST CMNTY BANCORP INC COM	Financials	200	12.21		45.3%	84.3%	-38.9%
BAX.N	BAXTER INTL INC COM	Health Care	43,207	86.02	1	27.7%	66.5%	-38.8%
BCOV.OQ	BRIGHTCOVE INC COM	Information Technology	296	7.18		2.1%	40.7%	-38.6%
LBRT.N	LIBERTY OILFIELD SVCS INC COM CL A	Energy	2,600	14.16	1	9.7%	47.5%	-37.8%
VLO.N	VALERO ENERGY CORP COM	Energy	35,192	85.98	1	38.6%	76.0%	-37.4%
DFIN.N	DONNELLEY FINL SOLUTIONS INC COM	Financials	984	30.10		18.2%	54.8%	-36.6%
UBA.N	URSTADT BIDDLE PPTYS INC CL A	Real Estate	598	19.83		17.1%	53.5%	-36.5%
LTL.OQ	FULL HSE RESORTS INC COM	Consumer Discretionary	287	8.38		21.2%	56.7%	-35.5%
SUN.N	SUNOCO LP/SUNOCO FIN CORP COM UT REP LP	Energy	3,567	42.62	1	21.8%	57.3%	-35.5%
DHL.N	D R HORTON INC COM	Consumer Discretionary	30,262	85.40	1	23.8%	59.1%	-35.3%
PFC.OQ	PREMIER FINANCIAL CORP COM	Financials	1,119	30.70		13.1%	48.1%	-35.1%
CHEF.OQ	CHEFS WHSE INC COM	Consumer Staples	1,203	31.74		44.2%	79.1%	-34.9%
GDDY.N	GODADDY INC CL A	Information Technology	13,458	80.50		48.2%	82.8%	-34.7%
HUBG.OQ	HUB GROUP INC CL A	Industrials	2,903	85.32		34.3%	68.3%	-34.0%
IDCC.OQ	INTERDIGITAL INC COM	Information Technology	1,983	64.61		49.0%	82.9%	-34.0%
IESC.OQ	IES HLDGS INC COM	Industrials	851	40.94		40.2%	73.9%	-33.7%
FRO.N	FRONTLINE LTD SHS NEW	Energy	1,869	9.44		14.9%	48.4%	-33.5%
CDAY.N	CERIDIAN HCM HLDG INC COM	Information Technology	10,145	66.72		36.8%	70.3%	-33.5%
WNC.N	WABASH NATL CORP COM	Industrials	835	17.12		43.9%	77.3%	-33.4%
USLM.OQ	UNITED STS LIME & MINERALS I COM	Materials	660	116.62		52.9%	86.2%	-33.4%
LTRPA.OQ	LIBERTY TRIPADVISOR HLDGS IN COM SER A	Communication Services	127	1.75		36.4%	69.5%	-33.1%
MTRN.N	MATERION CORP COM	Materials	1,693	82.78		35.5%	68.5%	-33.0%
TNXP.OQ	TONIX PHARMACEUTICALS HLDG C COM	Health Care	103	0.21		13.4%	46.3%	-33.0%
HST.O	HOST HOTELS & RESORTS INC COM	Real Estate	12,326	17.26	1	27.4%	59.3%	-31.8%
MGM.N	MGM RESORTS INTERNATIONAL COM	Consumer Discretionary	18,243	41.54	1	47.6%	79.2%	-31.6%
GRTX.O	GALERA THERAPEUTICS INC COM	Health Care	57	2.14	1H	26.7%	58.1%	-31.4%
WLMS.K	WILLIAMS INDL SVCS GROUP INC COM	Industrials	37	1.43		30.5%	61.6%	-31.2%
EMKR.OQ	EMCORE CORP COM	Information Technology	138	3.71		5.3%	36.4%	-31.1%
RDN.N	RADIAN GROUP INC COM	Financials	4,190	23.87		17.6%	48.7%	-31.1%

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Source: Citi Research, FactSet, Compustat, Thomson Reuters IBES

Region Focus: Europe

February has been a difficult month for European investors. At the start of the year with UST yields rising and a more hawkish Fed, global investors had started to look more favorably on European equities. Equity flows were finally starting to move away from the US and towards Europe. Events of the past few weeks have put a dramatic halt to this. Positioning in European equities has turned sharply net short and the shortest in some time (Equity Markets Positioning Model: Rapid Increase in European Equity Shorts). This has meant that some of the trends that were starting to emerge earlier in the year have stalled and in some cases we have seen a reversal as investors have become distinctly risk averse.

What does this mean for stock crowding in Europe? Firstly, the average return spread between high and low crowded stocks is negative again (due to having a reversal of a reversal in trend), Cyclical, despite the risk aversion in markets, remain the most crowded sectors. For Energy and Materials this makes sense given the hike in oil and commodity prices, but less so for Industrials. Given that higher energy and commodities prices only exacerbate inflation pressures and the likelihood of higher interest rates, the high valuation parts of the market have seen a fall in crowding such as Semiconductors and Retail (luxury).

We expect volatility to continue while the uncertainty around the Russia / Ukraine conflict continues, and as such, it's difficult to see stable trends emerging in the near term that will allow conviction to build in stock crowding. Earnings Momentum remains the most crowded factor, which is a surprise, and we would expect this to transition to Low Risk soon.

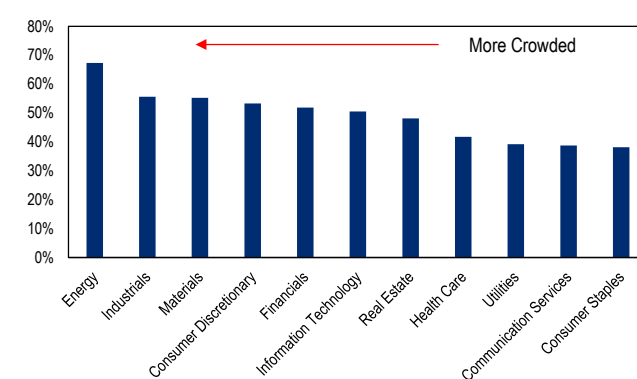
Figure 13. Aggregate Industry Group Crowding Scores Changes

GICS Industry Group	Feb	Mar	1M Chg	3M Chg
Consumer Services	48.4%	52.5%	4.1%	0.1%
Household & Personal Products	26.8%	29.8%	3.0%	0.8%
Materials	52.4%	55.3%	2.9%	5.7%
Media & Entertainment	40.2%	43.0%	2.8%	0.1%
Commercial & Professional Services	53.3%	55.1%	1.8%	-1.1%
Telecommunication Services	23.7%	25.3%	1.7%	-1.2%
Real Estate	46.3%	48.1%	1.4%	6.0%
Capital Goods	55.5%	56.9%	1.4%	-0.2%
Food & Staples Retailing	40.1%	41.2%	1.1%	-1.1%
Banks	56.2%	57.1%	1.0%	1.0%
Food Beverage & Tobacco	38.1%	38.8%	0.7%	4.4%
Pharmaceuticals, Biotechnology & Life Sciences	43.9%	44.0%	-0.3%	0.0%
Utilities	40.5%	39.2%	-1.3%	-2.0%
Energy	68.7%	67.3%	-1.4%	3.1%
Transportation	51.8%	50.2%	-1.6%	-3.4%
Software & Services	49.7%	47.5%	-1.7%	-4.3%
Diversified Financials	50.0%	47.8%	-1.7%	-2.9%
Insurance	54.2%	52.2%	-2.0%	4.3%
Technology Hardware & Equipment	52.1%	50.0%	-2.1%	0.6%
Automobiles & Components	56.1%	53.4%	-2.7%	1.9%
Consumer Durables & Apparel	61.7%	58.3%	-2.8%	-6.0%
Health Care Equipment & Services	40.6%	37.8%	-2.8%	-5.2%
Retailing	52.7%	48.9%	-3.0%	-1.6%
Semiconductors & Semiconductor Equipment	66.7%	61.4%	-5.2%	-6.1%

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Source: Citi Research, IBES, Worldscope, Thomson Reuters, Markit, Stoxx

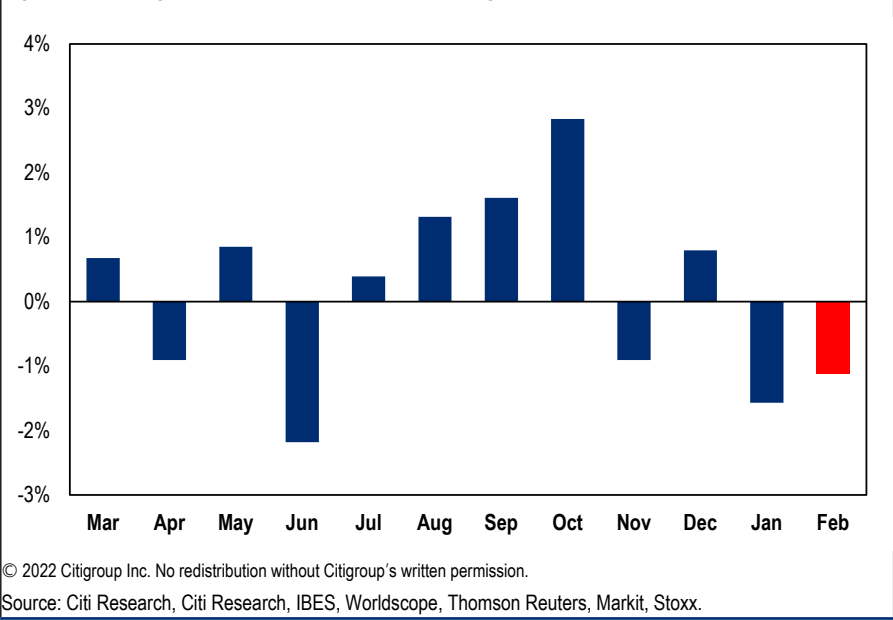
Figure 14. Aggregate Sector Crowding Scores



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Source: Citi Research, IBES, Worldscope, Thomson Reuters, Markit, Stoxx

Figure 15. Average Performance Spread between High/Low Crowded Stocks



Europe: Crowding Quant + Fundamental

Figure 16 shows the most and least crowded trades (in the top or bottom quintile) in Europe combined with our analyst recommendations. We also show whether, for a given stock, whether the analyst has an upside or downside catalyst watch on the stock. The stocks are then grouped by countries and sectors.

Figure 16. Crowding Composite Screen

Sedol	RIC	Company Name	Country	GICS Sector	Closing Price (USD)	Citi Rating	Catalyst Watch	Crowding Composite Rank	Prior Crowding Composite Rank	Change in Crowding Composite	Quant Crowded Factor Rank	Hist Relative Valuation Rank	Consensus Rating Skewness Rank	Macro Risk Contribution Rank	Short Interest Rank (Inverse)
Citi Buy Recommendations / Upside Catalyst Watches that are in the Top 20% Least Crowded															
BXDZ97	TRYG.CO	TRYG A/S DKK5	Denmark	Financials	21.22	1		19.1%	15.9%	3.1%	19.7%	19.8%	38.1%	41.9%	73.1%
450109	GN.CO	GN STORE NORD DKK4	Denmark	Health Care	47.62	1		14.5%	41.4%	-26.9%	7.4%	22.3%	73.9%	63.6%	11.8%
BN4MYF	VWS.CO	VESTAS WIND SYSTEM DKK0.20	Denmark	Industrials	28.75	1		11.9%	8.8%	3.1%	0.7%	85.7%	11.3%	29.7%	42.5%
B1L3CS	UBIP.PA	UBISOFT ENTERTAIN NPV	France	Communication Services	45.65	1		3.7%	6.9%	-3.2%	30.4%	6.2%	40.4%	5.7%	44.3%
B1Y9TB	DANO.PA	DANONE EUR0.25	France	Consumer Staples	53.72	1		8.5%	15.7%	-7.2%	48.5%	25.3%	15.2%	32.7%	34.1%
BNBNSG	ENX.PA	EURONEXT EUR1.60	France	Financials	84.79	1		17.5%	8.5%	9.0%	18.9%	11.3%	64.5%	54.4%	38.6%
BDRJ2B	TKOO.PA	TIKEHAU CAPITAL EUR12	France	Financials	24.59	1		13.6%	19.6%	-6.0%	64.2%	19.1%	65.6%	21.5%	5.6%
B0DJ8Q	ALSO.PA	ALSTOM EUR7.00	France	Industrials	20.88	1		4.3%	5.0%	-0.6%	9.6%	15.2%	65.1%	33.5%	8.5%
B0NJ1	EDF.PA	EDF EUR0.5	France	Utilities	8.14	1H		4.5%	7.6%	-3.1%	10.8%	3.0%	34.4%	81.5%	4.9%
B7VG6L	O2Dn.F	TELEFONICA DEUTSCH NPV	Germany	Communication Services	2.56	1		4.6%	25.8%	-21.1%	68.6%	19.4%	31.8%	1.4%	15.3%
BZCNB4	DHER.DE	DELIVERY HERO SE NPV	Germany	Consumer Discretionary	44.21	1	UPSIDE	17.8%	67.2%	-49.4%	12.6%	50.6%	54.1%	57.8%	13.6%
403197	ADSGn.DE	ADIDAS AG NPV (REGD)	Germany	Consumer Discretionary	204.33	1		8.1%	22.0%	-14.0%	12.9%	21.6%	57.5%	50.2%	10.8%
BYW88S	HFGG.DE	HELLOFRESH SE NPV	Germany	Consumer Staples	41.06	1		14.9%	6.8%	8.1%	59.6%	9.3%	54.1%	33.6%	23.6%
510740	BEIG.DE	BEIERSDORF AG NPV	Germany	Consumer Staples	93.10	1		7.8%	1.8%	5.9%	56.5%	32.3%	37.3%	4.2%	22.1%
BKF1H5	8TRA.DE	TRATON SE NPV (NEW)	Germany	Industrials	17.54	1		5.6%	19.9%	-14.3%	38.7%	12.4%	42.7%	30.3%	18.4%
B8KX7	GTY.DE	GRAND CITY PROPERT EUR0.10	Germany	Real Estate	20.24	1		8.1%	18.9%	-10.8%	32.1%	26.9%	42.5%	20.6%	31.3%
B02NR8	NEL.OL	NEL ASA NOK0.20	Norway	Industrials	1.50	1H		5.3%	14.2%	-8.9%	6.3%	89.9%	21.3%	1.3%	22.5%
B63G2	PZU.WA	PZU SA PLN0.10	Poland	Financials	6.54	1H		15.6%	5.9%	9.8%	67.5%	13.9%	43.6%	13.8%	43.1%
B233HR	RENE.LS	REN-REDES ENERGET EUR1(REGD)	Portugal	Utilities	2.82	1		13.2%	11.5%	1.7%	24.1%	66.0%	6.0%	22.3%	56.4%
BYY3DX	GRLS.MC	GRIFOLS SA EUR0.25 (CLASS A) POST	Spain	Health Care	17.39	1		2.1%	4.0%	-1.9%	14.4%	11.4%	43.6%	17.6%	22.3%
BMDT77	EMBRACb.S	EMBRACER GROUP AB SER'B'NPV	Sweden	Communication Services	7.01	1	UPSIDE	5.0%	16.1%	-11.1%	19.8%	50.1%	61.2%	5.0%	2.8%
BUXSCH	EVOG.ST	EVOLUTION AB NPV	Sweden	Consumer Discretionary	97.61	1H		8.7%	28.7%	-20.0%	32.8%	7.5%	57.5%	17.9%	40.5%
B92M6T	ROSEG.S	ZUR ROSE GP AG CHF30.00	Switzerland	Consumer Staples	145.52	1		12.8%	13.7%	-0.9%	17.5%	79.6%	37.5%	14.3%	24.7%
717158	CSGN.S	CREDIT SUISSE GP CHF0.04 (REGD)	Switzerland	Financials	7.46	1		3.9%	19.8%	-15.9%	0.3%	5.9%	4.3%	93.6%	23.8%
711038	ROG.S	ROCHE HLDGS AG GENUSSSCHEINE NPV	Switzerland	Health Care	365.33	1		11.6%	29.5%	-17.9%	34.6%	55.9%	57.1%	9.6%	11.5%
710306	NOVN.S	NOVARTIS AG CHF0.50 (REGD)	Switzerland	Health Care	84.39	1		2.3%	3.9%	-1.6%	8.4%	58.6%	26.7%	9.2%	11.0%
BQ510J	GAMA.L	GAMMA COMMUNICATIO ORD	United Kingdom	Communication Services	18.17	1		13.3%	40.5%	-27.2%	33.1%	14.9%	54.4%	20.8%	51.7%
B1ZBKY	MONEY.L	MONEYSUPERMARKET.C ORD	United Kingdom	Communication Services	2.54	1		4.9%	8.4%	-3.5%	12.7%	9.3%	83.1%	4.9%	27.7%
BBT32N	FDEV.L	FRONTIER DEVELOPME GBP0.005	United Kingdom	Communication Services	15.21	1		2.3%	0.7%	1.5%	20.6%	30.8%	43.6%	2.2%	16.4%
B4Y7R1	CURY.L	CURRYS PLC ORD GBP0.001	United Kingdom	Consumer Discretionary	1.20	1		8.0%	14.4%	-6.4%	10.6%	29.9%	25.4%	79.0%	8.0%
B019KW	SBRY.L	SAINSBURY(J) ORD GBP0.28571428	United Kingdom	Consumer Staples	3.29	1		18.8%	42.8%	-24.0%	20.4%	65.7%	14.2%	18.3%	73.3%
B3MBS7	OCDO.L	OCADO GROUP PLC ORD GBP0.02	United Kingdom	Consumer Staples	16.06	1		7.4%	12.2%	-4.8%	7.9%	57.8%	23.6%	4.4%	57.4%
B10RZP	ULVR.L	UNILEVER PLC ORD GBP0.031111	United Kingdom	Consumer Staples	45.11	1		1.1%	3.1%	-2.0%	11.6%	17.8%	21.0%	6.0%	44.6%
098952	AZN.L	ASTRAZENECA ORD USD0.25	United Kingdom	Health Care	114.80	1	UPSIDE	17.3%	35.5%	-18.2%	26.7%	10.7%	89.8%	8.4%	51.7%
BG5KQW	CWR.L	CERES POWER HLDGS ORD GBP0.10	United Kingdom	Industrials	8.02	1H		12.4%	16.4%	-4.0%	40.7%	55.5%	63.5%	9.9%	2.9%
B0130H	ITM.L	ITM POWER ORD GBP0.05	United Kingdom	Industrials	4.16	1H		10.5%	12.4%	-1.9%	9.7%	96.1%	38.0%	3.0%	17.3%
B23K0M	CPIL	CAPITA PLC ORD GBP0.02066666	United Kingdom	Information Technology	0.30	1		13.8%	14.8%	-1.0%	3.8%	4.2%	38.1%	80.3%	50.5%
BWFKZT	CLLS.O	CELLECTIS S A SPON ADS	United States	Health Care	3.53	1H		15.0%	18.9%	-3.9%	31.8%	52.6%	31.8%		28.3%
Citi Sell Recommendations / Downside Catalyst Watches that are in the Top 20% Most Crowded															
B54C01	SDFGn.DE	K+S AG NPV (REGD)	Germany	Materials	24.92	3		81.6%	70.0%	11.5%	99.7%	38.9%	41.2%	62.7%	83.5%
525620	AGL.MI	AUTOGRIILL SPA NPV	Italy	Consumer Discretionary	6.23	3		82.8%	61.9%	20.9%	81.8%	85.1%	23.2%	72.7%	65.7%
BYSVKN	CRES.MI	COIMA RES SPA NPV	Italy	Real Estate	8.24	3		84.6%	60.5%	24.1%	92.8%	43.7%	43.6%	81.9%	72.7%
BG0T3J	ELK.OL	ELKEM ASA NOK5	Norway	Materials	3.56	3		91.0%	33.6%	57.4%	99.8%	19.7%	43.6%	97.8%	92.5%
BWXCOZ	FLTRF.L	FLUTTER ENTERTAINM ORD EUR0.09	United Kingdom	Consumer Discretionary	105.82	1	DOWNSIDE	90.0%	96.9%	-6.9%	61.6%	79.5%	98.8%	53.8%	56.7%
B5VQMV	ENT.L	ENTAIN PLC ORD EUR0.01	United Kingdom	Consumer Discretionary	19.73	1	DOWNSIDE	88.7%	77.9%	10.8%	19.1%	93.5%	97.5%	47.8%	88.5%
B7KR2P	EZJ.L	EASYJET ORD GBP0.27285714	United Kingdom	Industrials	6.29	3		97.5%	65.1%	32.4%	84.3%	78.6%	65.3%	76.0%	87.6%
B6YTL5	SGC.L	STAGECOACH GROUP ORD	United Kingdom	Industrials	1.00	3		89.1%	87.3%	1.8%	62.2%	37.5%	65.6%	82.5%	99.7%

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Source: Citi Research, IBES, Worldscope, Thomson Reuters, Markit, Stoxx.

Europe: Largest Increase in Crowding Score – Top 50

Figure 17 presents the top 50 stocks that have had the largest increase in their crowding score relative to the previous month. For reference, we provide the Citi analyst recommendation where relevant.

Figure 17. Stocks Entering Most Crowded Quintile of Crowding Composite

Sedol	RIC	Company Name	Country	GICS Sector	Closing Price (USD)	Citi Rating	Catalyst Watch	Crowding Composite Rank	Prior Crowding Composite Rank	Change in Crowding Composite	Quant Crowded Factor Rank	Hist Relative Valuation Rank	Consensus Rating Skewness Rank	Macro Risk Contribution Rank	Short Interest Rank (Inverse)
762204	BOIR.PA	BOIRON EUR1	France	Health Care	43.16			93.6%	21.4%	72.2%	95.5%	63.4%	100.0%	14.7%	91.0%
571630	VLAN.AS	VAN LANSCHOT KEMPE CVA REP	Netherlands	Financials	23.27			88.9%	20.4%	68.6%	96.7%	25.7%		91.9%	63.5%
713525	EMBL.MI	CREDITO EMILIANO EUR1	Italy	Financials	6.15			72.9%	14.6%	58.3%	89.7%	48.8%	43.6%	58.8%	63.0%
BG0T3J	ELK.OL	ELKEM ASA NOKS	Norway	Materials	3.56	3		91.0%	33.6%	57.4%	99.8%	19.7%	43.6%	97.8%	92.5%
B1YNGV	ST5G.DE	STEICO SE NPV (BR)	Germany	Industrials	87.96			86.5%	29.8%	56.7%	94.6%	88.5%	100.0%	48.6%	8.1%
BNKF5Z	KINV6.ST	KINNEVIK AB SER'A'NPV	Sweden	Financials	24.41			92.7%	40.2%	52.5%	96.7%	91.4%	26.9%	73.4%	
BMHTHK	AM3D.DE	SLM SOLUTIONS GROU NPV	Germany	Industrials	14.21			81.0%	29.5%	51.5%	47.9%	97.3%	100.0%	64.9%	14.6%
596293	SEM.LS	SEMAPA SOC INVEST NPV	Portugal	Materials	12.39			82.2%	32.7%	49.4%	95.0%	16.0%		77.6%	73.4%
416279	TCFF.PA	THALES SA EUR3	France	Industrials	117.63	1		67.7%	18.5%	49.1%	52.0%	64.9%	73.0%	33.8%	67.2%
429537	EVNV.VI	EVN AG NPV	Austria	Utilities	22.73			59.5%	10.7%	48.8%	39.9%	64.7%	84.9%	40.7%	45.8%
B14SKR	CMCX.L	CMC MARKETS ORD GBP0.25	United Kingdom	Financials	3.01			55.9%	7.2%	48.7%	71.2%	50.7%	89.8%	30.1%	27.3%
BNFWV7	COFA.PA	COFACE EUR2.00	France	Financials	10.58			92.5%	44.7%	47.8%	88.0%	43.6%	84.9%	75.9%	67.6%
BNNTR9	SEDANA.ST	SEDANA MEDICAL AB NPV	Sweden	Health Care	6.22			57.9%	10.1%	47.8%	96.7%	86.1%		31.6%	4.0%
411522	BPSL.MI	BCA POP DI SONDRIO EUR3	Italy	Financials	3.21			72.6%	25.0%	47.5%	90.3%	37.5%		85.6%	29.4%
713666	JCDX.PA	JC DECAUX SA NPV	France	Communication Services	23.01	2		87.3%	40.3%	47.0%	99.6%	93.4%	12.1%	60.8%	75.7%
494862	WEHA.AS	WERELDHAVE NV EUR1	Netherlands	Real Estate	16.98			83.6%	37.4%	46.2%	90.5%	89.3%	1.5%	96.0%	54.7%
592735	ADFG.DE	ATOSS SOFTWARE AG NPV	Germany	Information Technology	172.65			73.8%	29.1%	44.7%	90.1%	93.6%	78.3%	34.3%	9.6%
BOLCW2	PCTN.L	PICTON PROP INCOME ORD NPV	United Kingdom	Real Estate	1.22			60.0%	16.2%	43.8%	76.9%	62.2%	65.6%	23.9%	48.3%
B170DQ	KOOGN.DE	KLOECKNER & CO SE NPV	Germany	Industrials	12.84			58.6%	15.3%	43.3%	68.7%	29.2%	43.6%	79.2%	53.0%
BUXCLP	VMUK.L	VIRGIN MONEY UK PL ORD	Australia	Financials	2.34			48.3%	5.4%	43.0%	93.7%	21.7%	2.1%		85.9%
507143	METS.BE	METSA BOARD CORPOR	Finland	Materials	8.63			89.3%	46.4%	42.9%	99.8%	27.5%	78.3%	47.5%	95.1%
BWVYKX	BCART.BR	BIOCARTIS GROUP NV NPV	Belgium	Health Care	2.12			75.8%	33.7%	42.1%	96.7%	99.4%	43.6%	33.6%	38.8%
584330	SATG.DE	SARTORIUS AG NPV	Germany	Health Care	362.78			76.8%	35.2%	41.6%	95.2%	53.8%	100.0%	4.6%	60.2%
BLN9XH	SWE6.ST	SWECO AB SER'B'NPV	Sweden	Industrials	12.48			46.6%	5.5%	41.1%	92.1%	71.9%	26.9%	27.8%	31.7%
096970	BAB.L	BABCOCK INTL GROUP ORD	United Kingdom	Industrials	4.06	1		90.3%	50.0%	40.3%	81.5%	93.5%	43.6%	37.5%	95.0%
B151P4	MTGB.ST	MODERN TIMES GROUP	Sweden	Communication Services	11.60	1H		78.3%	38.5%	39.8%	66.4%	80.3%	100.0%	20.6%	50.7%
BF6P5N	ALERS.PA	EUROBIO-SCIENTIFIC EUR0.32	France	Health Care	21.70			54.1%	14.7%	39.4%	96.7%	16.6%		90.5%	8.4%
BNKF60	KINV6.ST	KINNEVIK AB SER'B'NPV	Sweden	Financials	23.41			88.1%	48.8%	39.3%	96.7%	92.5%	26.9%	71.5%	56.2%
BD6K45	CPG.L	COMPASS GROUP ORD	United Kingdom	Consumer Discretionary	20.63	1		75.2%	35.9%	39.2%	82.5%	39.1%	38.1%	75.5%	75.3%
BYPC1T	ASSA.ST	ASSA ABLOY SER'B'NPV	Sweden	Industrials	24.44	1		77.0%	38.5%	38.5%	92.9%	47.8%	43.3%	60.0%	70.2%
BYVW3C	FORT.L	FORTERRA PLC ORD GBP0.01	United Kingdom	Materials	2.82	1		67.7%	29.2%	38.5%	90.0%	27.4%	65.6%	61.6%	46.2%
BMX64W	SAGA.L	SAGA PLC ORD GBP0.15	United Kingdom	Financials	3.19			90.3%	51.9%	38.5%	91.5%	72.1%	78.3%	68.0%	41.4%
575035	DBKG.DE	DEUTSCHE BANK AG NPV(REGD)	Germany	Financials	10.00	3H		73.1%	34.9%	38.2%	94.1%	32.6%	11.3%	70.9%	95.4%
462719	BVB.DE	BORUSSIA DORTMUND NPV	Germany	Communication Services	3.74			75.2%	37.1%	38.1%	74.7%	76.2%	78.3%	45.2%	36.4%
738006	ARLG.DE	AAREAL BANK AG NPV	Germany	Financials	26.68	1		63.3%	25.6%	37.8%	74.0%	77.1%	17.7%	94.2%	19.4%
556971	LPKG.DE	LPKF LASER & ELECT NPV	Germany	Information Technology	14.66			78.5%	40.9%	37.6%	83.5%	83.4%	84.9%	47.2%	19.6%
B11LJN	TUIT.L	TUI AG ORD REG SHS NPV (DI)	United Kingdom	Consumer Discretionary	2.57	3H		50.7%	13.2%	37.4%	82.6%	93.3%	0.7%	61.6%	20.7%
B17NY9	OKOBV.HE	ORIOLA OYJ SER'B'NPV	Finland	Health Care	2.01			48.0%	11.0%	37.0%	94.7%	43.4%	26.9%	21.4%	67.0%
552902	MBGn.DE	MERCEDES-BENZ ORD	Germany	Consumer Discretionary	63.38	1		89.0%	52.2%	36.8%	86.6%	51.8%	94.3%	92.4%	22.1%
B55Q3P	GENL.L	GENEL ENERGY ORD GBP0.10	United Kingdom	Energy	1.98			94.4%	57.7%	36.7%	96.7%	35.5%	54.4%	83.5%	98.7%
B1VV9V	SLIGR.AS	SLIGRO FOOD GROUP EUR0.06	Netherlands	Consumer Staples	22.62			96.7%	60.2%	36.5%	93.0%	50.5%	84.9%	92.7%	63.2%
068866	ERM.L	EUROMONEY INST INV ORD	United Kingdom	Communication Services	11.72			64.0%	27.5%	36.5%	74.3%	25.8%	26.9%	77.4%	80.1%
BVG7F0	IGT.N	INTERNATIONAL GAME	United States	Consumer Discretionary	25.84			86.9%	50.9%	36.0%	69.3%	89.8%	73.9%		39.5%
548120	CBLP.PA	MERSEN SA EUR2	France	Industrials	32.07			95.7%	60.0%	35.7%	95.0%	55.7%	78.3%	97.8%	49.4%
550190	BBVA.MC	BBVA(BILB-VIZ-ARG) EUR0.49	Spain	Financials	5.24	1		68.8%	33.3%	35.4%	90.5%	45.8%	43.6%	80.1%	32.6%
B292JQ	GETP.PA	GETLINK SE EUR0.40	France	Industrials	15.21	2		57.6%	22.3%	35.3%	79.9%	94.9%	11.9%	74.0%	11.4%
BGHVXC	DRLO.CO	DRILLING CO 1972 DKK10	Denmark	Energy	47.09			69.5%	34.5%	35.0%	82.4%	94.7%	38.1%	10.6%	68.7%
BYXS69	QGEN.N	QIAGEN NV EUR0.01	Germany	Health Care	46.04			95.8%	61.5%	34.3%	75.9%	65.0%	73.9%	93.8%	67.9%
BN796M	FACC.VI	FACC AG NVP	Austria	Industrials	8.09			43.8%	9.5%	34.3%	76.0%	85.8%	14.4%	14.4%	54.8%
701855	NVGR.LS	NAVIGATOR COMP NPV	Portugal	Materials	3.26			86.1%	52.6%	33.5%	87.8%	57.8%	43.6%	78.0%	71.1%

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Source: Citi Research, IBES, Worldscope, Thomson Reuters, Markit, Stoxx.

Europe: Largest Decrease in Crowding Score – Top 50

Figure 18 shows the top 50 stocks that have had the largest decrease in their crowding score relative to the previous month. For reference, we provide the Citi analyst recommendation where relevant.

Figure 18. Stocks Entering Least Crowded Quintile of Crowding Composite

Sedol	RIC	Company Name	Country	GICS Sector	Closing Price (USD)	Citi Rating	Catalyst Watch	Crowding Composite Rank	Prior Crowding Composite Rank	Change in Crowding Composite	Quant Crowded Factor Rank	Hist Relative Valuation Rank	Consensus Rating Skewness Rank	Macro Risk Contribution Rank	Short Interest Rank (Inverse)
BFC9VL	FNMA.ST	FERRONORDIC AB NPV	Sweden	Industrials	6.74			16.8%	96.2%	-79.4%	11.8%	1.5%		88.5%	47.5%
BNGW4R	BACTb.ST	BACTIGUARD HOLDING SER'B/NPV	Sweden	Health Care	11.74			13.0%	83.5%	-70.5%	0.7%	54.9%		76.2%	7.9%
BYPBRY	ENEA.ST	ENEA AB NPV	Sweden	Information Technology	18.45			7.8%	70.6%	-62.8%	0.7%	53.0%		62.4%	5.8%
BDCVXS	ALKAL.PA	KALRAY SA EUR10	France	Information Technology	28.74			15.3%	77.1%	-61.7%	0.7%	96.2%		45.9%	1.9%
464654	DECB.BR	DECEUNINOK NPV	Belgium	Industrials	2.60			1.7%	63.4%	-61.6%	13.3%	30.1%	26.9%	35.8%	0.4%
466802	PRICb.ST	PRICER AB SER'B/NPV	Sweden	Information Technology	1.75			10.3%	71.3%	-61.4%	0.7%	65.3%		60.1%	3.4%
B1L7YL	POS.OL	POS ASA NOK3	Norway	Energy	0.30			13.2%	73.8%	-60.6%	4.3%	58.9%	0.1%	92.0%	19.6%
BFF5Q0	LYKOb.ST	LYKO GROUP AB SER'A/NPV	Sweden	Consumer Discretionary	19.10			34.4%	94.3%	-59.8%	0.7%	96.9%	26.9%	19.1%	84.1%
536477	OTTS.ST	OTT SYSTEMS NPV	Sweden	Industrials	17.53			32.6%	92.0%	-59.4%	0.7%	62.7%		50.4%	65.5%
539968	KIT.OL	KITRON ASA NOK0.10	Norway	Information Technology	2.23			12.1%	69.9%	-57.8%	7.2%	81.5%		47.2%	0.5%
B55N4H	ARISE.ST	ARISE AB NPV	Sweden	Utilities	4.04			5.6%	61.0%	-55.5%	26.6%	46.8%		36.4%	4.1%
536488	KNOW.ST	KNOWIT AB NPV	Sweden	Information Technology	29.55			18.0%	71.3%	-53.3%	11.2%	44.0%		72.4%	23.5%
BUGS8T	ADKO.VI	ADKO BANK AG NPV	Austria		12.13	1H		33.2%	86.4%	-53.2%	8.9%	30.1%	78.3%	63.1%	1.0%
BPV8VP	INSTAL.ST	INSTALCO AB NPV	Sweden	Industrials	7.19			29.9%	82.4%	-52.5%	20.3%	91.7%		94.3%	30.6%
BYSS4Q	DFDS.CO	DFDS AS DKK20	Denmark	Industrials	39.89			19.0%	70.9%	-51.9%	0.7%	28.5%		45.3%	56.8%
BYL5SE	COPN.S	COSMO PHARMA N.V. EUR0.26 (REGO)	Switzerland	Health Care	60.98			19.7%	70.8%	-51.1%	0.7%	52.7%		39.7%	19.0%
B4LSFQ	SVB.ST	SVERS SEMICONDUCT NPV	Sweden	Information Technology	0.79			10.0%	60.6%	-50.6%	3.2%	67.7%		80.7%	33.0%
BFZ1K4	SPOT.N	SPOTIFY TECHNOLOGY S A SHS	United States	Communication Services	135.17	1		37.6%	87.9%	-50.3%	7.0%	60.8%	39.7%	32.3%	33.0%
B00FX5	BSLN.S	BASILEA PHARMACEUT CHF1 (REGO)	Switzerland	Health Care	38.11			37.8%	87.7%	-49.9%	5.2%	99.3%	65.6%	38.7%	20.0%
BMCMT2	NWHD.ST	NORCIC WATERPROOF NPV	Sweden	Industrials	16.26			15.3%	65.1%	-49.8%	12.5%	73.5%		25.9%	5.1%
BF3NMS	BONEX.ST	BONESUPPORT HLG AB NPV	Sweden	Health Care	4.00			9.5%	59.2%	-49.7%	0.7%	96.2%		16.2%	27.1%
B2CNB4	DHER.DE	DELIVERY HERO SE NPV	Germany	Consumer Discretionary	44.21	1	UPSIDE	17.8%	67.2%	-49.4%	12.6%	50.6%	54.1%	57.8%	13.6%
454721	LAGA.PA	LAGARDERE SA EUR6.10	France	Communication Services	27.62	2		41.5%	90.7%	-49.2%	23.2%	72.7%	26.9%	43.9%	75.3%
BUXMLF	AVANZ.ST	AVANZA BANK HLDG NPV	Sweden	Financials	20.27	1		31.3%	80.5%	-49.2%	24.3%	33.4%	89.8%	22.1%	53.0%
B8VJ5R	AKTIA.HE	AKTIA BANK PLC NPV	Finland	Financials	10.33			8.5%	57.4%	-49.0%	5.0%	21.5%		86.9%	11.1%
528917	MUMG.DE	MENSCH & MASCHINE ORD NPV	Germany	Information Technology	55.29			5.3%	54.1%	-48.7%	10.1%	59.9%		62.1%	25.4%
B3P8D4	ALCAR.PA	CARMAT EUR0.04	France	Health Care	10.05			41.0%	87.7%	-46.7%	0.5%	53.2%	100.0%	97.2%	48.2%
BKPG50	TETV.ST	TETHYS OIL AB NPV	Sweden	Energy	7.50			38.9%	85.3%	-46.4%	8.9%	35.8%		9.5%	46.6%
B281L7	FAGRO.BR	FAGRON NPV	Belgium	Health Care	16.12			8.9%	54.6%	-45.6%	25.0%	10.7%	65.6%	7.7%	14.1%
445218	WRTIV.HE	WARTSILA OYJ ABP NPV	Finland	Industrials	9.73	2		14.1%	58.9%	-44.8%	14.6%	31.1%	42.7%	60.6%	28.5%
445836	IMMO.BR	IMMOBEL NPV	Belgium	Real Estate	76.60			6.8%	51.1%	-44.3%	0.7%	26.1%	100.0%	7.7%	14.1%
BVFZND	HOFI.ST	HOIST FINANCE AB NPV	Sweden	Financials	2.25	2H		11.1%	55.3%	-44.2%	3.0%	3.3%	6.0%	94.1%	60.0%
485283	STB.OL	STOREBRAND ASA SER'A/NOK5	Norway	Financials	8.89			30.3%	74.4%	-44.0%	8.7%	76.5%	26.9%	75.7%	33.2%
B0PYHC	LRE.L	LANCASHIRE HLDGS COM SHS USD0.50	United Kingdom	Financials	4.99	2		30.9%	74.7%	-43.8%	46.8%	3.1%	43.6%	37.8%	90.4%
BYV2MV	PURPL.L	PURPLEBRICKS GROUP ORD GBP0.01	United Kingdom	Real Estate	0.20	1H		49.1%	92.3%	-43.2%	6.4%	52.3%	26.9%	76.6%	93.6%
BYJDLW	EMG.L	MAN GROUP PLC (N) ORD USD0.0342857142	United Kingdom	Financials	2.42	1		34.8%	76.9%	-42.1%	31.4%	34.2%	73.4%	55.5%	33.8%
B04D94	CCEPC.AS	COCA-COLA EUROPACI ORD EUR0.01	Netherlands	Consumer Staples	46.26	1		48.0%	90.1%	-42.1%	16.7%	33.9%	65.6%	69.8%	67.3%
BLHJQ5	09B.F	LASTMINUTE.COM EUR0.01 (BR)	Switzerland	Consumer Discretionary	38.07			30.8%	72.5%	-41.7%	0.7%	53.6%		43.7%	79.3%
B1FW06	MONTE.BR	MONTEA NV NPV	Belgium	Real Estate	116.70			12.4%	53.9%	-41.4%	17.7%	67.0%	26.9%	4.0%	56.9%
580003	BGBN.PA	BIGBEN INTERACTIVE EUR2	France	Consumer Discretionary	15.45			38.8%	80.2%	-41.4%	26.0%	68.3%	84.9%	55.0%	3.3%
BYYY0P	KARO.ST	KARO PHARMA AB NPV	Sweden	Health Care	5.67			26.5%	67.8%	-41.3%	34.8%	51.0%		50.5%	32.0%
B0HL9C	TFBANK.ST	TF BANK AB NPV	Sweden	Financials	15.63			51.4%	92.4%	-41.0%	4.8%	45.4%	100.0%	75.9%	33.6%
BHOWHG	PLAZb.ST	PLATZER FASTIGHETE NPV	Sweden	Real Estate	9.99			43.3%	83.7%	-40.4%	11.5%	50.4%	65.6%	62.2%	55.1%
BUXLXK	3YK.F	KALEYRA INC COM	United States	Information Technology	6.76			46.1%	86.2%	-40.1%	6.1%	61.3%	100.0%		32.2%
BKV4GX	SATSS.OL	SATS ASA NOK2.125	Norway	Consumer Discretionary	2.04			3.0%	42.7%	-39.7%	2.8%	48.6%	43.6%	13.1%	12.9%
B2NGPM	PAGPA.L	PARAGON BANKING GR ORD GBP1	United Kingdom	Financials	5.86			48.7%	87.0%	-38.3%	46.0%	32.1%	73.4%	85.7%	17.7%
711399	CLN.S	CLARIANT AG CHF3.00 (REGO)	Switzerland	Materials	16.44	2		54.2%	92.5%	-38.3%	37.8%	57.4%	25.4%	94.0%	50.6%
B4Y8D2	BULTEN.ST	BULTEN AB NPV	Sweden	Consumer Discretionary	6.51			3.6%	41.7%	-38.2%	4.2%	10.9%		84.3%	1.4%
BRJ2VC	ENTRA.OL	ENTRA ASA NOK1	Norway	Real Estate	19.75			32.3%	70.5%	-38.2%	29.7%	54.7%	16.2%	33.3%	89.8%
527127	SIXG.DE	SIXT SE NON VTG PRF NPV	Germany	Industrials	75.83			45.2%	83.1%	-37.9%	25.7%	19.8%	73.9%	86.2%	42.2%

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Source: Citi Research, IBES, Worldscope, Thomson Reuters, Markit, Stoxx.

Region Focus: Asia Pacific

Risk-off sentiment drives flight to Quality

Figure 19. Asia Pacific Crowding Summary

Region	Most Crowded Style		Performance vs Market	
	Style	Sector	Most Crowded	Least Crowded
Asia ex Japan	Quality	Information Technology	2.4%	3.7%
Japan	Earnings Momentum	Energy	0.7%	4.0%
Australia	Price Momentum	Communication Services	-3.9%	-2.8%

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Source: Citi Research

In February, Quality remained the most crowded style in Asia ex Japan, scoring high in almost all aspects of crowding measures. Estimates Momentum also remained crowded in Japan, while Price Momentum has become the most crowded in Australia with its low short interest and high sell-side sentiment. In February, Quality in Asia ex JP gained 0.5%, with most of the gains concentrated in the second half of the month as Value rotated out of favor.

We combine our stock-level crowdedness rankings with our fundamental analysts' views to identify non-consensus calls. Figure 20 highlights the shortlist screen of our Buy recommendations or Upside Catalyst Watches that are relatively uncrowded and our Sell recommendations or Downside Catalyst Watches that are relatively crowded. We believe these are the anti-consensus calls from our fundamental analysts that have potential strong stock price implications; this is a useful screen to find the stock calls from our Citi analysts that investors should especially pay attention to.

Figure 20. APAC Crowding Shortlist Screen: Biggest Movers and Catalyst Watches

Sedol	RIC	Company Name	Country	GICS Sector	Closing Price (LC)	1M Return (LC) (%)	12M Return (LC) (%)	Citi Rating	Catalyst Watch	Crowding Composite Rank	Change in Crowding Composite
Citi Buy Recommendations / Upside Catalyst Watches that are in the Top 20% Least Crowded											
610047	HPCL.BO	HINDUSTAN PETROL INR10	India	Energy	284.6	1.3%	15.8%	1	UPSIDE	7.0%	-11.2%
BGS92Z	GGAS.BO	GUJARAT GAS LTD INR2 (POST	India	Utilities	528.0	-22.5%	-3.0%	1	UPSIDE	6.3%	-10.1%
B9B4FJ	NEA.AX	NEARMAP LTD NPV	Australia	Information Technology	1.2	-9.5%	-45.6%	1H		16.3%	-45.4%
BDRTVP	GENS.SI	GENTING SING LTD NPV	Singapore	Consumer	0.8	2.0%	-10.0%	1		6.1%	-38.1%
664154	6471.T	NSK LTD NPV	Japan	Industrials	695.0	-5.1%	-36.6%	1		18.3%	-24.7%
B05BPG	STA.BK	SRI TRANG AGRO IND	Thailand	Consumer	25.8	-16.9%	-44.9%	1		5.0%	-60.5%
BWZN1R	6826.HK	SHANGHAI HAORAI BI 'H' CNY1	Hong Kong	Health Care	39.9	-12.9%	-29.0%	1H		6.2%	-31.0%
Citi Sell Recommendations / Downside Catalyst Watches that are in the Top 20% Most Crowded											
625002	6383.T	DAIFUKU CO LTD NPV	Japan	Industrials	8090.0	4.9%	-20.5%	3		85.3%	7.9%
626735	0388.HK	HONG KONG EXCHANGE NPV	Hong Kong	Financials	355.8	-19.6%	-26.3%	3		95.9%	-3.0%
B1YVKN	2020.HK	ANTA SPORTS PRODUC HKD0.10	China H	Consumer	114.0	-8.0%	-4.7%	3		87.4%	
B3QDJB	300124.SZ	SHENZHEN INOVANCE 'A' CNY1	China A	Industrials	61.6	2.8%	10.7%	3		85.6%	-1.2%

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Source: Citi Research, Factset, IBES, Worldscope, Thomson Reuters, Bloomberg, MSCI.

Asia ex Japan

Crowded stocks continued to underperform

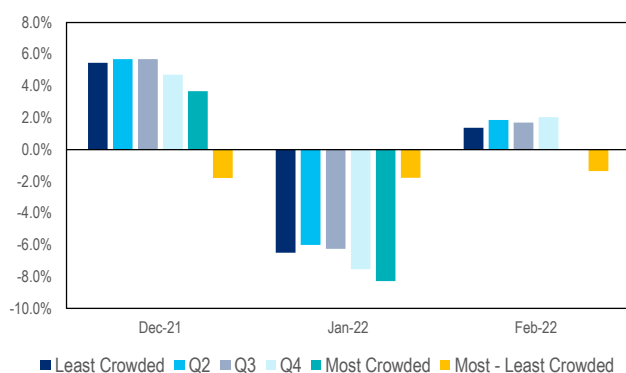
In February, the most crowded quintile continued to underperformed the least crowded ones by 1.4%. Quality as a style was outperformed by momentum and growth, which rose sharply since mid-month as Value rotated out of favor.

Among sectors, average crowding scores of Materials rose to similar level as Industrials, joining the top 3 most crowded sectors. Energy has also moved up in crowdedness, leaving Consumer Staples among the least crowded sectors.

We remind investors that crowding is more of a risk indicator than an alpha factor, i.e. we do not advocate buy a stock or sector simply because it is crowded or uncrowded. Rather, if there are elevated levels of crowding, we believe there is a heightened risk of volatility should there be an event that triggers an inflection point of unwinding the crowded trade as investors rush for the exit.

In the tables below, we summarize the performance of stocks by their crowdedness scores over the past 3 months, and highlight the recent changes in scores and ranking by sectors.

Figure 21. AxJ Relative Return of Crowded Stocks



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Source: Citi Research

Figure 22. AxJ Crowding Change by Sector (Average Stock Score)

Sector	Prev Mth	Current Mth	Change	Current Crowding
Information Technology	56.3%	55.8%	-0.5%	Most
Financials	53.8%	53.2%	-0.1%	Most
Materials	50.2%	52.5%	2.9%	Most
Industrials	52.0%	52.3%	0.0%	
Consumer Discretionary	50.9%	50.6%	-1.1%	
Energy	44.4%	49.4%	5.1%	
Communication Services	49.0%	47.4%	-0.7%	
Utilities	46.1%	47.0%	-0.4%	
Consumer Staples	45.0%	44.5%	-1.9%	Least
Real Estate	44.1%	44.4%	3.3%	Least
Health Care	37.2%	36.7%	-0.4%	Least

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Source: Citi Research

Asia ex Japan: Crowding Quant + Fundamental

Figure 23 shows the most and least crowded trades (in the top or bottom quintile) in Asia ex Japan, combined with our analyst recommendations. We also show whether, for a given stock, the analyst has an upside or downside catalyst watch on the stock. The stocks are then grouped by regions/countries and sectors.

Figure 23. Most / Least Crowded Stock Screen

Sedol	RIC	Company Name	Country	GICS Sector	Closing Price (LC)	1M Return (LC) (%)	12M Return (LC) (%)	Citi Rating	Catalyst Watch	Crowding Composite Rank	Prior Crowding Composite Rank	Change in Crowding Composite	Quant Crowded Factor Rank	Hist Relative Valuation Rank	Consensus Rating Skewness Rank	Macro Risk Contribution Rank	Short Interest Rank (Inverse)
Citi Buy Recommendations / Upside Catalyst Watches that are in the Top 20% Least Crowded																	
B01T19	600984.SS	SHANGHAI CONSTRUCT 'A/CNY1	China A	Industrials	9.84	-4.1%	-36.8%	1		0.5%	1.0%	-0.5%	18.3%	25.6%	25.8%	12.5%	
B6207T	002373.SZ	CHINA TRANSINFO TE 'A/CNY1	China A	Information	13.52	0.6%	-20.1%	1		1.2%	1.7%	-0.5%	44.8%	15.2%	30.8%	4.8%	
680279	600686.SS	SINOPEC S/PETROCHE 'A/CNY1	China A	Materials	4.05	4.9%	11.3%	1		2.2%	1.6%	0.6%	26.5%	49.3%	8.5%	18.1%	
661651	600584.SS	JOET GROUP CO LTD 'A/CNY1	China A	Information	27.40	2.0%	-32.4%	1		3.1%	3.7%	-0.6%	24.7%	18.0%	18.9%	51.0%	
B2NWD5	601898.SS	CHINA COAL ENERGY 'A/CNY1	China A	Energy	7.70	28.8%	48.6%	1		3.9%	2.3%	1.6%	27.0%	34.1%	7.4%	47.8%	
B3FJ9X	601727.SS	SHANGHAI ELECTRIC 'A/CNY1	China A	Industrials	4.48	4.7%	-17.5%	1		7.0%	8.3%	-1.3%	14.4%	37.7%	3.4%	77.0%	
B1WJ31	002024.SZ	SUNING COM 'A/CNY1	China A	Consumer	3.63	-7.2%	-50.6%	1		9.7%	12.0%	-2.3%	6.7%	51.8%	30.8%	52.4%	
B1WLHY	601600.SS	ALUMINUM CORP CHN 'A/CNY1	China A	Materials	7.11	35.2%	63.8%	1		9.9%	5.9%	4.0%	8.5%	44.4%	16.9%	72.5%	
B3MPN5	6808.HK	SUN ART RETAIL GRO NPV	China H	Consumer Staples	2.77	-5.8%	-59.2%	1		1.0%	3.3%	-2.3%	19.5%	31.1%	17.4%	4.1%	22.7%
B0RYVB	1833.HK	PING AN HEALTHCARE	China H	Health Care	23.50	-8.4%	-78.1%	1H		2.3%			5.3%	53.6%	22.0%	8.2%	15.7%
669377	2314.HK	LEE & MAN PAPER MA HKD0.025	China H	Materials	5.10	-4.9%	-32.4%	1		7.0%			22.4%	36.9%	17.4%	39.5%	22.0%
BIWZNR	6826.HK	SHANGHAI HAQHAI BI 'H' CNY1	Hong Kong	Health Care	39.90	-12.9%	-29.0%	1H		6.2%	37.2%	-31.0%	25.0%	34.5%	34.0%	51.0%	7.9%
BYQ98C	2120.HK	WENZHOU KANGNING H 'H' CNY1	Hong Kong	Health Care	11.70	-4.9%	-55.8%	1		9.0%	6.7%	2.3%	15.1%	3.2%		10.1%	100.0%
614376	LUPN.BO	LUPIN LTD INR2	India	Health Care	704.35	-19.2%	-32.8%	1		2.3%	7.3%	-5.1%	6.3%	65.6%	11.7%	15.2%	
B00FLR	RATB.BO	RBL BANK LIMITED INR10	India	Financials	126.55	-15.4%	-49.2%	1		6.0%	8.3%	-2.3%	1.8%	47.1%	8.0%	62.2%	
BG582Z	GGAS.BO	GUJARAT GAS LTD INR2 (POST	India	Utilities	528.00	-22.5%	-3.0%	1	UPSIDE	6.3%	16.4%	-10.1%	26.2%	58.8%	19.7%	15.5%	
610047	HPCL.BO	HINDUSTAN PETROL INR10	India	Energy	284.65	1.3%	15.8%	1	UPSIDE	7.0%	18.2%	-11.2%	21.5%	10.9%	78.9%	13.1%	
B7JW35	ACES.JK	ACE HARDWARE INDON IDR10	Indonesia	Consumer	1,025.00	-20.2%	-34.7%	1		1.4%	15.9%	-14.5%	27.7%	35.8%	32.7%	43.1%	0.0%
654387	MYOR.JK	MAYORA INDAH IDR20	Indonesia	Consumer Staples	1,550.00	-17.6%	-44.0%	1		7.1%	36.2%	-29.1%	30.0%	15.8%	21.8%	60.8%	
B0DD1H	KRIB.KL	KOSSAN RUBBER INDU NPV	Malaysia	Health Care	1.77	-3.3%	-52.2%	1		7.3%	3.3%	4.0%	91.5%	17.5%	29.5%	2.4%	21.4%
B0RTVP	GENS.SI	GENTING SING LTD NPV	Singapore	Consumer	0.76	2.0%	-10.0%	1		6.1%	44.2%	-38.1%	5.8%	13.0%	23.7%	82.5%	19.2%
634445	051900.KS	LG HOUSEHOLD&HEALT	South Korea	Consumer Staples	950,000.00	-3.7%	-36.5%	1		4.0%	7.0%	-3.0%	47.5%	8.2%	37.7%	37.5%	8.6%
B0VL7J	271560.KS	ORION CORP KRW500	South Korea	Consumer Staples	90,000.00	-10.9%	-31.8%	1		5.2%	10.4%	-5.2%	65.1%	8.4%	41.9%	10.5%	20.1%
B00LR0	018880.KS	HANON SYSTEMS KRW100	South Korea	Consumer	11,550.00	4.5%	-31.9%	1		8.5%	13.3%	-4.8%	29.2%	50.1%	22.0%	34.6%	29.7%
B4347P	114090.KS	GRAND KOREA LEISUR KRW500	South Korea	Consumer	14,700.00	3.2%	-13.8%	1		8.6%	13.2%	-4.5%	13.0%	50.6%	5.2%	95.7%	1.5%
B3PSSB	4147.TWO	TAI MED BIOLOGICS I TWO10	Taiwan	Health Care	68.40	2.2%	-15.8%	1		2.6%	3.0%	-0.4%	3.5%	1.7%	34.9%	56.9%	34.3%
605104	2357.TW	ASUSTEK COMPUTER TWO10	Taiwan	Information	376.00	4.6%	19.9%	1		8.2%	11.9%	-3.7%	45.6%	25.9%	34.4%	32.1%	26.3%
643280	6147.TWO	CHIPBOND TECHNOLO TWO10	Taiwan	Information	71.10	4.7%	-4.0%	1		8.6%	8.9%	-0.3%	47.3%	16.4%	17.9%	76.8%	6.4%
B05BPG	STA.BK	SRI TRANG AGRO IND	Thailand	Consumer	25.75	-16.9%	-44.9%	1		5.0%	65.5%	-60.5%	16.0%	12.6%	100.0%	4.2%	
BFMXJF	MAKRO.BK	SIAM MAKRO THB0.5(LOCAL)	Thailand	Consumer Staples	42.00	6.3%	13.2%	1		5.8%	16.8%	-11.0%	14.9%	67.2%	38.4%	13.0%	
690529	IRPC.BK	IRPC PUBLIC CO LTD	Thailand	Energy	3.68	-6.1%	7.0%	1		9.2%	12.6%	-3.4%	39.2%	14.2%	31.3%	58.3%	
Citi Sell Recommendations / Downside Catalyst Watches that are in the Top 20% Most Crowded																	
B3QDJB	300124.SZ	SHENZHEN INNOVANCE 'A/CNY1	China A	Industrials	61.64	2.8%	10.7%	3		85.6%	86.9%	-1.2%	72.0%	81.3%	57.5%	75.9%	78.3%
B1YVKN	2020.HK	ANTA SPORTS PRODUK HKD0.10	China H	Consumer	114.00	-8.0%	-4.7%	3		87.4%			78.9%	89.9%	72.6%	77.0%	21.0%
626735	0388.HK	HONG KONG EXCHANGE NPV	Hong Kong	Financials	355.80	-19.6%	-26.3%	3		95.9%	98.9%	-3.0%	71.4%	74.1%	60.0%	86.9%	76.0%

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Source: Citi Research, Factset, IBES, Worldscope, Thomson Reuters, Bloomberg, MSCI., * Highlighted in green are names with the highest change in crowding composite

Asia ex Japan: Newly Crowded Screen

Figure 24 presents the stocks that have just entered the top quintile of most crowded stocks versus the previous month. For reference, we provide the Citi analyst recommendation where relevant.

Figure 24. Newly Crowded Screen

Sedol	RIC	Company Name	Country	GICS Sector	Closing Price (LC)	1M Return (LC) (%)	12M Return (LC) (%)	Citi Rating	Catalyst Watch	Crowding Composite Rank	Prior Crowding Composite Rank	Change in Crowding Composite	Quant Crowded Factor Rank	Hist Relative Valuation Rank	Consensus Rating Skewness Rank	Macro Risk Contribution Rank	Short Interest Rank (Inverse)
Stocks Entering Most Crowded Quintile of Crowding Composite																	
609303	600110.SS	NUOGE INVESTMENT C 'A/CNY1	China A	Industrials	14.00	8.9%	69.1%			91.9%	55.8%	36.1%	93.3%	84.7%	100.0%	27.1%	
616543	000933.SZ	HENAN SHENHUO COAL 'A/CNY1	China A	Materials	14.51	35.4%	50.4%			91.5%	68.7%	22.8%	66.9%	54.1%	100.0%	83.3%	
668072	600348.SS	SHAN XI HUA YANG G 'A/CNY1	China A	Energy	12.75	23.8%	149.0%			93.1%	65.8%	27.4%	61.7%	85.1%	100.0%	62.3%	
B4W4ZY	300015.SZ	AIER EYE HOSPITAL 'A/CNY1	China A	Health Care	34.98	8.4%	-28.9%	1		90.1%	63.9%	26.1%	48.8%	62.0%	90.3%	76.4%	100.0%
BP3R79	600348.SS	SHAN XI HUA YANG G 'A/CNY1	China A	Energy	12.75	23.8%	149.0%			93.0%	64.3%	28.7%	61.7%	85.1%	100.0%	61.5%	
BP3RF8	600596.SS	ZHEJIANG XINAN CHE 'A/CNY1	China A	Materials	27.20	25.5%	97.4%			95.0%	65.4%	29.6%	83.8%	74.4%	100.0%	56.0%	
BD5800	300083.SZ	GUANGDONG CREATE C	China A	Consumer	13.71	15.1%	-1.3%			97.7%	73.6%	24.0%	94.6%	97.5%	100.0%	37.6%	
BD6QWQ	000933.SZ	HENAN SHENHUO COAL 'A/CNY1	China A	Materials	14.51	35.4%	50.4%			91.4%	68.6%	22.8%	66.9%	54.1%	100.0%	83.2%	
646587	0027.HK	GALAXY ENTERTAINME NPV	Hong Kong	Consumer	42.15	-8.4%	-42.6%	1		95.1%	57.6%	37.5%	71.0%	67.2%	90.7%	81.7%	52.0%
657407	0008.HK	PCOW LIMITED NPV	Hong Kong	Communication	4.34	4.8%	-3.1%	1		98.7%	69.6%	29.1%	85.3%	88.7%	66.7%	72.4%	76.8%
B00LNZ	002490.SZ	SHANDONG MOLONG PE 'H/CNY1	Hong Kong	Energy	4.11	-1.7%	86.8%			87.9%	54.3%	33.6%	53.2%	96.8%		15.3%	100.0%
B1KR43	0435.HK	SUNLIGHT REAL EST NPV REIT	Hong Kong	Real Estate	3.85	-10.5%	-3.7%			99.5%	70.7%	28.8%	90.1%	56.7%		96.8%	75.5%
BPFIJHC	AXBK.BO	AXIS BANK INR2	India	Financials	715.00	-10.5%	-3.0%	1		95.2%	74.7%	20.5%	93.1%	21.0%	90.3%	95.9%	
613944	NALU.BO	NATIONAL ALUMINUM INR5	India	Materials	122.80	4.2%	100.7%			85.2%	63.4%	21.8%	83.9%	51.0%	57.5%	76.3%	
B0SX19	PHOE.BO	PHOENIX MILLS INR2	India	Real Estate	939.10	-5.9%	17.6%	1	UPSIDE	87.0%	64.9%	22.1%	53.6%	62.9%	90.6%	66.7%	
674325	JIST.NS	JINDAL STAINLESS INR2	India	Materials	197.45	-8.8%	161.9%			88.0%	66.9%	21.1%	86.0%	50.4%	100.0%	39.8%	
B03KTQ	CNTP.NS	CENTURYPLY LTD INR1	India	Materials	589.95	-8.1%	84.2%			87.5%	56.8%	30.7%	58.2%	80.6%	70.9%	65.2%	
B1BL58	SOBH.BO	SOBHA LIMITED INR10	India	Real Estate	749.85	-12.5%	58.4%	1		86.7%	55.3%	31.4%	48.6%	78.8%	87.7%	57.5%	
BYVKGS	CRDE.NS	CREDITACCESS GRAME INR10	India	Financials	681.60	3.9%	-6.0%			91.2%	46.5%	44.8%	89.5%	46.4%	100.0%	49.7%	
B4KQGS	HRUM.JK	HARUM ENERGY TBK IDR100	Indonesia	Energy	12,600.00	20.6%	123.0%	1H		92.9%	31.9%	61.0%	70.0%	91.7%	100.0%	11.5%	
618349	TAAN.KL	TA ANN HLDGS BHD NPV	Malaysia	Materials	5.25	40.8%	85.5%			90.0%	68.0%	22.0%	76.2%	63.8%	69.6%	60.4%	66.2%
689183	DNEX.KL	DAGANG NEXCHANGE NPV	Malaysia	Information	1.02	1.0%	59.4%			87.3%	51.3%	36.0%	38.4%	95.6%		39.6%	87.6%
B2927P	FRLO.SI	FIRST RESOURCES LT NPV	Singapore	Consumer Staples	2.05	24.2%	46.4%	1		90.9%	58.9%	32.0%	64.1%	85.0%	45.8%	61.2%	85.9%
603602	018670.KS	SK GAS KRW5000	South Korea	Energy	116,500.00	-5.7%	22.4%			90.2%	63.2%	27.0%	76.8%	69.9%		42.0%	100.0%
619843	033240.KS	JAHWA ELECTRONICS KRW500	South Korea	Information	21,700.00	-3.3%	37.8%			91.7%	61.5%	30.2%	75.9%	83.2%		69.3%	66.1%
657453	047820.KQ	CHOROKBAEM MEDIA C KRW500	South Korea	Communication	2,585.00	4.9%	8.2%			90.4%	38.5%	51.9%	84.4%	81.6%		22.8%	100.0%
B01NKW	017550.KS	SOOSAN HEAVY IND KRW500	South Korea	Industrials	2,610.00	1.0%	-31.4%			89.1%	65.3%	23.8%	75.4%	73.5%		36.3%	100.0%
B15C6D	032350.KS	LOTTE TOUR DEVELOP KRW500	South Korea	Consumer	18,100.00	10.0%	-11.9%			95.1%	42.6%	52.5%	100.0%	98.5%		83.5%	24.0%
B28TPF	044450.KS	KSS LINE LTD KRW500	South Korea	Industrials	12,500.00	7.3%	16.8%			88.2%	51.9%	36.2%	70.2%	61.7%		81.8%	69.9%
B95T10	114810.KQ	IONES CO LTD KRW500	South Korea	Information	10,050.00	2.4%	71.8%			87.3%	65.5%	21.8%	79.3%	78.7%		63.6%	58.5%
BZ1HBQ	226320.KS	IT'S HANBUL CO LTD KRW500	South Korea	Consumer Staples	21,850.00	41.9%	-24.4%			86.9%	66.2%	20.6%	61.2%	36.8%		81.5%	100.0%
623918	9933.TW	CTCI CORP TWD10	Taiwan	Industrials	41.50	8.2%	11.6%			94.9%	74.2%	20.7%	55.3%	61.9%		82.6%	84.7%
628360	2408.TW	NANYA TECHNOLOGY C TWD10	Taiwan	Information	81.60	13.3%	-11.1%			96.4%	75.2%	21.1%	79.0%	40.9%	82.6%	91.2%	75.3%
629411	3033.TW	WEIKENG INDUSTRIAL TWD10	Taiwan	Information	32.00	7.0%	64.5%			85.2%	64.2%	21.0%	62.8%	74.4%		92.4%	25.4%
637803	6111.TWO	SOFTSTAR ENTERTAIN TWD10	Taiwan	Communication	95.60	18.8%	55.6%			89.4%	59.8%	29.6%	45.5%	37.3%		82.7%	100.0%
643245	6177.TW	DA LI CO LTD TWD10	Taiwan	Real Estate	30.95	3.7%	4.7%			96.0%	64.7%	31.2%	96.5%	38.3%		71.5%	86.8%
657410	2337.TW	MACRONIX INTERNATL TWD10	Taiwan	Information	44.60	8.8%	6.4%			90.3%	70.3%	20.0%	81.1%	17.4%	83.1%	80.1%	72.7%
B10KGS	3527.TWO	MACROBLOCK INC TWD10	Taiwan	Information	178.50	6.9%	70.0%			94.5%	69.7%	24.8%	89.2%	64.8%		29.8%	100.0%
BYYH5C	BCP.BK	BANGCHAK CORPORATI	Thailand	Energy	31.25	5.9%	12.6%			90.8%	50.4%	40.4%	58.2%	37.7%	78.6%	94.8%	
661421	MAJOR.BK	MAJOR CINEPLEX GRO	Thailand	Communication	19.70	-2.0%	-4.8%			83.3%	35.3%	58.0%	97.9%	3.8%	83.0%	90.6%	

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Source: Citi Research, Factset, IBES, Worldscope, Thomson Reuters, Bloomberg, MSCI. , * Highlighted in green are names with the highest change in crowding composite

Asia ex Japan: Newly Uncrowded Screen

Figure 25 presents the stocks that have just entered the bottom quintile of least crowded stocks versus the previous month. For reference, we provide the Citi analyst recommendation where relevant.

Figure 25. Newly Uncrowded Screen

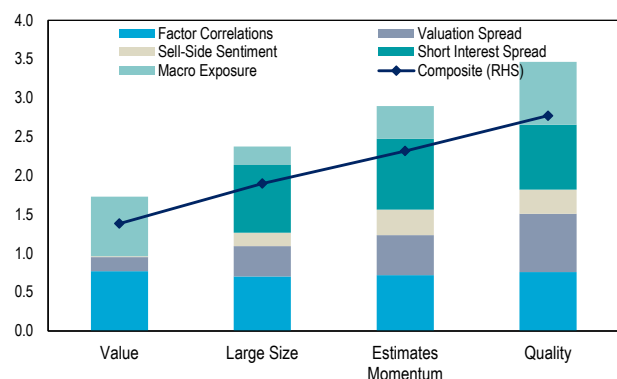
Sedol	RIC	Company Name	Country	GICS Sector	Closing Price (LC)	1M Return (LC) (%)	12M Return (LC) (%)	Citi Rating	Catalyst Watch	Crowding Composite Rank	Prior Crowding Composite Rank	Change in Crowding Composite	Quant Crowded Factor Rank	Hist Relative Valuation Rank	Consensus Rating Skewness Rank	Macro Risk Contribution Rank	Short Interest Rank (Inverse)
Stocks Entering Least Crowded Quintile of Crowding Composite																	
BK4XS3	603317.SS	SICHUAN TEWAY FOOD A CNY1	China A	Consumer Staples	21.06	0.3%	-54.7%			13.6%	37.1%	-23.4%	14.0%	34.3%	71.6%	34.6%	
BWZ1NR	6826.HK	SHANGHAI HACHAI BI/H CNY1	Hong Kong	Health Care	39.90	-12.9%	-28.0%	1H		6.2%	37.2%	-31.0%	25.0%	34.5%	34.0%	51.0%	7.9%
BMX7Q6	IPCA.BO	IPCA LABORATORIES INR1	India	Health Care	954.75	-7.9%	-1.3%			13.8%	45.2%	-31.4%	35.6%	39.3%	70.9%	7.2%	
B10SSN	JUBA.BO	JUBLANT PHARMOVA INR1	India	Health Care	396.60	-24.7%	-49.5%			12.0%	85.9%	-73.8%	17.1%	28.6%	15.1%	87.8%	
B8W3TV	JUST.BO	JUST DIAL LTD INR10	India	Communication	741.40	-16.8%	-19.0%	2		4.0%	26.5%	-22.5%	15.9%	45.7%	35.3%	15.0%	
BF1YBK	AUFI.BO	AU SMALL FINANCE B INR10	India	Financials	1,125.05	-16.3%	-11.3%	1		13.3%	36.9%	-23.6%	30.2%	21.6%	19.1%	81.9%	
654387	MYOR.JK	MAYORA INDAH DR20	Indonesia	Consumer Staples	1,550.00	-17.6%	-44.0%	1		7.1%	36.2%	-29.1%	30.0%	15.8%	21.8%	60.8%	
690461	TENA.KL	TENAGA NASIONAL BHD MYR1	Malaysia	Utilities	9.04	-0.8%	-13.1%	3		4.0%	28.7%	-24.7%	26.8%	15.0%	40.2%	18.3%	33.8%
B0KLOR	VTRX.KL	VITROX CORP BHD NPV	Malaysia	Information	7.25	-7.8%	-10.9%	2		14.7%	41.3%	-26.7%	39.6%	77.5%	31.3%	25.6%	6.2%
B8SLCF	IGRE.KL	IGB REAL ESTATE IN UNITS	Malaysia	Real Estate	1.39	-9.7%	-18.7%			10.7%	37.3%	-26.7%	52.4%	14.4%	33.0%	65.2%	2.1%
B3MM01	IML.PS	INTEGRATED MICRO-E PHP1	Philippines	Information	8.53	-17.8%	-33.4%			12.5%	85.0%	-72.5%	29.1%	63.3%	28.9%	25.5%	
B0RTVP	GENS.SI	GENTING SING LTD NPV	Singapore	Consumer	0.76	2.0%	-10.0%	1		6.1%	44.2%	-38.1%	5.8%	13.0%	82.5%	19.2%	
BL9YQK	CROM.SI	CROMWELL EU REIT NPV	Singapore	Real Estate	2.33	-2.1%	7.1%			10.1%	65.3%	-55.2%	3.9%	45.0%	28.2%	55.6%	
616752	034810.KQ	HAESUNG INDL KRW500	South Korea	Real Estate	12,450.00	-11.7%	6.9%			11.0%	68.2%	-57.2%	4.2%	6.7%	31.0%	100.0%	
626418	036570.KS	NCSOFT CORP KRW500	South Korea	Communication	437,000.00	-17.5%	-54.5%	2		5.9%	29.5%	-23.5%	49.8%	11.3%	26.7%	41.4%	22.9%
637578	006260.KS	LS CORP KRW5000	South Korea	Industrials	51,200.00	-1.3%	-24.8%			14.1%	45.9%	-31.8%	46.7%	27.0%	34.6%	75.9%	5.9%
608521	001720.KS	SHINYOUNG SECUR KRW5000	South Korea	Financials	63,000.00	4.1%	12.5%			13.1%	39.8%	-26.7%	2.5%	46.7%	84.4%	13.9%	
B6WFJ0	040910.KQ	ICD CO LTD KRW500	South Korea	Information	10,300.00	-1.4%	-39.9%			13.8%	44.6%	-30.7%	19.5%	9.5%	60.4%	62.1%	
603789	2612.TW	CHINESE MARITIME T TWD10	Taiwan	Industrials	54.20	12.4%	60.8%			13.7%	51.0%	-37.2%	19.0%	86.6%	17.9%	21.0%	
605556	2417.TW	AVERMEDIA TECH INC TWD10	Taiwan	Consumer	26.95	-10.5%	-52.2%			8.4%	43.9%	-35.6%	10.0%	31.3%	40.6%	49.5%	
614180	5371.TWO	CORETRONICS CORP TWD10	Taiwan	Information	70.80	-5.2%	48.6%			9.8%	37.5%	-27.7%	11.5%	83.3%	37.2%	3.8%	
620868	6016.TWO	CONCORD SECURITIES TWD10	Taiwan	Financials	13.55	-1.5%	-6.9%			6.0%	40.8%	-33.9%	24.3%	70.3%	15.1%	16.0%	
649269	9919.TW	KNH ENTERPRISE CO TWD10	Taiwan	Consumer Staples	23.15	-17.3%	-30.9%			5.1%	47.2%	-42.0%	9.1%	78.1%	0.5%	33.6%	
657515	2809.TW	KING'S TOWN BANK TWD10	Taiwan	Financials	40.15	-1.0%	3.6%			14.6%	55.7%	-41.1%	7.3%	24.8%	97.3%	16.8%	
677631	1307.TW	SAN FANG CHEMICAL TWD10	Taiwan	Materials	20.70	2.5%	-2.8%			11.6%	36.1%	-24.5%	12.1%	12.7%	58.5%	55.2%	
B00VD2	1558.TW	ZENG HSING INDL CO TWD10	Taiwan	Consumer	143.50	-0.3%	-6.8%			4.9%	26.3%	-21.5%	31.2%	21.1%	65.7%	2.7%	
B0VCJH	1582.TW	SYNCOMOLD ENTERPRIS TWD10	Taiwan	Information	69.30	1.2%	-17.1%			4.0%	35.6%	-31.5%	13.5%	12.1%	86.7%	1.9%	
B0X8PJ	6504.TW	NAN LIU ENTERPRISE TWD10	Taiwan	Consumer	112.50	0.0%	-33.4%			7.0%	33.9%	-26.8%	10.5%	34.4%	14.3%	66.9%	
B3KHQ8	2727.TW	WOWPRIME CORP TWD10	Taiwan	Consumer	131.00	4.4%	-20.8%			10.4%	39.0%	-28.6%	9.8%	86.3%	32.0%	8.0%	
BZ3C81	4766.TW	NAN PAO RESINS CHE TWD10	Taiwan	Materials	135.00	-2.9%	-15.9%			13.1%	33.1%	-20.1%	19.5%	19.1%	97.7%	7.3%	
BZ3D2G	6561.TWO	CHIEF TELECOM INC TWD10	Taiwan	Communication	273.00	3.2%	-9.9%			10.9%	31.4%	-20.5%	47.5%	23.5%	1.4%	64.7%	
BK80TL	3714.TW	ENNOSTAR INC TWD10	Taiwan	Information	74.30	-17.4%	-15.6%			7.1%	29.7%	-22.6%	7.7%	30.4%	49.7%	42.1%	27.5%
641892	DELTA.BK	DELTA ELECTRONICS	Thailand	Information	365.00	-12.3%	-1.6%			4.2%	53.8%	-49.6%	22.2%	92.9%	6.3%	10.9%	
B05BPG	STA.BK	SRI TRANG AGRO IND	Thailand	Consumer	25.75	-16.9%	-44.9%	1		5.0%	65.5%	-60.5%	16.0%	12.6%	100.0%	4.2%	
BWZ1D1	TASCO.BK	TIPCO ASPHALT THB1(LOCAL)	Thailand	Materials	17.10	-6.0%	-14.9%			0.8%	28.6%	-27.7%	20.1%	16.4%	39.3%	16.1%	

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Source: Citi Research, Factset, IBES, Worldscope, Thomson Reuters, Bloomberg, MSCI.

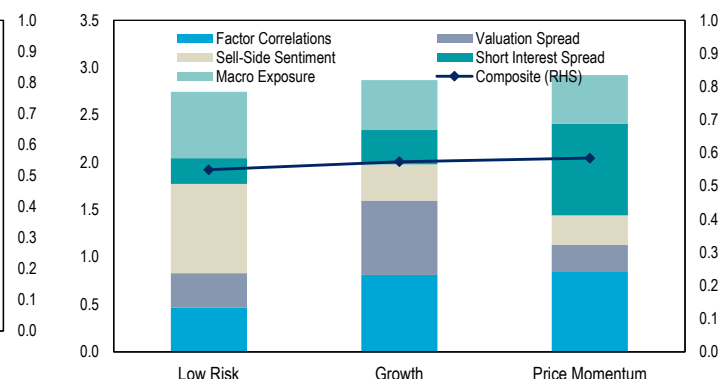
Asia ex Japan: Style Crowding Momentum and Breakdown

Figure 26. Crowded Styles with Positive Factor Momentum



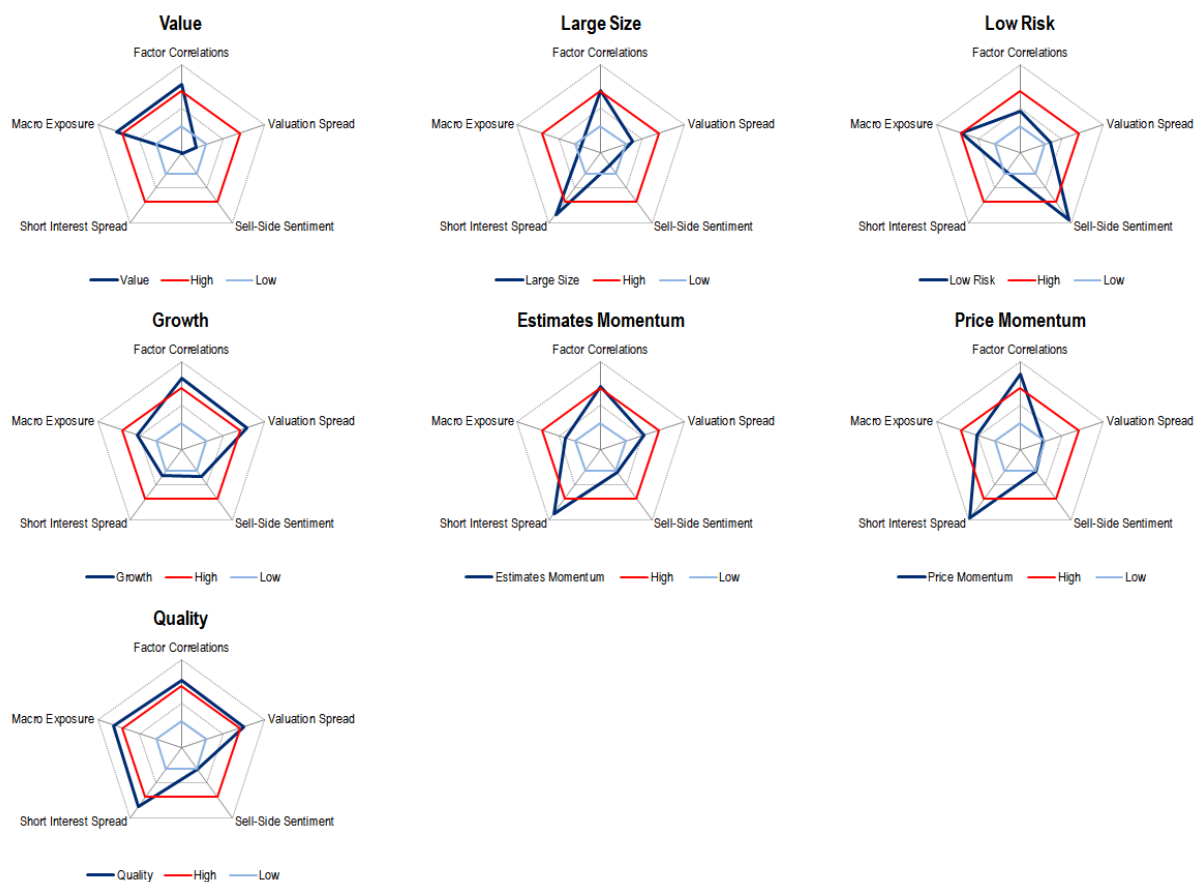
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Source: Citi Research

Figure 27. Crowded Styles with Negative Factor Momentum



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Source: Citi Research

Figure 28. Exposure to Components of Crowding by Styles



Methodology: [Searching for Alpha: Style Crowding in Asia: Getting Ahead of the Crowd](#)

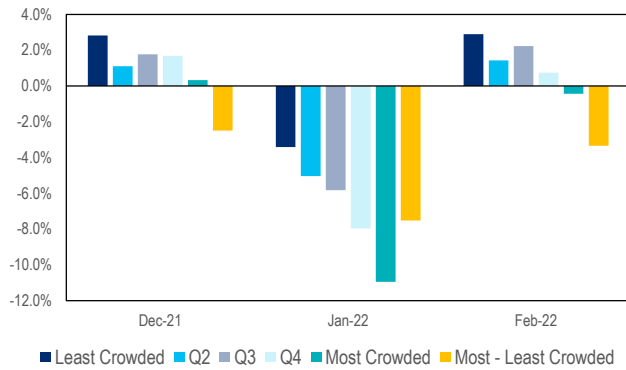
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Source: Citi Research

Japan

Crowding returns, Sector and Stock Crowding

Figure 29. Japan Relative Return of Crowded Stocks



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Source: Citi Research

Figure 30. Japan Crowding Change by Sector (Average Stock Score)

Sector	Prev Mth	Current Mth	Change	Current Crowding
Energy	75.5%	65.7%	-9.8%	Most
Real Estate	63.3%	64.3%	0.5%	Most
Information Technology	53.4%	56.0%	2.6%	Most
Materials	56.0%	54.7%	-0.8%	
Industrials	55.4%	53.8%	-1.2%	
Communication Services	50.2%	52.2%	1.8%	
Financials	52.9%	51.7%	-1.0%	
Consumer Discretionary	49.2%	48.9%	-0.2%	
Utilities	32.8%	36.8%	5.2%	Least
Health Care	34.6%	36.0%	1.4%	Least
Consumer Staples	27.1%	25.9%	-0.9%	Least

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Source: Citi Research

Figure 31. Crowding Screen

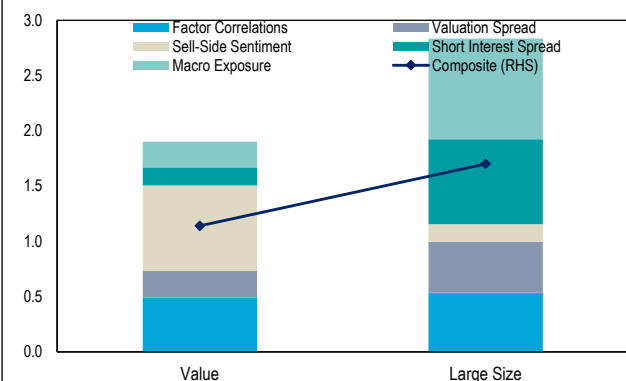
Sedol	RIC	Company Name	Country	GIICS Sector	Closing Price (LC)	1M Return (LC) (%)	12M Return (LC) (%)	Citi Rating	Catalyst Watch	Crowding Composite Rank	Prior Crowding Composite Rank	Change in Crowding Composite	Quant Crowded Factor Rank	Hist Relative Valuation Rank	Consensus Rating Steadiness Rank	Macro Risk Contribution Rank	Short Interest Rank (Inverse)
Citi Buy Recommendations / Upside Catalyst Watches that are in the Top 20% Least Crowded																	
625086	4506.T	SUMITOMO DAINIPPON	Japan	Health Care	1,189.00	-4.0%	-31.2%	1		2.6%	10.0%	-7.4%	7.0%	8.9%	1.4%	29.5%	72.8%
625050	1878.T	DAITO TRUST CONST NPV	Japan	Real Estate	12,170.00	-8.2%	5.9%	1		8.9%	27.1%	-18.2%	11.5%	46.1%	41.0%	13.2%	41.4%
635700	9749.T	FUJII SOFT INCORP NPV	Japan	Information	5,730.00	14.1%	7.3%	1		10.8%	8.9%	1.8%	11.9%	78.0%	19.9%	26.6%	27.1%
BK7CSR	4485.T	JTOWER INC NPV	Japan	Industrials	3,960.00	-18.7%	-52.2%	1H		12.6%	36.1%	-23.5%	19.7%	1.2%	88.9%	14.1%	45.6%
626705	4768.T	OTSUKA CORP NPV	Japan	Information	4,295.00	-1.0%	-9.1%	1H		13.6%	31.6%	-17.9%	4.4%	43.7%	40.0%	31.2%	53.1%
601070	7259.T	AINIS CORPORATION NPV	Japan	Consumer	3,840.00	-15.5%	2.5%	1		13.7%	36.7%	-23.0%	26.3%	26.0%	27.6%	81.7%	11.5%
B978H9	4587.T	PEPTIDREAM INC NPV	Japan	Health Care	1,915.00	-7.6%	-61.0%	1H		16.0%	18.2%	-2.2%	12.3%	0.9%	82.6%	7.0%	77.5%
659777	6005.T	MUURA CO LTD NPV	Japan	Industrials	3,005.00	-10.2%	-45.8%	1		16.2%	22.3%	-6.2%	15.6%	29.1%	63.3%	4.9%	68.5%
649374	2503.T	KIRIN HOLDINGS CO NPV	Japan	Consumer Staples	1,832.00	-2.3%	-13.1%	1		16.5%	27.6%	-11.2%	9.7%	32.6%	51.1%	21.2%	68.5%
664154	6471.T	NSK LTD NPV	Japan	Industrials	695.00	-5.1%	-36.6%	1		18.3%	42.9%	-24.7%	10.1%	24.4%	46.1%	91.8%	16.2%
604963	2815.T	ARIAKE JAPAN CO NPV	Japan	Consumer Staples	5,530.00	-8.1%	-14.5%	1		18.4%	38.2%	-19.7%	8.1%	28.2%	82.6%	28.2%	41.9%
Citi Sell Recommendations / Downside Catalyst Watches that are in the Top 20% Most Crowded																	
663567	6723.T	RENESAS ELECTRONIC	Japan	Information	1,278.00	-1.1%	12.0%	3		99.3%	98.2%	1.2%	95.1%	37.0%	98.0%	93.9%	94.6%
625002	6383.T	DAIFUKU CO LTD NPV	Japan	Industrials	8,090.00	4.9%	-20.5%	3		85.3%	77.5%	7.9%	86.6%	78.4%	51.1%	50.7%	71.1%
Stocks Entering Most Crowded Quintile of Crowding Composite																	
602150	6770.T	ALPS ALPINE CO LTD NPV	Japan	Information	1,102.00	-13.2%	-25.8%	1		80.8%	56.8%	23.9%	93.8%	32.2%	58.3%	95.8%	45.3%
603658	4676.T	FUJII MEDIA HOLDING NPV	Japan	Communication	1,214.00	-3.3%	-9.2%			80.4%	57.7%	22.7%	90.3%	34.8%	19.9%	87.0%	92.3%
606945	6918.T	AVAL DATA CORP NPV	Japan	Information	2,620.00	4.0%	-23.8%			80.8%	33.4%	47.4%	95.2%	39.5%	32.9%	93.1%	
612392	6875.T	MEGACHIPS CORP NPV	Japan	Information	3,510.00	-15.6%	3.4%			83.7%	55.5%	28.2%	74.4%	22.3%	100.0%	38.6%	99.4%
613612	7715.T	NAGANO KEIKI CO NPV	Japan	Information	1,236.00	-8.0%	31.8%			94.1%	64.0%	30.1%	96.2%	64.0%	60.8%	76.9%	
614742	9436.T	OKINAWA CELLULAR NPV	Japan	Communication	5,000.00	0.7%	-1.2%			80.3%	58.3%	22.0%	34.7%	83.1%	98.1%	43.2%	
617245	8060.T	CANON MARKETING JP	Japan	Information	2,330.00	-6.0%	-0.3%			88.8%	60.9%	27.9%	100.0%	37.7%	71.5%	69.5%	70.9%
619170	6366.T	CHYODA CORP NPV	Japan	Industrials	372.00	0.5%	-26.8%			96.7%	69.0%	27.7%	84.3%	99.1%	31.0%	92.3%	82.9%
625062	5471.T	DAIDO STEEL CO NPV	Japan	Materials	3,935.00	-10.4%	-13.6%			81.6%	57.8%	23.7%	99.8%	21.3%	63.3%	87.9%	55.8%
629140	6789.T	ROLAND DG CORP NPV	Japan	Information	2,903.00	10.8%	63.8%			83.5%	55.2%	28.3%	65.5%	47.5%	71.5%	70.0%	78.4%
634596	2695.T	KURA SUSHI INC NPV	Japan	Consumer	3,600.00	-1.4%	-3.6%	2		81.7%	52.0%	29.8%	56.3%	87.3%	92.4%	48.0%	44.4%
642820	5486.T	HITACHI METALS NPV	Japan	Materials	1,990.00	-4.8%	13.3%			91.1%	64.8%	26.3%	78.6%	95.2%	7.1%	86.9%	92.0%
647217	9706.T	JAPAN AIRPORT TERM	Japan	Industrials	5,090.00	-4.7%	-2.3%			97.1%	67.2%	30.0%	87.5%	95.7%	60.3%	69.2%	83.5%
648960	9616.T	KYORITSU MAINTENAN	Japan	Consumer	4,190.00	-1.3%	8.0%			88.2%	53.8%	34.4%	74.6%	94.2%	42.7%	88.1%	47.7%
649668	9766.T	KONAMI HOLDINGS CO	Japan	Communication	6,640.00	-3.3%	-4.5%	2		89.6%	66.5%	23.1%	71.0%	69.4%	95.2%	64.8%	51.2%
654468	2327.T	NS SOLUTIONS CORP NPV	Japan	Information	3,555.00	-2.6%	10.6%	1		86.5%	58.7%	27.7%	89.7%	61.7%	51.1%	47.6%	92.6%
659842	8848.T	LEOPALACE 21 CORP NPV	Japan	Real Estate	192.00	9.1%	35.2%			93.6%	68.4%	25.3%	96.2%	98.7%		9.9%	91.9%
664035	6997.T	NIPPON CHEMI-CON NPV	Japan	Information	1,784.00	-4.5%	2.5%			95.4%	72.4%	23.1%	88.6%	82.1%	19.9%	90.7%	97.4%
664054	4091.T	NIPPON SANJO HOLDI NPV	Japan	Materials	2,166.00	-6.8%	10.2%			82.0%	61.2%	20.8%	87.3%	64.1%	41.0%	47.0%	89.5%
664092	1332.T	NIPPON SUISAN NPV	Japan	Consumer Staples	538.00	-0.7%	0.7%			81.1%	59.5%	21.6%	71.8%	39.0%	71.5%	64.4%	80.3%
Stocks Entering Least Crowded Quintile of Crowding Composite																	
601070	7259.T	AINIS CORPORATION NPV	Japan	Consumer	3,840.00	-15.5%	2.5%	1		13.7%	36.7%	-23.0%	26.3%	26.0%	27.6%	81.7%	11.5%
609349	7575.T	JAPAN LIFELINE CO NPV	Japan	Health Care	1,071.00	5.7%	-21.2%			9.5%	39.3%	-29.8%	7.4%	9.4%	7.1%	46.6%	86.0%
609891	9974.T	BELC CO LTD NPV	Japan	Consumer Staples	5,290.00	-1.9%	-5.2%			14.0%	36.9%	-22.9%	38.8%	36.2%	82.6%	9.1%	8.1%
617385	7611.T	HIDAY HIDAKA CORP NPV	Japan	Consumer	1,787.00	4.1%	4.3%			12.1%	70.8%	-58.8%	4.0%	76.1%		42.9%	11.0%
618749	4714.T	RISO KYOKU CO LTD NPV	Japan	Consumer	359.00	-12.4%	15.8%			17.9%	74.4%	-56.5%	8.9%	35.5%		74.3%	31.4%
619560	9502.T	CHUBU ELEC POWER NPV	Japan	Utilities	1,185.00	4.2%	-9.2%			4.2%	24.8%	-20.5%	31.1%	41.9%	7.1%	11.5%	41.5%
621815	4745.T	TOKYO INDIVIDUALIZ NPV	Japan	Consumer	585.00	-6.3%	-5.3%			9.7%	36.4%	-26.7%	4.6%	26.0%		83.5%	12.4%
625029	6961.T	ENPLAS CORP NPV	Japan	Information	2,591.00	-4.6%	-42.5%			11.2%	35.6%	-24.4%	10.9%	23.3%		72.8%	24.3%
626691	2651.T	LAWSON INC NPV	Japan	Consumer Staples	4,635.00	-4.0%	-8.4%			3.9%	28.0%	-24.1%	24.7%	49.6%	2.3%	17.9%	35.8%
633863	4839.T	WOWOW INC NPV	Japan	Communication	1,721.00	-2.4%	-39.5%			19.3%	45.8%	-26.5%	27.2%	49.7%		47.3%	28.4%
639870	3002.T	GUINZE LTD NPV	Japan	Consumer	3,830.00	-3.9%	-0.9%			18.6%	39.9%	-21.3%	3.6%	18.5%	82.6%	24.2%	60.3%
642864	6245.T	HIRANO TEOSSEED CO NPV	Japan	Industrials	1,926.00	-21.0%	-30.0%			16.1%	93.5%	-77.5%	24.9%	44.7%		30.8%	43.9%
642890	4530.T	HISAMITSU PHARM CO	Japan	Health Care	3,520.00	-3.2%	-47.5%			2.9%	27.5%	-24.6%	0.1%	45.3%		33.0%	20.2%
643904	3593.T	HOGY MEDICAL CO NPV	Japan	Health Care	3,240.00	3.3%	2.5%			5.2%	28.1%	-22.9%	8.4%	68.3%	23.8%	4.6%	31.7%
645644	7244.T	ICHIKOH INDUSTRIES NPV	Japan	Consumer	427.00	-18.0%	-43.4%			16.3%	38.1%	-21.8%	3.6%	8.4%		74.3%	59.2%
646835	7942.T	JSP CORP NPV	Japan	Materials	1,590.00	0.9%	-14.2%			15.8%	48.8%	-33.0%	3.1%	43.2%		85.4%	12.2%
664154	6471.T	NSK LTD NPV	Japan	Industrials	695.00	-5.1%	-36.6%	1		18.3%	42.9%	-24.7%	10.1%	24.4%	46.1%	91.8%	16.2%
664623	9716.T	NOMURA CO LTD NPV	Japan	Industrials	893.00	-6.2%	8.9%			11.1%	72.6%	-61.5%	18.9%	63.9%	7.1%	58.2%	16.0%
665805	9511.T	OKINAWA ELEC POWER	Japan	Utilities	1,457.00	3.8%	-1.4%			1.3%	25.8%	-24.5%	29.5%	27.5%		4.7%	19.1%
674058	5947.T	RINNAI CORP NPV	Japan	Consumer	9,580.00	-5.2%	-12.3%			10.5%	43.8%	-33.3%	21.2%	57.1%	15.0%	34.4%	35.4%

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Source: Citi Research, Factset, IBES, Worldscope, Thomson Reuters, Bloomberg, MSCI., * Highlighted in green are names with the highest change in crowding composite

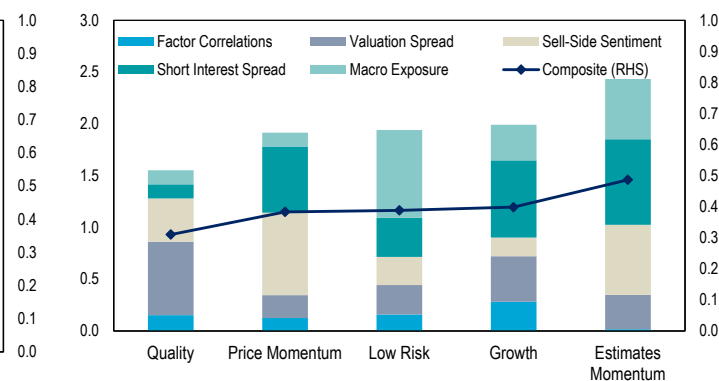
Japan: Style Crowding Momentum and Breakdown

Figure 32. Crowded Styles with Positive Factor Momentum



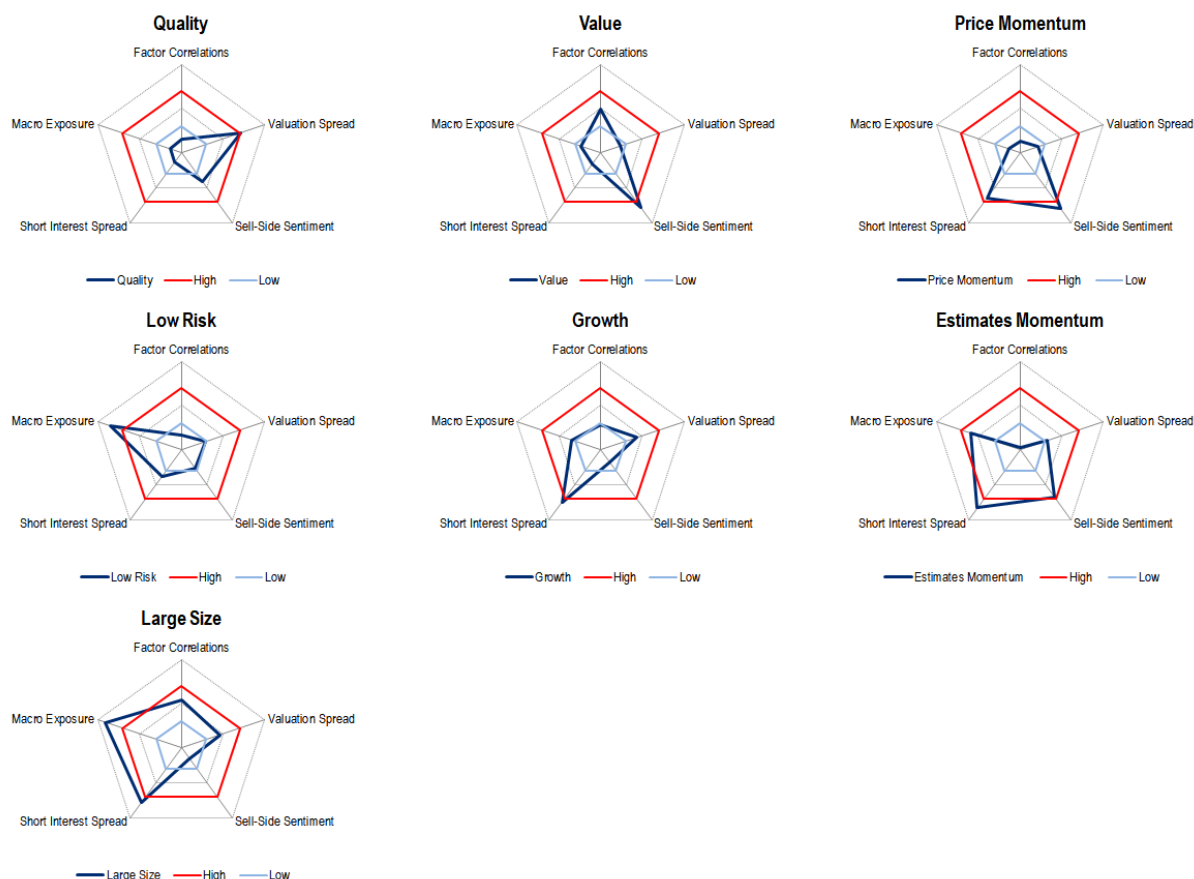
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Source: Citi Research

Figure 33. Crowded Styles with Negative Factor Momentum



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Source: Citi Research

Figure 34. Exposure to Components of Crowding by Styles



Methodology: [Searching for Alpha: Style Crowding in Asia: Getting Ahead of the Crowd](#)

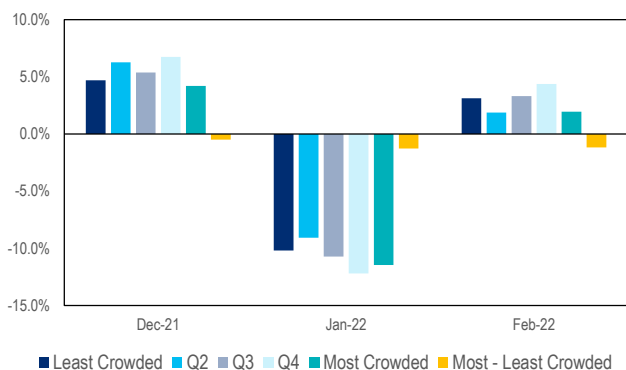
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Source: Citi Research

Australia

Crowding Returns, Sector and Stock Crowding

Figure 35. Australia Relative Return of Crowded Stocks



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Source: Citi Research

Figure 36. Australia Crowding Change by Sector (Average Stock Score)

Sector	Prev Mth	Current Mth	Change	Current Crowding
Communication Services	73.8%	71.0%	-2.8%	Most
Real Estate	52.5%	64.0%	11.5%	Most
Energy	64.3%	62.9%	1.4%	Most
Consumer Discretionary	57.1%	58.0%	0.9%	
Financials	52.2%	52.7%	-0.3%	
Materials	49.7%	51.0%	0.4%	
Utilities	54.4%	49.6%	-4.9%	
Industrials	45.1%	42.2%	-2.9%	
Health Care	41.0%	37.6%	-4.0%	Least
Information Technology	44.1%	35.0%	-11.5%	Least
Consumer Staples	30.7%	32.0%	1.1%	Least

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Source: Citi Research

Figure 37. Crowding Composite

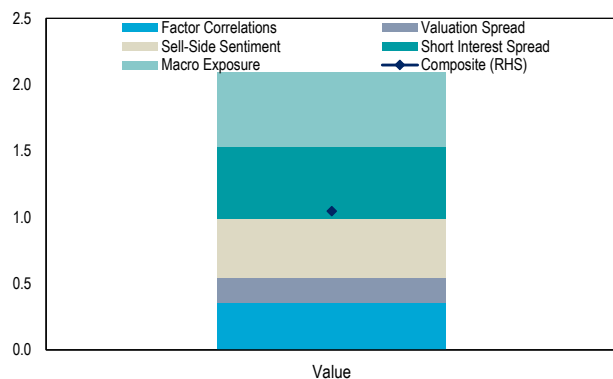
Sedol	RIC	Company Name	Country	GICS Sector	Closing Price (LC)	1M Return (LC) (%)	12M Return (LC) (%)	Citi Rating	Catalyst Watch	Crowding Composite Rank	Prior Crowding Composite Rank	Change in Crowding Composite	Quant Crowded Factor Rank	Hist Relative Valuation Rank	Consensus Rating Skewness Rank	Macro Risk Contribution Rank	Short Interest Rank (Inverse)
Citi Buy Recommendations / Upside Catalyst Watches that are in the Top 20% Least Crowded																	
BWSRTS	A2M.AX	THE A2 MILK CO LTD NPV	Australia	Consumer Staples	5.38	1.1%	-42.5%	1		1.5%	5.8%	-4.3%	19.7%	19.2%	7.1%	10.1%	46.5%
628661	ANN.AX	ANSELL NPV	Australia	Health Care	25.16	-3.2%	-29.1%	1		2.1%	1.2%	0.8%	8.6%	7.4%	47.2%	30.7%	15.0%
696374	MGX.AX	MOUNT GIBSON IRON NPV	Australia	Materials	0.53	21.8%	-40.8%	1H		3.3%	12.9%	-9.6%	24.5%	35.4%	27.9%	27.9%	6.2%
BTPJH2	APX.AX	APPEN LTD NPV	Australia	Information	7.09	-25.1%	-55.3%	1		5.0%	7.1%	-2.0%	7.3%	0.5%	55.9%	62.8%	4.4%
627102	IAG.AX	INSUREAUST LTD NPV	Australia	Financials	4.45	1.6%	-8.8%	1		7.4%	16.9%	-9.5%	44.4%	27.7%	37.0%	20.7%	14.4%
621179	COH.AX	COCHLEAR LTD NPV	Australia	Health Care	222.50	14.3%	7.6%	1		8.3%	2.5%	5.8%	30.1%	24.2%	7.1%	53.7%	33.8%
B8P4LP	XRO.AX	XERO LIMITED NPV	Australia	Information	98.05	-12.0%	-15.4%	1		8.9%	26.4%	-17.5%	15.7%	40.9%	22.8%	25.8%	46.8%
BYSGKW	CGC.AX	COSTA GROUP HLDGS NPV	Australia	Consumer Staples	2.77	-7.0%	-38.8%	1		9.2%	27.9%	-18.7%	11.9%	4.4%	66.5%	21.7%	48.5%
613716	ASB.AX	AUSTAL LIMITED NPV	Australia	Industrials	1.94	-5.6%	-20.9%	1		14.8%	8.9%	5.9%	35.1%	4.7%	89.4%	37.2%	10.3%
B9B4FJ	NEA.AX	NEARMAP LTD NPV	Australia	Information	1.19	-9.5%	-45.6%	1H		16.3%	61.7%	-45.4%	9.1%	52.5%	43.7%	55.0%	23.2%
B3XOF9	EVN.AX	EVOLUTION MINING NPV	Australia	Materials	4.20	15.4%	7.4%	1		17.5%	19.6%	-2.2%	27.8%	66.5%	20.9%	37.0%	35.0%
B1FJOC	BXB.AX	BRAMBLES LTD NPV	Australia	Industrials	10.16	6.4%	1.5%	1		17.8%	15.3%	2.4%	30.8%	23.1%	37.8%	46.3%	49.4%
638782	OZL.AX	OZ MINERALS LTD NPV	Australia	Materials	26.50	6.9%	20.1%	1		18.3%	33.4%	-15.1%	59.3%	60.7%	6.7%	49.6%	12.1%
BYZCMK	BUB.AX	BUBS AUSTRALIA LTD NPV	Australia	Consumer Staples	0.44	-5.4%	-17.9%	1H		18.6%	25.2%	-6.5%	40.4%	69.2%	18.8%	31.0%	29.4%
Citi Sell Recommendations / Downside Catalyst Watches that are in the Top 20% Most Crowded																	
None																	
Stocks Entering Most Crowded Quintile of Crowding Composite																	
608728	TLS.AX	TELSTRA CORP LTD NPV	Australia	Communication	3.92	-3.2%	26.3%			96.2%	72.1%	24.1%	90.4%	78.0%	59.8%	55.6%	98.2%
618041	CPJ.AX	COMPUTERSHARE LTD NPV	Australia	Information	20.99	2.2%	48.3%	2		97.9%	73.9%	24.0%	98.2%	68.7%	59.8%	86.3%	85.6%
622166	RMD.AX	RESMED INC COI COM USD0.004	Australia	Health Care	33.86	0.5%	39.1%	1		83.1%	47.9%	35.3%	54.5%	75.3%	63.8%	63.3%	77.1%
622559	COR.AX	CHARTER HALL RETAI UNITS	Australia	Real Estate	4.13	1.2%	12.2%	2		86.1%	63.8%	22.3%	77.3%	54.7%	22.8%	94.8%	90.9%
623864	CSR.AX	CSR LIMITED NPV	Australia	Materials	5.68	0.2%	1.4%	1		82.0%	55.8%	26.1%	38.1%	74.5%	96.5%	54.0%	66.5%
626400	NAB.AX	NATL AUSTRALIA BK NPV	Australia	Financials	28.89	3.5%	9.8%	2		90.2%	67.5%	22.8%	86.6%	54.9%	75.6%	90.7%	50.9%
695498	AWC.AX	ALUMINA LTD NPV	Australia	Materials	2.08	7.5%	18.9%	2		90.8%	50.9%	39.9%	80.6%	72.8%	61.8%	59.2%	84.7%
695757	ILU.AX	ILUKA RESOURCES NPV	Australia	Materials	10.69	2.8%	44.9%	2		87.0%	50.6%	36.4%	92.4%	83.2%	50.0%	47.8%	68.2%
B50YP2	MYR.AX	MYR HOLDINGS LTD NPV	Australia	Consumer	0.42	0.0%	42.4%			85.5%	58.9%	26.6%	59.1%	45.1%	74.2%	93.8%	
B08JUS	IGL.AX	IVE GROUP LTD NPV	Australia	Communication	2.09	22.6%	33.1%			99.1%	77.0%	22.1%	86.1%	71.4%		81.4%	100.0%
BLBQ28	WPR.AX	WAYPOINT REIT NPV (STAPLED)	Australia	Real Estate	2.73	-1.8%	8.5%			82.2%	55.2%	27.0%	57.3%	18.1%	76.0%	82.7%	95.9%
Stocks Entering Least Crowded Quintile of Crowding Composite																	
629159	SPL.AX	STARPHARMA HLD LTD NPV	Australia	Health Care	0.86	-17.0%	-58.7%			14.5%	78.8%	-64.3%	3.3%	53.8%		57.6%	26.5%
B9B4FJ	NEA.AX	NEARMAP LTD NPV	Australia	Information	1.19	-9.5%	-45.6%	1H		16.3%	61.7%	-45.4%	9.1%	52.5%	43.7%	55.0%	23.2%
671261	CDA.AX	CODAN LTD NPV	Australia	Information	7.29	-18.3%	-49.9%			15.1%	42.9%	-27.9%	3.8%	24.5%	92.1%	50.6%	7.6%
B01NQF	STX.AX	STRIKE ENERGY LTD NPV	Australia	Energy	0.30	20.0%	-6.2%			19.2%	46.6%	-27.4%	46.7%	87.9%		12.1%	7.9%
B04KLG	SSM.AX	SERVICE STREAM LTD NPV	Australia	Industrials	0.92	21.1%	-17.3%			9.8%	35.9%	-26.1%	16.7%	20.1%	80.3%	25.1%	15.3%
B0LX4B	VTG.AX	VITA GROUP LIMITED NPV	Australia	Consumer	0.26	-21.2%	-50.8%			7.1%	40.5%	-33.4%	4.3%	21.4%		75.7%	13.8%
BLOKWK	TYR.AX	TYRO PAYMENTS LTD NPV	Australia	Information	1.59	-26.4%	-49.8%			11.2%	31.3%	-20.0%	12.4%	49.7%	76.0%	10.6%	16.2%

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Source: Citi Research, Factset, IBES, Worldscope, Thomson Reuters, Bloomberg, MSCI., * Highlighted in green are names with the highest change in crowding composite

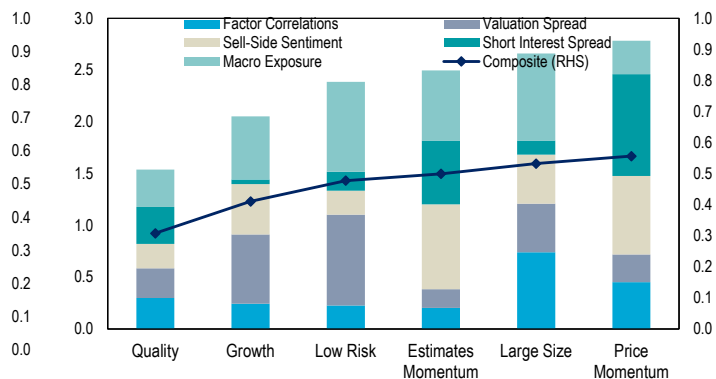
Australia: Style Crowding Momentum and Breakdown

Figure 38. Crowded Styles with Positive Factor Momentum



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Source: Citi Research

Figure 39. Crowded Styles with Negative Factor Momentum



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Source: Citi Research

Figure 40. Exposure to Components of Crowding by Styles



Methodology: [Searching for Alpha: Style Crowding in Asia: Getting Ahead of the Crowd](#)

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Source: Citi Research

Background and Methodology

Since the global financial crisis over a decade ago, quantitative investors have been concerned about crowding of systematic investment strategies. Or more simply stated, is everyone looking at the same factors and investing in the same stocks. While sympathetic to the view, we would be much more worried if the entire investment community, including fundamental and quant investors as well as hedge funds and multi-strategy funds, were investing in the same theme or set of stocks. The tech bubble in late 1990s, defensive positioning during the GFC period, and the chasing yields and low-volatility stocks in early 2010s are a few obvious examples of extreme crowding or consensus trades in the equity market. With the proliferation of hedge funds and increased flows into ETFs and factor investing (including smart beta indices), crowding has become an increasing concern among a broad range of investors. We think that it's timely and important to consider a systematic way to measure crowding in the global equity market.

Over the last few years, we have developed a framework to evaluate crowdedness in quantitative factors, based on their correlations with short interest, factor valuation, inter-quantile correlation, and macro risk contribution. Looking to extend this framework to quantify crowdedness at the stock level has its own set of challenges with the lack of public information on investors' holdings and much-delayed (45+ days) 13F filings in U.S.

We have been considering other more timely market-based indicators to measure crowding at the stock level. With more and more investors chasing the same set of stocks, we would expect the prices of these stocks to move higher, resulting in abnormally high valuations. Also, the short interest data from prime brokerage business may provide more timely information from tactical investors with demands for shorting or hedging.

Given that the majority of the equity assets are managed by active investors with a fundamental approach, a common view on stocks helped with sell-side analyst consensus recommendations could be one of the key factors that contribute to crowding. With macro factors continuing to drive equity market rotation and risk (please see [Global RAM](#) report), common macro concerns can also lead to consensus trades. These metrics, along with our analysis on factor crowding, can help quantify the degree of crowdedness at the stock level.

Conventional thinking is to avoid buying crowded stocks (high crowding composite), as they may become harder to attract marginal investors, especially the longer they remain crowded and/or a negative fundamental inflection emerges. However, there are times when stocks become crowded and remain so for good investment reasons. There could be a new development in the company or a change in view by fundamental analysts that causes the stock to attract an even larger base of investors.

Similar thinking can be applied to stocks that are non-consensus (low crowding composite). Typically, stocks that are less crowded are prone to react more positively to fundamental catalysts, as they can attract a larger set of new investors. However, on the flip side, not all fundamental catalysts are created equal and may not lead to upward consensus ratings changes or a significant change in valuation.

We do not intend the crowding composite to be a buy/sell signal by itself and do not recommend that investors rely on a crowding composite score as the sole factor in making an investment decision but rather consider it as one factor among many. For example, we believe that it could make sense to buy the shares of a company with a lower crowding composite score when comparing otherwise similarly situated companies (i.e., where an investor otherwise has a similar expectation of performance – positive or negative). Conversely, we would not recommend buying a company with a lower crowding composite score if an investor otherwise has more positive expectations of performance with respect to another company (e.g., expected total return). Accordingly, investors should consider other fundamental or quantitative factors in evaluating the expected performance of a particular company and then consider the crowding composite score as an additional measure of possible investment risk.

The Citi Quant Crowding Composite

We introduce a Crowding Composite factor based on the following five metrics:

- **Ranking of the Most Crowded Quant Factor** – based on our research [US Quantitative Insights](#) and [Searching for Alpha: Style Crowding in Asia: Getting Ahead of the Crowd](#)).

Region specific as discussed in the previous sections

- **Relative Valuation** – an equal-weighted composite of historical relative Book to Price and FY1 Earnings to Price. We require minimum of 24 months of historical data.

$$\frac{\text{current B/P}}{5 - \text{year average B/P}} ; \quad \frac{\text{current FY1 E/P}}{5 - \text{year average FY1 E/P}}$$

A lower valuation (ie. in yield terms) indicates more crowding.

- **Short Interest Ratio** – historical relative short interest ratio (based on Markit data). We require minimum of 24 months of historical data.

$$\frac{\text{current Short Interest Ratio}}{5 - \text{year average Short Interest Ratio}}$$

A lower short interest ratio indicates a higher consensus trade.

- **Skewness in sell-side Analyst Rating Distribution** – based on sell-side analysts' stock ratings from IBES. We require at least three analyst recommendations.

$$\frac{\# \text{ buy recommendations} - \# \text{ sell recommendations}}{\text{total } \# \text{ recommendations}}$$

A higher concentration of buy ratings from sell-side analysts could lead to more crowding.

- **Macro Exposure** – macro contribution of individual stock risk from our Risk Attribute Model (RAM).

$$\text{Macro } R^2 \text{ of individual stock in RAM}$$

Higher macro exposures in stocks may lead to consensus positions.

The above five metrics are percentile ranked individually across the broad regional / country universe of stocks. These rankings are then equally weighted to create the final Crowding Composite score for each stock. We require at least four of these five metrics to have data in order to calculate the crowding composite score. A higher (lower) composite rank indicates a higher (lower) amount of crowding compared to the rest of the universe.

Previously Published Research

Figure 41. Research Reports (since 2009)

Date	Research Theme	Report Link
26-Jul-21	Machine Learning	Searching for Alpha: Practical Considerations in Building Neural Networks for Stock Selection
22-Jul-21	ESG	ESG Insights: Indexed ESG Funds – A Widespread Implementation Choice
22-Jun-21	Factor	Searching for Alpha: Go with the Stock Connect Flow, for a Sharpe of 4
18-Jun-21	Factor	Searching for Alpha: Overlapping Price Mo. and Short Interest to avoid drawdowns and improve returns
15-Jun-21	ESG	ESG Insights: ESG Fundamental Characteristics
13-Apr-21	ESG	ESG Insights: Following the ESG Herd: Has ESG become a Crowded Trade?
29-Mar-21	Machine Learning	Searching for Alpha: Pairs Trading: Applying Machine Learning to Pairs Trading
09-Mar-21	Positioning	Regime Modelling using Futures Positioning: Futures vs. Cash – A Distant but Meaningful Relationship
18-Feb-21	ESG	ESG Insights: The ESG 'Premium': How does ESG compare to other Factors?
01-Feb-21	Event	Searching for Alpha: Asia Earnings Surprise: Predicting Asia Earnings Surprises
14-Jan-21	ESG	ESG Insights: Where Machines do it Better: Inferred ESG Ratings Data
30-Oct-20	Factor	Searching for Alpha: China A Alpha – Smoothing Price Momentum
16-Oct-20	Factor	Under the Microscope: Overlapping Momentum
14-Sep-20	Positioning	Equity Markets Positioning Model: Introducing the EMP
11-Sep-20	Factor	Searching for Alpha: Combining ESG and Risk Premia Investment: A Double Screen Approach
08-Sep-20	Factor	Searching for Alpha: Factoring Short Interest: Measuring and Profiting from Information in Shorts
28-May-20	Machine Learning	Searching for Alpha: Machine Learning - SHAP Value as Factor Selection Criterion
28-Feb-20	Machine Learning	Searching for Alpha: Machine Learning: Leveraging Return Forecasts
21-Feb-20	Factor	Searching for Alpha: China A Alpha – Sector-rel. Value Is Powerful. Choose Sector Mappings Wisely
03-Oct-19	Machine Learning	Searching for Alpha: Machine Learning: Beyond Random Forest for Stock Selection
23-Sep-19	Event	Searching for Alpha: Earnings Surprise: Managing Expectations
05-Mar-19	Machine Learning	Searching For Alpha: Machine Learning: Interpreting Machine Learning Predictions
07-Feb-19	Misc	Searching for Alpha: GAAP vs. Non-GAAP: Which Earnings does the Market Price?
21-Nov-18	Positioning	Searching for Alpha: Style Crowding in Asia: Getting Ahead of the Crowd
17-Sep-18	Event	Searching for Alpha: Earnings Surprise: Using ML to Forecast Earnings Surprises & Returns
13-Sep-18	ESG	Searching for Alpha: The ESG Edge: ESG Investing – A Step Forward
03-Sep-18	Machine Learning	Searching For Alpha: Machine Learning: Interacting Machine Learning and Factors
03-May-18	Positioning	Measuring the Crowded Trade: Introduction to our Crowding Composite for individual stocks
14-Mar-18	Factor	Searching for Alpha: Profiting from Capex: Look To Capex Announcements
07-Sep-17	Rotation	Searching for Alpha: Tactical Style Rotation: Using Risk and Return to Manage Style Exposure
10-Mar-17	Misc	Searching for Alpha: Big Data: Navigating New Alternative Datasets
13-Feb-17	Factor	Searching for Alpha: Betting Against (Accurate) Beta
19-Sep-16	Factor	Searching for Alpha: Competitive Advantage: Survival of the Fittest
09-Sep-16	Factor	Searching for Alpha: Financial Strength Redux
14-Apr-16	Rotation	Searching for Alpha: Dynamic Style Weighting: Risk-Based Equity Style Allocation
04-Mar-16	Smart Beta	Long-Only Pure Style Portfolios: No Shorts Please
18-Feb-16	Factor	Industry Alpha Insights: Banks: One Size Does Not Fit All
21-Sep-15	Factor	Under the Microscope: Stock Momentum Conflation
15-Sep-15	Allocation	Searching for Alpha: Macro Moves Markets: Economic Data, Expectations and Market Pricing
23-Mar-15	Rotation	Searching for Alpha: Style Timing: Style Performance, Trading Volumes and Investor Agreement
13-Mar-15	Misc	World Radar Screen: Refining Our Global Search for Alpha
18-Feb-15	Factor	Searching for Alpha: Networking with Analysts: Modelling Analyst Forecast Dependence
01-Oct-14	Smart Beta	The Rise of Low Risk Investing: Is It Getting Crowded Out There?
27-Mar-14	Factor	Under the Microscope: Five Innovations In Momentum Investing
07-Mar-14	Factor	Searching for Alpha: Timing Price Momentum: When Does Momentum Move?
27-Nov-13	Smart Beta	Equity Risk Premia Investing: A New Methodology for Monitoring Style Performance
23-Jul-13	Allocation	Stock Market Country Selection: Changes to a Well-Established Model
02-Jul-13	Factor	Searching For Alpha: Diving For Dividends: QUARI - Quality with A Reliable Income
24-Jun-13	Misc	Global Theme Machine: An Objective Way of Identifying Attractive Investment Themes
25-Mar-13	Factor	Searching for Alpha: Purifying Analyst Recommendations: Removing Beta to get to the Alpha
06-Nov-12	Factor	Searching for Alpha: Tangible Benefits of Intangibles: Brand, Respect & Intellectual Capital
09-Mar-12	Smart Beta	Low-Risk Portfolio Strategies: Sharpe Ratio Maximisation and Multi-Asset Applications
28-Feb-12	Rotation	Macro Risk and Style Rotation: A Guide Rather than a Prescription
14-Sep-11	Factor	Searching for Alpha: Accruals Volatility - A New Approach to Quality Investing
24-Aug-11	Allocation	Industry Alpha Insights: Four Approaches to Tactical Industry Selection
17-Mar-11	Misc	Industry Alpha Insights: Quantifying Industry-Specific Fundamentals
18-Nov-10	Smart Beta	Low-Risk Equity Portfolios: More than just Minimum Variance
15-Nov-10	Allocation	Under the Microscope: Measuring Systemic Risk - The Absorption Ratio
14-Jun-10	Factor	Under the Microscope: Optionality in Valuation
31-Mar-10	Event	Searching for Alpha: Earnings Surprise: Still Profiting from Surprises
29-Jan-10	Factor	Momentum in Japan: Looking at Price, Trading Values and Earnings
15-Oct-09	Rotation	Searching for Alpha: Style Rotation: Optimising Style Rotation Strategies

Source: Citi Research

Citi Quant Research Team

Figure 42. Citi Quantitative Research Teams

Global Quantitative Research

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Appendix A-1

ANALYST CERTIFICATION

The research analysts primarily responsible for the preparation and content of this research report are either (i) designated by "AC" in the author block or (ii) listed in bold alongside content which is attributable to that analyst. If multiple AC analysts are designated in the author block, each analyst is certifying with respect to the entire research report other than (a) content attributable to another AC certifying analyst listed in bold alongside the content and (b) views expressed solely with respect to a specific issuer which are attributable to another AC certifying analyst identified in the price charts or rating history tables for that issuer shown below. Each of these analysts certify, with respect to the sections of the report for which they are responsible: (1) that the views expressed therein accurately reflect their personal views about each issuer and security referenced and were prepared in an independent manner, including with respect to Citigroup Global Markets Inc. and its affiliates; and (2) no part of the research analyst's compensation was, is, or will be, directly or indirectly, related to the specific recommendations or views expressed by that research analyst in this report.

IMPORTANT DISCLOSURES

The Firm has made a market in the publicly traded equity securities of Purplebricks Group PLC on at least one occasion since 1 Jan 2021.

The Firm has made a market in the publicly traded equity securities of PepsiCo Inc on at least one occasion since 1 Jan 2021.

The Firm has made a market in the publicly traded equity securities of Universal Health Services Inc on at least one occasion since 1 Jan 2021.

The Firm has made a market in the publicly traded equity securities of JCDecaux SA on at least one occasion since 1 Jan 2021.

The Firm has made a market in the publicly traded equity securities of Carlsberg A/S on at least one occasion since 1 Jan 2021.

The Firm has made a market in the publicly traded equity securities of Zoetis Inc on at least one occasion since 1 Jan 2021.

An employee of Citigroup Global Markets or its affiliates is a Director of Trane Technologies PLC. The Firm has made a market in the publicly traded equity securities of Trane Technologies PLC on at least one occasion since 1 Jan 2021.

Due to Citigroup Global Markets Limited's involvement as advisor to SCHNEIDER ELECTRIC in relation to the announced acquisition of LARSEN & TOUBRO ('the Company') Electrical and Automation business. Citi Research restricted publication of new research reports and suspended its rating and target price on the 1st May 2018 (the Suspension Date). Please note the Company price chart that appears in this report and available on Citi Research's disclosure website does not reflect that Citi Research did not have a rating or target price between the Suspension Date and 18 November 2019, when Citi Research resumed full coverage.

The Firm has made a market in the publicly traded equity securities of ViacomCBS Inc on at least one occasion since 1 Jan 2021.

The Firm has made a market in the publicly traded equity securities of Unilever PLC on at least one occasion since 1 Jan 2021.

The Firm has made a market in the publicly traded equity securities of Bristol-Myers Squibb Co on at least one occasion since 1 Jan 2021.

Due to Citi's involvement in advising Deutsche Bank over the consideration of strategic options and potential combination with Commerzbank, Citi Research restricted publication of new research reports, and suspended its rating and target price on 20th March 2019 (the Suspension Date). Please note that the Company price chart that appears in this report and available on Citi Research's disclosure website does not reflect that Citi Research did not have a rating or target price between the Suspension Date and 26th April 2019 when Citi Research resumed full coverage. The Firm has made a market in the publicly traded equity securities of Deutsche Bank AG on at least one occasion since 1 Jan 2021.

The Firm has made a market in the publicly traded equity securities of Bath & Body Works Inc on at least one occasion since 1 Jan 2021.

The Firm has made a market in the publicly traded equity securities of Amazon.com Inc on at least one occasion since 1 Jan 2021.

The Firm has made a market in the publicly traded equity securities of Novo Nordisk A/S on at least one occasion since 1 Jan 2021.

The Firm has made a market in the publicly traded equity securities of NVIDIA Corp on at least one occasion since 1 Jan 2021.

The Firm has made a market in the publicly traded equity securities of Ucb SA on at least one occasion since 1 Jan 2021.

The Firm has made a market in the publicly traded equity securities of Abbvie Inc on at least one occasion since 1 Jan 2021.

The Firm has made a market in the publicly traded equity securities of McDonald's Corp on at least one occasion since 1 Jan 2021.

The Reg AC's analyst primarily responsible for this report is currently interviewing for a senior position with DIS. Due to Citi's role as financial advisor to Walt Disney Co. (DIS) in the acquisition of Twenty-first Century Fox (FOXA), Citi Research restricted publication of new research reports, and suspended its rating and target price on February 28, 2018, (the Suspension Date). Please note that the Company price chart that appears in this report and available on Citi Research's disclosure website does not reflect that Citi Research did not have a rating or target price between the Suspension Date and April 8, 2019, when Citi Research resumed full coverage. The Firm has made a market in the publicly traded equity securities of Walt Disney Co on at least one occasion since 1 Jan 2021.

The Firm has made a market in the publicly traded equity securities of Hellofresh SE on at least one occasion since 1 Jan 2021.

The Firm has made a market in the publicly traded equity securities of Telefonica Deutschland Holding AG on at least one occasion since 1 Jan 2021.

The Firm has made a market in the publicly traded equity securities of Eurofins Scientific SE on at least one occasion since 1 Jan 2021.

The Firm has made a market in the publicly traded equity securities of AstraZeneca PLC on at least one occasion since 1 Jan 2021.

The Firm has made a market in the publicly traded equity securities of Ping An Insurance Group Co of China Ltd on at least one occasion since 1 Jan 2021.

The Firm has made a market in the publicly traded equity securities of Snap Inc on at least one occasion since 1 Jan 2021.

Due to Citigroup Global Markets Limited's involvement as advisor to Banco de Sabadell S.A, in relation to the announced potential merger with BBVA, Citi Research restricted publication of new research reports and suspended its rating and target price on Sabadell and BBVA on 19th November 2020 (the

Suspension Date). Please note that the Company price chart that appears in this report and available on Citi Research's disclosure website does not reflect that Citi Research did not have a rating or target price between the Suspension Date and the 27th November 2020, when Citi Research resumed full coverage. Due to Citigroup Global Markets Limited's involvement as advisor to PNC Financial Services Group in relation to the Company's announced acquisition of BBVA US from Banco Bilbao Vizcaya Argentaria SA, Citi Research restricted publication of new research reports and suspended its rating and target price on BBVA on the 16th November 2020 (the Suspension Date). Please note that the Company price chart that appears in this report and available on Citi Research's disclosure website does not reflect that Citi Research did not have a rating or target price between the Suspension Date and the 18th November 2020, when Citi Research resumed full coverage. The Firm has made a market in the publicly traded equity securities of Banco Bilbao Vizcaya Argentaria SA on at least one occasion since 1 Jan 2021.

The Firm has made a market in the publicly traded equity securities of Air Products and Chemicals Inc on at least one occasion since 1 Jan 2021.

The Firm has made a market in the publicly traded equity securities of Medtronic PLC on at least one occasion since 1 Jan 2021.

The Firm has made a market in the publicly traded equity securities of Splunk Inc on at least one occasion since 1 Jan 2021.

The Firm has made a market in the publicly traded equity securities of Ascendis Pharma A/S on at least one occasion since 1 Jan 2021.

The Firm has made a market in the publicly traded equity securities of Capita PLC on at least one occasion since 1 Jan 2021.

The Firm has made a market in the publicly traded equity securities of Blueprint Medicines Corp on at least one occasion since 1 Jan 2021.

The Firm has made a market in the publicly traded equity securities of Daiichi Sankyo Co Ltd on at least one occasion since 1 Jan 2021.

The Firm has made a market in the publicly traded equity securities of Apple Inc on at least one occasion since 1 Jan 2021.

Due to Citigroup Global Markets Limited's involvement as financial advisor to Reckitt Benckiser on the sale of Scholl (its footcare business) to Yellow Wood Partners, Citi Research restricted publication of new research reports and suspended its rating and target price on Reckitt Benckiser on 24th February 2021 (the Suspension Date). Please note that the Company price chart that appears in this report and available on Citi Research's disclosure website does not reflect that Citi Research did not have a rating or target price on the merged entity Stellantis between the Suspension Date and the 25th February 2021, when Citi Research resumed full coverage. The Firm has made a market in the publicly traded equity securities of Reckitt Benckiser Group PLC on at least one occasion since 1 Jan 2021.

The Firm has made a market in the publicly traded equity securities of AT&T Inc on at least one occasion since 1 Jan 2021.

The Firm has made a market in the publicly traded equity securities of Discovery Inc on at least one occasion since 1 Jan 2021.

The Firm has made a market in the publicly traded equity securities of CH Robinson Worldwide Inc on at least one occasion since 1 Jan 2021.

The Firm has made a market in the publicly traded equity securities of Union Pacific Corp on at least one occasion since 1 Jan 2021.

The Firm has made a market in the publicly traded equity securities of Avanza Bank Holding AB on at least one occasion since 1 Jan 2021.

The Firm has made a market in the publicly traded equity securities of Flutter Entertainment PLC on at least one occasion since 1 Jan 2021.

The Firm has made a market in the publicly traded equity securities of Modern Times Group MTG AB on at least one occasion since 1 Jan 2021.

The Firm has made a market in the publicly traded equity securities of Ralph Lauren Corp on at least one occasion since 1 Jan 2021.

The Firm has made a market in the publicly traded equity securities of Ping An Healthcare and Technology Co Ltd on at least one occasion since 1 Jan 2021.

The Firm has made a market in the publicly traded equity securities of Qualcomm Inc on at least one occasion since 1 Jan 2021.

The Firm has made a market in the publicly traded equity securities of Grifols SA on at least one occasion since 1 Jan 2021.

The Firm has made a market in the publicly traded equity securities of Netflix Inc on at least one occasion since 1 Jan 2021.

The Firm has made a market in the publicly traded equity securities of Beyond Meat Inc on at least one occasion since 1 Jan 2021.

The Firm has made a market in the publicly traded equity securities of Alkermes Plc on at least one occasion since 1 Jan 2021.

The Firm has made a market in the publicly traded equity securities of Addiko Bank AG on at least one occasion since 1 Jan 2021.

The Firm has made a market in the publicly traded equity securities of TUI AG on at least one occasion since 1 Jan 2021.

Due to Citigroup Global Markets Inc's role as advisor in relation to the strategic options review for Bombardier's transportation business, in which Bombardier, along with Alstom SA and the Caisse de d e t placement du Quebec (la Caisse), sold its Transportation business to Alstom, Citi Research restricted publication of new research reports and suspended its rating and target price on the 17th February 2020 (the Suspension Date). Please note that the Company price chart that appears in this report and available on Citi Research's disclosure website does not reflect that Citi Research did not have a rating or target price between the Suspension Date and the 11th January 2021 when Citi Research resumed full coverage. The Firm has made a market in the publicly traded equity securities of Alstom SA on at least one occasion since 1 Jan 2021.

The Firm has made a market in the publicly traded equity securities of Ocado Group PLC on at least one occasion since 1 Jan 2021.

The Firm has made a market in the publicly traded equity securities of ITM Power PLC on at least one occasion since 1 Jan 2021.

The Firm has made a market in the publicly traded equity securities of Babcock International Group PLC on at least one occasion since 1 Jan 2021.

The Firm has made a market in the publicly traded equity securities of Booz Allen Hamilton Holding Corp on at least one occasion since 1 Jan 2021.

The Firm has made a market in the publicly traded equity securities of Continental AG on at least one occasion since 1 Jan 2021.

The Firm has made a market in the publicly traded equity securities of Man Group PLC on at least one occasion since 1 Jan 2021.

The Firm has made a market in the publicly traded equity securities of Walmart Inc on at least one occasion since 1 Jan 2021.

The Firm has made a market in the publicly traded equity securities of Honeywell International Inc on at least one occasion since 1 Jan 2021.

DMBH is a market maker in the publicly traded equity securities of Powszechny Zaklad Ubezpieczen SA. DMBH rating distribution versus Investment Banking service provision in the past 12 months as at December 31, 2021 is as follows: Buy (1) representing 46% of the DMBH coverage 0% of which are IB clients, Hold (2) representing 37% of the DMBH coverage 0% of which are IB clients, Sell (3) representing 17% of the DMBH coverage 0% of which are IB clients. DMBH Analyst holds a long position in the securities of PZU. DMBH acts as a dealer and regularly trades in the securities of Powszechny Zaklad Ubezpieczen SA. The Firm has made a market in the publicly traded equity securities of Powszechny Zaklad Ubezpieczen SA on at least one occasion since 1 Jan 2021.

The Firm has made a market in the publicly traded equity securities of Ren Redes Energeticas Nacionais SGPS SA on at least one occasion since 1 Jan 2021. Citigroup Global Markets Limited acted as Financial Advisor to Pontegadea in relation to its acquisition of a stake in Redes Energeticas Nacionais SGPS SA. As such Citi restricted research on Redes Energeticas Nacionais SGPS SA from 2nd August 2021 until 3rd August 2021 at which point Citi resumed research coverage.

The Firm has made a market in the publicly traded equity securities of Linde PLC on at least one occasion since 1 Jan 2021.

The Firm has made a market in the publicly traded equity securities of Galaxy Entertainment Group Ltd on at least one occasion since 1 Jan 2021.

The Firm has made a market in the publicly traded equity securities of Tripadvisor Inc on at least one occasion since 1 Jan 2021.

The Firm has made a market in the publicly traded equity securities of Wartsila Oyj Abp on at least one occasion since 1 Jan 2021.

The Firm has made a market in the publicly traded equity securities of Delivery Hero SE on at least one occasion since 1 Jan 2021.

The Firm has made a market in the publicly traded equity securities of Sherwin-Williams Co on at least one occasion since 1 Jan 2021.

The Firm has made a market in the publicly traded equity securities of United Parcel Service Inc on at least one occasion since 1 Jan 2021.

The Firm has made a market in the publicly traded equity securities of Johnson & Johnson on at least one occasion since 1 Jan 2021.

The Firm has made a market in the publicly traded equity securities of Forterra PLC on at least one occasion since 1 Jan 2021.

The Firm has made a market in the publicly traded equity securities of Poste Italiane SpA on at least one occasion since 1 Jan 2021.

The Firm has made a market in the publicly traded equity securities of Logitech International SA on at least one occasion since 1 Jan 2021.

The Firm has made a market in the publicly traded equity securities of Bank of America Corp on at least one occasion since 1 Jan 2021.

The Firm has made a market in the publicly traded equity securities of Delta Air Lines Inc on at least one occasion since 1 Jan 2021.

The Firm has made a market in the publicly traded equity securities of Li Ning Co Ltd on at least one occasion since 1 Jan 2021.

The Firm has made a market in the publicly traded equity securities of Thales SA on at least one occasion since 1 Jan 2021.

The Firm has made a market in the publicly traded equity securities of D R Horton Inc on at least one occasion since 1 Jan 2021.

The Firm has made a market in the publicly traded equity securities of Home Depot Inc on at least one occasion since 1 Jan 2021.

The Firm has made a market in the publicly traded equity securities of British American Tobacco PLC on at least one occasion since 1 Jan 2021.

The Firm has made a market in the publicly traded equity securities of Alnylam Pharmaceuticals Inc on at least one occasion since 1 Jan 2021.

The Firm has made a market in the publicly traded equity securities of United Airlines Holdings Inc on at least one occasion since 1 Jan 2021.

The Firm has made a market in the publicly traded equity securities of Euronet Worldwide Inc on at least one occasion since 1 Jan 2021.

The Firm has made a market in the publicly traded equity securities of Montea NV on at least one occasion since 1 Jan 2021.

Due to Citigroup Global Markets Inc's role providing a Fairness Opinion to NRG's Business Review Committee in relation to the sale of NRG's stake in NRG Yield to GIP, Citi Research restricted publication of new research reports, and suspended its rating and target price on 2017-07-12 (the Suspension Date). Please note the Company price chart that appears in this report and available on Citi Research's disclosure website does not reflect that Citi Research did not have a rating or target price between the Suspension Date and 07/29/2018, when Citi Research resumed full coverage. Due to Citi's involvement as advisor to NRG Energy (the company) in its acquisition of Direct Energy LP, a wholly owned subsidiary of Centrica PLC, Citi Research restricted publication of new research reports, and suspended its rating and target price on 24 July, 2020 (the Suspension Date). Please note that the Company price chart that appears in this report and available on Citi Research's disclosure website does not reflect that Citi did not have a rating or target price between the Suspension Date and 03 Feb, 2021 when Citi Research resumed full coverage.

The Firm has made a market in the publicly traded equity securities of Ansell Ltd on at least one occasion since 1 Jan 2021.

The Firm has made a market in the publicly traded equity securities of Microchip Technology Inc on at least one occasion since 1 Jan 2021.

The Firm has made a market in the publicly traded equity securities of Equinix Inc on at least one occasion since 1 Jan 2021. Citi Global Markets Inc. is acting as advisor to Equinix Inc in their joint venture with PGIM Real Estate (PGIM), the real estate investment and financing arm of Prudential Financial global asset management business, to develop and operate two xScale data centers in Sydney, Australia.

The Firm has made a market in the publicly traded equity securities of GN Store Nord A/S on at least one occasion since 1 Jan 2021.

The Firm has made a market in the publicly traded equity securities of Teradyne Inc on at least one occasion since 1 Jan 2021.

The Firm has made a market in the publicly traded equity securities of Ionis Pharmaceuticals Inc on at least one occasion since 1 Jan 2021.

The Firm has made a market in the publicly traded equity securities of Meta Platforms Inc on at least one occasion since 1 Jan 2021.

Citigroup Global Markets Limited is acting as Joint Global Coordinator on the announced 9-year Convertible Bond issued by Cellnex. The Firm has made a market in the publicly traded equity securities of Cellnex Telecom SA on at least one occasion since 1 Jan 2021. Due to Citigroup Global Markets Limited's involvement as financial to Abertis Infraestructuras S.A in relation to the announced indication of interest by Atlantia Spa, Citi Research restricted publication of new research reports on Cellnex Telecom SA and suspended its rating and target price on the 20th April 2017 ('the Suspension Date'). Please note that the Company price chart that appears in this report and available on Citi Research's disclosure website does not reflect that Citi Research did not have a rating or target price between the Suspension Date and the 10th December 2018, when Citi Research resumed full coverage.

The Firm has made a market in the publicly traded equity securities of Verizon Communications Inc on at least one occasion since 1 Jan 2021.

The Firm has made a market in the publicly traded equity securities of Ardelyx Inc on at least one occasion since 1 Jan 2021.

The Firm has made a market in the publicly traded equity securities of Baxter International Inc on at least one occasion since 1 Jan 2021.

The Firm has made a market in the publicly traded equity securities of Aareal Bank AG on at least one occasion since 1 Jan 2021.

A member of Research Management has a position that may be considered material to that individual in the securities of JP Morgan Chase & Co. The Firm has made a market in the publicly traded equity securities of JPMorgan Chase & Co on at least one occasion since 1 Jan 2021.

The Firm has made a market in the publicly traded equity securities of Konami Holdings Corp on at least one occasion since 1 Jan 2021.

The Firm has made a market in the publicly traded equity securities of Blackstone Inc on at least one occasion since 1 Jan 2021.

The Firm has made a market in the publicly traded equity securities of J Sainsbury PLC on at least one occasion since 1 Jan 2021.

The Firm has made a market in the publicly traded equity securities of Kellogg Co on at least one occasion since 1 Jan 2021.

Due to Citigroup Global Market Inc's role as dealer on the recent Tender Offer transaction for Johnson Controls International PLC, Citi Research restricted publication of new research reports, and suspended its rating and target price on May 1st 2019, (the Suspension Date). Please note that the Company price chart that appears in this report and available on Citi Research's disclosure website does not reflect that Citi Research did not have a rating or target price between the Suspension Date and June 4th 2019 when Citi Research resumed full coverage. Due to Citi's involvement in the acquisition of divestiture involving Brookfield Business Partners(the Company)and Johnson Controls International PLC, Citi Research restricted publication of new research reports, and suspended its rating and target price on November 13th 2018, (the Suspension Date). Please note that the Company price chart that appears in this report and available on Citi Research's disclosure website does not reflect that Citi Research did not have a rating or target price between the Suspension

Date and November 14th, 2018, when Citi Research resumed full coverage. The Firm has made a market in the publicly traded equity securities of Johnson Controls International PLC on at least one occasion since 1 Jan 2021.

The Firm has made a market in the publicly traded equity securities of BTRS Holdings Inc on at least one occasion since 1 Jan 2021.

The Firm has made a market in the publicly traded equity securities of Deutsche Telekom AG on at least one occasion since 1 Jan 2021.

Due to Citigroup Global Market Inc's role as a advisor to BREIT in relation to the BREIT-led joint venture with MGM Resorts to acquire the real estate assets of the Bellagio for \$4.25 billion in a sale-leaseback transaction. , Citi Research restricted publication of new research reports, and suspended its rating and target price on 15 Oct 2019 (the Suspension Date). Please note the Company price chart that appears in this report and available on Citi Research's disclosure website does not reflect that Citi Research did not have a rating or target price between the Suspension Date and the 27th June 2019, when Citi Research resumed full coverage. The Firm has made a market in the publicly traded equity securities of MGM Resorts International on at least one occasion since 1 Jan 2021.

The Firm has made a market in the publicly traded equity securities of Resmed Inc on at least one occasion since 1 Jan 2021.

The Firm has made a market in the publicly traded equity securities of Continental Resources Inc on at least one occasion since 1 Jan 2021.

Due to Citigroup Global Markets Limited's involvement as advisor to Areva SA in relation to the announced sale of a 75.5% stake in New NP Capital to Electricite de France, Citi Research restricted publication of new research reports and suspended its rating and target price on EDF on the 19th May 2015 (the Suspension Date). Please note that the Company price chart that appears in this report and available on Citi Research's disclosure website does not reflect that Citi Research did not have a rating or target price between the Suspension Date and the 27th June 2019, when Citi Research resumed full coverage. The Firm has made a market in the publicly traded equity securities of Electricite de France SA on at least one occasion since 1 Jan 2021.

The Firm has made a market in the publicly traded equity securities of Euronext NV on at least one occasion since 1 Jan 2021.

The Firm has made a market in the publicly traded equity securities of Visa Inc on at least one occasion since 1 Jan 2021.

The Firm has made a market in the publicly traded equity securities of Compass Group PLC on at least one occasion since 1 Jan 2021.

The Firm has made a market in the publicly traded equity securities of Stagecoach Group PLC on at least one occasion since 1 Jan 2021.

The Firm has made a market in the publicly traded equity securities of Entain PLC on at least one occasion since 1 Jan 2021.

The Firm has made a market in the publicly traded equity securities of Spotify Technology SA on at least one occasion since 1 Jan 2021.

The Firm has made a market in the publicly traded equity securities of Wells Fargo & Co on at least one occasion since 1 Jan 2021.

The Firm has made a market in the publicly traded equity securities of Agnico Eagle Mines Ltd on at least one occasion since 1 Jan 2021.

The Firm has made a market in the publicly traded equity securities of Alphabet Inc on at least one occasion since 1 Jan 2021.

The Firm has made a market in the publicly traded equity securities of Newmont Corporation on at least one occasion since 1 Jan 2021.

The Firm has made a market in the publicly traded equity securities of Brambles Ltd on at least one occasion since 1 Jan 2021.

The Firm has made a market in the publicly traded equity securities of Sats ASA on at least one occasion since 1 Jan 2021.

Citigroup Global Markets Ltd has been appointed as sole global co-ordinator to ADIDAS in relation to their recently announced convertible bond. The Firm has made a market in the publicly traded equity securities of Adidas AG on at least one occasion since 1 Jan 2021.

The Firm has made a market in the publicly traded equity securities of Ally Financial Inc on at least one occasion since 1 Jan 2021.

Due to Citi's involvement in the contemplated acquisition of Amer Sports by a consortium comprising ANTA Sports Products Limited and FountainVest Partners , Citi Research restricted publication of new research reports ANTA Sports Products Limited (the Company), and suspended its rating and target price of the Company on 11 September 2018 (the Suspension Date). Please note the Company's price chart available on Citi Research's disclosure website, does not reflect that Citi Research did not have a rating or target price between the Suspension Date and 8th July 2019 when Citi Research resumed full coverage. The Firm has made a market in the publicly traded equity securities of ANTA Sports Products Ltd on at least one occasion since 1 Jan 2021.

The Firm has made a market in the publicly traded equity securities of Grand City Properties SA on at least one occasion since 1 Jan 2021.

The Firm has made a market in the publicly traded equity securities of Golar LNG Ltd on at least one occasion since 1 Jan 2021. Due to a period of restriction, Citi Research suspended its rating and target price on June 1, 2020. Please note that the Company price chart that appears in this report and available on Citi Research's disclosure website does not reflect that Citi Research did not have a rating or target price between the Suspension Date and March 1, 2021 when Citi Research resumed full coverage.

The Firm has made a market in the publicly traded equity securities of Coca-Cola Co on at least one occasion since 1 Jan 2021.

The Firm has made a market in the publicly traded equity securities of Ceres Power Holdings PLC on at least one occasion since 1 Jan 2021.

The Firm has made a market in the publicly traded equity securities of Microsoft Corp on at least one occasion since 1 Jan 2021.

The Firm has made a market in the publicly traded equity securities of PayPal Holdings Inc on at least one occasion since 1 Jan 2021.

The Firm has made a market in the publicly traded equity securities of Endo International PLC on at least one occasion since 1 Jan 2021.

The Firm has made a market in the publicly traded equity securities of Qiagen NV on at least one occasion since 1 Jan 2021.

The Firm has made a market in the publicly traded equity securities of Getlink SE on at least one occasion since 1 Jan 2021.

The Firm has made a market in the publicly traded equity securities of Hoist Finance AB (publ) on at least one occasion since 1 Jan 2021.

The Firm has made a market in the publicly traded equity securities of Danone SA on at least one occasion since 1 Jan 2021.

The Firm has made a market in the publicly traded equity securities of Lagardere SA on at least one occasion since 1 Jan 2021.

The Firm has made a market in the publicly traded equity securities of Appen Ltd on at least one occasion since 1 Jan 2021.

The Firm has made a market in the publicly traded equity securities of Valero Energy Corp on at least one occasion since 1 Jan 2021.

Due to Citigroup Global Markets Limited's mandate as Advisor to Clariant AG in relation to the announced discussions between Clariant AG and Saudi Basic Industries Corp ('SABIC') around the potential combination with SABIC's Specialties division, Citi Research restricted publication of new research reports and suspended its rating and target price on the 18th September 2018 (the Suspension Date). Please note that the Company price chart that appears in this report and available on Citi Research's disclosure website does not reflect that Citi Research did not have a rating or target price between the Suspension Date and the 26th November 2019, when Citi Research resumed full coverage. Due to Citigroup Global Markets Limited's involvement as advisor to Clariant in relation to announced merger between Clariant AG and Huntsman Corporation. Citi Research restricted publication of new research reports and suspended its rating and target price on the 22nd May 2017 ('the Suspension Date'). Please note that the Company price chart that appears in this report and available on Citi Research's disclosure website does not reflect that Citi Research did not have a rating or target price between the Suspension Date and the 3rd November 2017, when Citi Research resumed full coverage. Due to Citigroup Global Markets Inc's involvement as advisor to PolyOne

Corporation in the acquisition of Clariant AG's Masterbatches business, Citi Research restricted publication of new research reports and suspended its rating and target price on the 19th December 2019 (the Suspension Date). Please note that the Company price chart that appears in this report and available on Citi Research's disclosure website does not reflect that Citi Research did not have a rating or target price between the Suspension Date and the 17th June 2020 when Citi Research resumed full coverage. The Firm has made a market in the publicly traded equity securities of Clariant AG on at least one occasion since 1 Jan 2021.

The Firm has made a market in the publicly traded equity securities of Lancashire Holdings Ltd on at least one occasion since 1 Jan 2021.

The Firm has made a market in the publicly traded equity securities of Currys PLC on at least one occasion since 1 Jan 2021.

The Firm has made a market in the publicly traded equity securities of Roche Holding AG on at least one occasion since 1 Jan 2021.

The Firm has made a market in the publicly traded equity securities of Traton SE on at least one occasion since 1 Jan 2021.

Due to Citigroup Global Markets Limited's involvement as corporate broker VIRGIN MONEY HOLDING UK PLC in relation to its takeover by CYBG PLC, Citi Research restricted publication of new research reports and suspended its rating and target price on the 8th May 2018 (the Suspension Date). Please note that the Company price chart that appears in this report and available on Citi Research's disclosure website does not reflect that Citi Research did not have a rating or target price between the Suspension Date and the 19th November 2018, when Citi Research resumed full coverage. The Firm has made a market in the publicly traded equity securities of Virgin Money UK PLC on at least one occasion since 1 Jan 2021.

The Firm has made a market in the publicly traded equity securities of Roku Inc on at least one occasion since 1 Jan 2021.

The Firm has made a market in the publicly traded equity securities of Evolution AB (publ) on at least one occasion since 1 Jan 2021.

The Firm has made a market in the publicly traded equity securities of National Australia Bank Ltd on at least one occasion since 1 Jan 2021.

The Firm has made a market in the publicly traded equity securities of Western Union Co on at least one occasion since 1 Jan 2021.

An employee of Citigroup Global Markets or its affiliates is a Director of Mastercard Inc. The Firm has made a market in the publicly traded equity securities of Mastercard Inc on at least one occasion since 1 Jan 2021.

The Firm has made a market in the publicly traded equity securities of K&S AG on at least one occasion since 1 Jan 2021.

The Firm has made a market in the publicly traded equity securities of Baker Hughes Co on at least one occasion since 1 Jan 2021.

The Firm has made a market in the publicly traded equity securities of Assa Abloy AB on at least one occasion since 1 Jan 2021.

The Firm has made a market in the publicly traded equity securities of Bayer AG on at least one occasion since 1 Jan 2021.

The Firm has made a market in the publicly traded equity securities of EOG Resources Inc on at least one occasion since 1 Jan 2021.

The Firm has made a market in the publicly traded equity securities of International Consolidated Airlines Group SA on at least one occasion since 1 Jan 2021.

The Firm has made a market in the publicly traded equity securities of Elkem ASA on at least one occasion since 1 Jan 2021.

Citigroup Global Markets Limited acted as financial advisor to Coima SGR S.p.A. in the transaction with Unione di Banche Italiane S.p.A. ("UBI") which facilitated UBI's transfer of its Milanese headquarters to the Porta Nuova development. Citi Research restricted publication of new research reports on COIMA RES SpA SIIQ and suspended its rating and target price on the 11th June 2020 (the Suspension Date). Please note that the Company price chart that appears in this report and available on Citi Research's disclosure website does not reflect that Citi Research did not have a rating or target price between the Suspension Date and the 6th October 2020, when Citi Research resumed full coverage. The Firm has made a market in the publicly traded equity securities of COIMA RES SpA SIIQ on at least one occasion since 1 Jan 2021.

The Firm has made a market in the publicly traded equity securities of Freeport-McMoRan Inc on at least one occasion since 1 Jan 2021.

The Firm has made a market in the publicly traded equity securities of Procter & Gamble Co on at least one occasion since 1 Jan 2021.

The Firm has made a market in the publicly traded equity securities of Nike Inc on at least one occasion since 1 Jan 2021. A member of Citigroup's Board of Directors is also on the Board of Directors of Nike Inc.

Due to Citi's involvement in the acquisition involving United Technologies (the Company), Citi Research restricted publication of new research reports, and suspended its rating and target price on 09/05/2017 (the Suspension Date). Please note that the Company price chart that appears in this report and available on Citi Research's disclosure website does not reflect that Citi Research did not have a rating or target price between the Suspension Date and 01/02/2019 when Citi Research resumed full coverage. Due to Citi's involvement in the merger of equals involving Raytheon Company (RTN) and United Technologies (UTX), Citi Research restricted publication of new research reports, and suspended its ratings and target prices for both companies on 06/09/2019 (the Suspension Date). Please note that the Company price chart that appears in this report and available on Citi Research's disclosure website does not reflect that Citi Research did not have a rating or target price between the Suspension Date and 06/24/2020 when Citi Research resumed full coverage. The Firm has made a market in the publicly traded equity securities of Raytheon Technologies Corp on at least one occasion since 1 Jan 2021.

The Firm has made a market in the publicly traded equity securities of Sempra Energy on at least one occasion since 1 Jan 2021.

The Firm has made a market in the publicly traded equity securities of Coca-Cola Europacific Partners PLC on at least one occasion since 1 Jan 2021.

The Firm has made a market in the publicly traded equity securities of Genpact Ltd on at least one occasion since 1 Jan 2021.

The Firm has made a market in the publicly traded equity securities of Morgan Stanley on at least one occasion since 1 Jan 2021.

The Firm has made a market in the publicly traded equity securities of Tikehau Capital SCA on at least one occasion since 1 Jan 2021.

The Firm has made a market in the publicly traded equity securities of Zur Rose Group AG on at least one occasion since 1 Jan 2021.

The Firm has made a market in the publicly traded equity securities of Booking Holdings Inc on at least one occasion since 1 Jan 2021.

The Firm has made a market in the publicly traded equity securities of Collectis SA on at least one occasion since 1 Jan 2021.

The Firm has made a market in the publicly traded equity securities of Embracer Group AB on at least one occasion since 1 Jan 2021.

The Firm has made a market in the publicly traded equity securities of ProQR Therapeutics NV on at least one occasion since 1 Jan 2021.

The Firm has made a market in the publicly traded equity securities of Costco Wholesale Corp on at least one occasion since 1 Jan 2021.

The Firm has made a market in the publicly traded equity securities of Enbridge Inc on at least one occasion since 1 Jan 2021.

The Firm has made a market in the publicly traded equity securities of Epam Systems Inc on at least one occasion since 1 Jan 2021.

The Firm has made a market in the publicly traded equity securities of Pfizer Inc on at least one occasion since 1 Jan 2021.

The Firm has made a market in the publicly traded equity securities of General Electric Co on at least one occasion since 1 Jan 2021.

The Firm has made a market in the publicly traded equity securities of Deutsche Lufthansa AG on at least one occasion since 1 Jan 2021.

The Firm has made a market in the publicly traded equity securities of Dexcom Inc on at least one occasion since 1 Jan 2021.

The Firm has made a market in the publicly traded equity securities of Mercedes-Benz Group AG on at least one occasion since 1 Jan 2021.

The Firm has made a market in the publicly traded equity securities of Credit Suisse Group AG on at least one occasion since 1 Jan 2021.

The Firm has made a market in the publicly traded equity securities of Twitter Inc on at least one occasion since 1 Jan 2021.

Citi Research suspended its rating and target price on December 17, 2019. Please note that the Company price chart that appears in this report and available on Citi Research's disclosure website does not reflect that Citi Research did not have a rating or target price between the Suspension Date and June 17, 2020 when Citi Research resumed full coverage.

Citigroup Global Markets Inc. or its affiliates has received compensation for investment banking services provided within the past 12 months from the Carlyle Group. Citigroup Global Markets Inc. or its affiliates expects to receive or intends to seek, within the next three months, compensation for investment banking services from the Carlyle Group.

The Firm has made a market in the publicly traded equity securities of Conocophillips on at least one occasion since 1 Jan 2021.

The Firm has made a market in the publicly traded equity securities of Ubisoft Entertainment SA on at least one occasion since 1 Jan 2021.

The Firm has made a market in the publicly traded equity securities of Gem Diamonds Ltd on at least one occasion since 1 Jan 2021.

Due to Citi's involvement in the proposed strategic alliance through a Memorandum of Understanding between Sumitomo Dainippon Pharma Co., Ltd (the Company) and Roivant Sciences Ltd., Citi Research restricted publication of new research reports, and suspended the Company's rating and target price on September 6, 2019 (the Suspension Date). Please note that the price chart of the Company available on Citi Research's disclosure website does not reflect that Citi Research did not have a rating or target price between the Suspension Date and January 21, 2020, when Citi Research resumed full coverage of the Company.

The Firm has made a market in the publicly traded equity securities of Intertek Group PLC on at least one occasion since 1 Jan 2021.

The Firm has made a market in the publicly traded equity securities of Iberdrola SA on at least one occasion since 1 Jan 2021.

Due to internal compliance reasons, Citi Research restricted publication of new research reports and suspended its rating and target price on the 30th July 2018 (the Suspension Date). Please note that the Company price chart that appears in this report and available on Citi Research's disclosure website does not reflect that Citi Research did not have a rating or target price between the Suspension Date and the 2nd of September 2019, when Citi Research resumed full coverage. The Firm has made a market in the publicly traded equity securities of Autogrill SpA on at least one occasion since 1 Jan 2021.

The Firm has made a market in the publicly traded equity securities of Galapagos NV on at least one occasion since 1 Jan 2021.

The Firm has made a market in the publicly traded equity securities of Frontier Developments PLC on at least one occasion since 1 Jan 2021.

The Firm has made a market in the publicly traded equity securities of O'Reilly Automotive Inc on at least one occasion since 1 Jan 2021.

The Firm has made a market in the publicly traded equity securities of Beiersdorf AG on at least one occasion since 1 Jan 2021.

The Firm has made a market in the publicly traded equity securities of Suncor Energy Inc on at least one occasion since 1 Jan 2021.

The Firm has made a market in the publicly traded equity securities of Nel ASA on at least one occasion since 1 Jan 2021.

The Firm has made a market in the publicly traded equity securities of Tryg A/S on at least one occasion since 1 Jan 2021.

The Firm has made a market in the publicly traded equity securities of Avery Dennison Corp on at least one occasion since 1 Jan 2021.

The Firm has made a market in the publicly traded equity securities of Eli Lilly and Co on at least one occasion since 1 Jan 2021.

The Firm has made a market in the publicly traded equity securities of NiSource Inc on at least one occasion since 1 Jan 2021.

The Firm has made a market in the publicly traded equity securities of Chevron Corp on at least one occasion since 1 Jan 2021.

One or more members of the board of directors of one of the subsidiaries of Citigroup Holdings are members of the board of directors of Southern Copper Corp. The Firm has made a market in the publicly traded equity securities of Southern Copper Corp on at least one occasion since 1 Jan 2021.

The Firm has made a market in the publicly traded equity securities of Easyjet PLC on at least one occasion since 1 Jan 2021.

The Firm has made a market in the publicly traded equity securities of Tesla Inc on at least one occasion since 1 Jan 2021.

The Firm has made a market in the publicly traded equity securities of Duke Energy Corp on at least one occasion since 1 Jan 2021.

Due to Citigroup Global Markets Limited's involvement as advisor to GlaxoSmithKline Plc in relation to the transaction whereby they have purchased the Consumer Healthcare Joint Venture stake from Novartis AG, Citi Research restricted publication of new research reports and suspended its rating and target price on the 27th March 2018 (the Suspension Date). Please note that the Company price chart that appears in this report and available on Citi Research's disclosure website does not reflect that Citi Research did not have a rating or target price between the Suspension Date and 15th May 2018 when Citi Research resumed full coverage. The Firm has made a market in the publicly traded equity securities of Novartis AG on at least one occasion since 1 Jan 2021.

The Firm has made a market in the publicly traded equity securities of Hong Kong Exchanges and Clearing Ltd on at least one occasion since 1 Jan 2021.

The Firm has made a market in the publicly traded equity securities of Exxon Mobil Corp on at least one occasion since 1 Jan 2021.

The Firm has made a market in the publicly traded equity securities of Vestas Wind Systems A/S on at least one occasion since 1 Jan 2021.

The Firm has made a market in the publicly traded equity securities of Molson Coors Beverage Co on at least one occasion since 1 Jan 2021.

The Firm has made a market in the publicly traded equity securities of Gamma Communications PLC on at least one occasion since 1 Jan 2021.

The Firm has made a market in the publicly traded equity securities of American Electric Power Company Inc on at least one occasion since 1 Jan 2021.

The Firm has made a market in the publicly traded equity securities of Moneysupermarket.Com Group PLC on at least one occasion since 1 Jan 2021.

Richard W Schlatter, Analyst, holds a long position in the securities of Meta Platforms Inc.

Chris Ma, Analyst, holds a long position in the securities of JP Morgan Chase & Co.

A member of the household of Chris Montagu, Strategist, holds a long position in the securities of Insurance Australia Group Ltd.

A member of the household of Hong Li, Analyst, holds a long position in the securities of Deutsche Bank, AT&T Inc.

Citigroup Global Markets Inc. or its affiliates beneficially owns 1% or more of any class of common equity securities of Splunk, OZ Minerals Ltd, Flutter Entertainment PLC, Man Group, TripAdvisor, Fujisoft, Aareal Bank AG, adidas, DraftKings Inc, Lancashire, Freeport McMoRan, Aluminum Corporation of China. This position reflects information available as of the prior business day.

Citigroup Global Markets Inc. or its affiliates has a net long position of 0.5% or more of any class of common equity securities of Carlsberg, Paramount Global, Bristol Myers Squibb, Deutsche Bank, Amazon.com, Inc., NVIDIA Corp, Walt Disney Co, HelloFresh SE, Telefónica Deutschland Holding AG,

Eurofins Scientific, Snap Inc, Splunk, OZ Minerals Ltd, Avanza, Flutter Entertainment PLC, Ping An Healthcare and Technology, Grifols SA, Netflix, Inc, 10X Genomics Inc., Beyond Meat, Inc., TUI AG, Alstom, Ocado Group PLC, ITM Power, Man Group, World Wrestling Entertainment, Evolution Mining Ltd, TripAdvisor, Wartsila, Delivery Hero SE, Renesas Electronics, Logitech International, NSK, Delta Air Lines, Inc, United Airlines Holdings, Inc, NRG, Peptidream, Luminar Technologies Inc., Fujisoft, Meta Platforms Inc, Plains All American Pipeline LP, Cellnex Telecom, Ardelyx, Aareal Bank AG, Konami Holdings, Deutsche Telekom AG, Euronext NV, Visa Inc., Entain, Spotify Technology SA, Wells Fargo & Co, Agnico Eagle Mines Ltd, Alumina Ltd, adidas, PayPal, Qiagen NV, Getlink SE, Danone, DraftKings Inc, Lancashire, Currys PLC, Playa Hotels & Resorts, Roku, Inc., K+S AG, Bayer AG, International Consolidated Airlines Group, S.A., Elkem, Freeport McMoRan, Aluminum Corporation of China, Morgan Stanley, Zur Rose Group AG, Lufthansa, Credit Suisse, Twitter, Galapagos, Alps Alpine, Nel, Sunoco LP, EasyJet, Tesla Inc, Hong Kong Exchanges & Clearing, Gamma Communications, Moneysupermarket.

Citigroup Global Markets Inc. or its affiliates beneficially owns 2.0% or more of any class of common equity securities of Splunk, Fujisoft, DraftKings Inc, Lancashire, Aluminum Corporation of China.

Within the past 12 months, Citigroup Global Markets Inc. or its affiliates has acted as manager or co-manager of an offering of securities of PepsiCo, Paramount Global, Fortress Transportation and Infrastructure Investors, Bristol Myers Squibb, Independence Realty, Amazon.com, Inc., NVIDIA Corp, McDonald's Corp, AstraZeneca PLC, Extra Space Storage Inc, AT&T Inc, Vertiv Holdings Co, Union Pacific Corp., TUI AG, Alstom, Ocado Group PLC, Walmart Inc, Honeywell International Inc., Linde PLC, TripAdvisor, Sherwin-Williams Co, Renesas Electronics, Ecovyst, Bank of America Corp, D.R. Horton, Home Depot Inc, British American Tobacco PLC, Clear Channel Outdoor Holdings Inc, Public Storage Inc, Luminar Technologies Inc., Equinix Inc., Crown Castle International Corp, Verizon Communications Inc, Baxter International Inc, Aareal Bank AG, JP Morgan Chase & Co, Avantor, Enviva Inc, Johnson Controls International plc, Billtrust, Warrior Met Coal, Continental Resources, Electricite de France, Kite Realty Group Trust, Wells Fargo & Co, Newmont Corporation, Ally Financial Inc, The Coca-Cola Company, Endo International PLC, Danone, Lagardere SA, Valero Energy Corp, Lancashire, Renewable Energy Group, TRATON, Virgin Money UK PLC, National Australia Bank Ltd, Mastercard Inc., Baker Hughes Co, Axis Bank, International Consolidated Airlines Group, S.A., National Storage Affiliates, Procter & Gamble Co, Raytheon Technologies, Sempra Energy, Coca-Cola Europacific Partners, Embracer Group AB, ProQR Therapeutics, Enbridge Inc., Pfizer, Lufthansa, Telephone & Data Systems Inc, Brookfield Infrastructure Partners, Autogrill SpA, Sunoco LP, Tryg, Avery Dennison Corp, Eli Lilly, NiSource Inc, Duke Energy, American Tower Corp, NMDC.

Citigroup Global Markets Inc. owns a position of 1 million USD or more in the debt securities of PepsiCo, Universal Health Services, Zoetis Inc, Keurig Dr Pepper Inc, Paramount Global, Fortress Transportation and Infrastructure Investors, Bristol Myers Squibb, Deutsche Bank, Bath & Body Works, Independence Realty, Amazon.com, Inc., NVIDIA Corp, AbbVie, McDonald's Corp, Walt Disney Co, AstraZeneca PLC, Ping An Insurance, Snap Inc, Air Products and Chemicals Inc, Splunk, Apple, Inc., AT&T Inc, Discovery Inc, Union Pacific Corp., Qualcomm Inc, Netflix, Inc, Walmart Inc, World Wrestling Entertainment, Honeywell International Inc., Linde PLC, TripAdvisor, Sherwin-Williams Co, United Parcel Service Inc., Johnson & Johnson, Bank of America Corp, Delta Air Lines, Inc, Home Depot Inc, United Airlines Holdings, Inc, Clear Channel Outdoor Holdings Inc, NRG, Public Storage Inc, Microchip Technology, Equinix Inc., Crown Castle International Corp, Meta Platforms Inc, Plains All American Pipeline LP, Verizon Communications Inc, Baxter International Inc, JP Morgan Chase & Co, Blackstone Inc, Kellogg Company, Johnson Controls International plc, MGM Resorts International, Continental Resources, Visa Inc., Spotify Technology SA, Wells Fargo & Co, Agnico Eagle Mines Ltd, Alphabet Inc, Newmont Corporation, DISH Network Corp, Ally Financial Inc, Golar LNG Limited, The Coca-Cola Company, Microsoft Corp., PayPal, Danone, Valero Energy Corp, National Australia Bank Ltd, Mastercard Inc., Baker Hughes Co, Healthpeak Properties Inc, EOG Resources Inc, Freeport McMoRan, Procter & Gamble Co, Nike Inc, Raytheon Technologies, Sempra Energy, Morgan Stanley, Booking Holdings, Costco Wholesale Corp, Enbridge Inc., Pfizer, General Electric Company, DexCom Inc, Credit Suisse, Twitter, ConocoPhillips, O'Reilly Automotive Inc, Suncor Energy Inc, Sunoco LP, Eli Lilly, Chevron, Southern Copper Company, Tesla Inc, Duke Energy, American Tower Corp, Exxon Mobil Corp, Molson Coors, American Electric Power Co Inc.

Citigroup Global Markets Inc. or its affiliates has received compensation for investment banking services provided within the past 12 months from PepsiCo, Universal Health Services, Zoetis Inc, Trane Technologies Plc, Keurig Dr Pepper Inc, Larsen & Toubro, Paramount Global, Insurance Australia Group Ltd, Unilever PLC, Fortress Transportation and Infrastructure Investors, Bristol Myers Squibb, Deutsche Bank, Coal India, Bath & Body Works, Independence Realty, Amazon.com, Inc., Novo Nordisk A/S, NVIDIA Corp, UCB, AbbVie, McDonald's Corp, Walt Disney Co, HelloFresh SE, Telefónica Deutschland Holding AG, Eurofins Scientific, AstraZeneca PLC, Ping An Insurance, Banco Bilbao Vizcaya Argentaria SA, Shenzhen Inovance Technology, Tenaga Nasional, Air Products and Chemicals Inc, Medtronic Plc, Charter Hall Retail REIT, Capita Group PLC, Extra Space Storage Inc, Sun Art, Apple, Inc., Reckitt Benckiser, China Coal Energy, AT&T Inc, Vertiv Holdings Co, Discovery Inc, Union Pacific Corp., Ping An Healthcare and Technology, Qualcomm Inc, Grifols SA, Netflix, Inc, Addiko Bank, TUI AG, Alstom, Ocado Group PLC, Continental, Man Group, Walmart Inc, Honeywell International Inc., PZU, REN, Linde PLC, Galaxy Entertainment, TripAdvisor, Wartsila, Delivery Hero SE, Sherwin-Williams Co, ASUSTeK Computer, United Parcel Service Inc., Renesas Electronics, Johnson & Johnson, Forterra, Poste Italiane, Ecovyst, Logitech International, NSK, Daifuku, Computershare, Bank of America Corp, Delta Air Lines, Inc, Li Ning, Thales, D.R. Horton, Home Depot Inc, British American Tobacco PLC, Cochlear Ltd, The A2 Milk Company Ltd, JCET Group, United Airlines Holdings, Inc, Liberty Media Corp, Clear Channel Outdoor Holdings Inc, Oil & Natural Gas, NRG, IRPC, Lupin, Public Storage Inc, Jacobs Engineering, Luminar Technologies Inc., Equinix Inc., GN Store Nord, Crown Castle International Corp, Cellnex Telecom, Verizon Communications Inc, Baxter International Inc, Aareal Bank AG, JP Morgan Chase & Co, Iluka Resources Ltd, Blackstone Inc, Sinopec Shanghai Petrochemical, Avantor, Kellogg Company, Enviva Inc, Johnson Controls International plc, Billtrust, Deutsche Telekom AG, MGM Resorts International, Warrior Met Coal, Austal Limited, Continental Resources, Electricite de France, Adaro Energy Indonesia, Visa Inc., Compass Group, Kite Realty Group Trust, NuStar Energy, L.P., Entain, Spotify Technology SA, Wells Fargo & Co, Agnico Eagle Mines Ltd, Alphabet Inc, Aisin, Newmont Corporation, adidas, Ally Financial Inc, Anta Sports Products, Golar LNG Limited, The Coca-Cola Company, Just Dial, Shanghai Electric Group, Microsoft Corp., PayPal, Endo International PLC, Getlink SE, Gujarat Gas, Hoist Finance AB, Danone, Lagardere SA, Valero Energy Corp, Clariant AG, Lancashire, Currys PLC, Vale Indonesia, Roche Holding AG, Playa Hotels & Resorts, TRATON, Virgin Money UK PLC, Evolution AB (publ), National Australia Bank Ltd, Western Union Co., Mastercard Inc., Baker Hughes Co, Assa Abloy, Bayer AG, Axis Bank, EOG Resources Inc, International Consolidated Airlines Group, S.A., National Storage Affiliates, Elkem, PCCW, Freeport McMoRan, Procter & Gamble Co, Nike Inc, Aluminum Corporation of China, Raytheon Technologies, Sempra Energy, Coca-Cola Europacific Partners, Genpact Ltd, Morgan Stanley, Tikehau Capital SCA, Booking Holdings, Collectis, ProQR Therapeutics, Costco Wholesale Corp, Enbridge Inc., Grand Korea Leisure, Pfizer, Genting Singapore, General Electric Company, Lufthansa, Mercedes-Benz Group AG, Credit Suisse, Twitter, Telephone & Data Systems Inc, Brookfield Infrastructure Partners, The Carlyle Group Inc, ConocoPhillips, Sumitomo Dainippon Pharma, Intertek, Iberdrola, Autogrill SpA, Galapagos, Beiersdorf, Alps Alpine, Suncor Energy Inc, Sunoco LP, Hindustan Petroleum, Tryg, Avery Dennison Corp, Eli Lilly, NiSource Inc,

Chevron, Southern Copper Company, EasyJet, Tesla Inc, Duke Energy, American Tower Corp, Novartis AG, Hong Kong Exchanges & Clearing, Exxon Mobil Corp, Vestas, Molson Coors, Hanon Systems, American Electric Power Co Inc, NMDC.

Citigroup Global Markets Inc. or its affiliates expects to receive or intends to seek, within the next three months, compensation for investment banking services from Keurig Dr Pepper Inc, Larsen & Toubro, Fortress Transportation and Infrastructure Investors, Bristol Myers Squibb, Coal India, Telefónica Deutschland Holding AG, China Coal Energy, AT&T Inc, Discovery Inc, Addiko Bank, TUI AG, Alstom, PZU, Forterra, Poste Italiane, British American Tobacco PLC, Liberty Media Corp, Oil & Natural Gas, IRPC, Equinix Inc., Cellnex Telecom, Verizon Communications Inc, Baxter International Inc, Blackstone Inc, Sinopec Shanghai Petrochemical, Enviva Inc, Deutsche Telekom AG, Electricite de France, Wells Fargo & Co, adidas, Ally Financial Inc, Golar LNG Limited, Gujarat Gas, Danone, Roche Holding AG, TRATON, Mastercard Inc., Baker Hughes Co, International Consolidated Airlines Group, S.A., Elkem, Nike Inc, Aluminum Corporation of China, Sempra Energy, Morgan Stanley, Tikehau Capital SCA, Grand Korea Leisure, General Electric Company, Mercedes-Benz Group AG, Credit Suisse, Brookfield Infrastructure Partners, The Carlyle Group Inc, ConocoPhillips, Sunoco LP, Hindustan Petroleum, Southern Copper Company, Tesla Inc, American Tower Corp, NMDC.

Citigroup Global Markets Inc. or its affiliates received compensation for products and services other than investment banking services from PepsiCo, Universal Health Services, JCDecaux, Carlsberg, Zoetis Inc, Trane Technologies Plc, Keurig Dr Pepper Inc, Phoenix Mills, First Resources, Switch, Inc., Larsen & Toubro, Paramount Global, Insurance Australia Group Ltd, Unilever PLC, Bristol Myers Squibb, Deutsche Bank, Coal India, Bath & Body Works, Independence Realty, Amazon.com, Inc., Novo Nordisk A/S, NVIDIA Corp, UCB, AbbVie, McDonald's Corp, Walt Disney Co, HelloFresh SE, Telefónica Deutschland Holding AG, Eurofins Scientific, AstraZeneca PLC, Ping An Insurance, Banco Bilbao Vizcaya Argentaria SA, Shenzhen Inovance Technology, Tenaga Nasional, Air Products and Chemicals Inc, Medtronic Plc, Splunk, Capita Group PLC, Extra Space Storage Inc, Daiichi Sankyo, Apple, Inc., Reckitt Benckiser, China Coal Energy, AT&T Inc, Vertiv Holdings Co, Discovery Inc, OZ Minerals Ltd, Union Pacific Corp., Flutter Entertainment PLC, Ralph Lauren Corporation, Ping An Healthcare and Technology, Qualcomm Inc, Grifols SA, Netflix, Inc, Addiko Bank, TUI AG, Alstom, Kirin Holdings, CMC Materials Inc, Continental, Man Group, Walmart Inc, World Wrestling Entertainment, Evolution Mining Ltd, Honeywell International Inc., PZU, REN, Linde PLC, TripAdvisor, Wartsila, Delivery Hero SE, Sherwin-Williams Co, ASUSTeK Computer, United Parcel Service Inc., Johnson & Johnson, Forterra, Poste Italiane, Ecovyst, Logitech International, NSK, Daifuku, Computershare, Bank of America Corp, Delta Air Lines, Inc, RBL Bank, Thales, D.R. Horton, Home Depot Inc, British American Tobacco PLC, CSR Ltd, Cheil Worldwide, JCET Group, United Airlines Holdings, Inc, Euronet Worldwide, Inc., Liberty Media Corp, Clear Channel Outdoor Holdings Inc, Oil & Natural Gas, Chipbond Technology, NRG, Ansell Ltd, IRPC, Lupin, Public Storage Inc, Jacobs Engineering, Equinix Inc., Teradyne Inc, Crown Castle International Corp, Meta Platforms Inc, Plains All American Pipeline LP, Cellnex Telecom, Verizon Communications Inc, Baxter International Inc, Aareal Bank AG, JP Morgan Chase & Co, Iluka Resources Ltd, Indo Tambang Raya Megah, Blackstone Inc, Sinopec Shanghai Petrochemical, Xero Limited, Avantor, Kellogg Company, Enviva Inc, Johnson Controls International plc, Deutsche Telekom AG, MGM Resorts International, Warrior Met Coal, Austal Limited, ResMed Inc, Continental Resources, Electricite de France, Adaro Energy Indonesia, Euronext NV, Valley National Bancorp, Visa Inc., Compass Group, Kite Realty Group Trust, NCSOFT, NuStar Energy, L.P., Entain, Spotify Technology SA, Wells Fargo & Co, Agnico Eagle Mines Ltd, Alphabet Inc, Aisin, Newmont Corporation, DISH Network Corp, adidas, Ally Financial Inc, Anta Sports Products, Grand City Properties, Golar LNG Limited, The Coca-Cola Company, Just Dial, NS Solutions, Shanghai Electric Group, Microsoft Corp., PayPal, Endo International PLC, Qiagen NV, Gujarat Gas, Hoist Finance AB, Siam Makro, Danone, Lagardere SA, Appen Limited, Mayora Indah, Valero Energy Corp, Clariant AG, Currys PLC, Vale Indonesia, Roche Holding AG, Playa Hotels & Resorts, TRATON, Virgin Money UK PLC, Roku, Inc., Evolution AB (publ), National Australia Bank Ltd, Western Union Co., Mastercard Inc., Baker Hughes Co, Assa Abloy, Bayer AG, Axis Bank, EOG Resources Inc, International Consolidated Airlines Group, S.A., National Storage Affiliates, Elkem, PCCW, Freeport McMoRan, Procter & Gamble Co, Nike Inc, Aluminum Corporation of China, Raytheon Technologies, Sempra Energy, Coca-Cola Europacific Partners, Genpact Ltd, Morgan Stanley, Tikehau Capital SCA, Booking Holdings, Host Hotels & Resorts, Costco Wholesale Corp, Enbridge Inc., Grand Korea Leisure, EPAM Systems, Inc., Pfizer, Genting Singapore, General Electric Company, Lufthansa, Mercedes-Benz Group AG, Credit Suisse, Twitter, Telephone & Data Systems Inc, Liberty Oilfield Services Inc., Brookfield Infrastructure Partners, The Carlyle Group Inc, ConocoPhillips, Sumitomo Dainippon Pharma, Intertek, Reliance Steel & Aluminum Co., Iberdrola, Lee & Man Paper, Autogrill SpA, LG H&H, O'Reilly Automotive Inc, Beiersdorf, Alps Alpine, Suncor Energy Inc, Nel, Sunoco LP, Hindustan Petroleum, Tryg, Avery Dennison Corp, Eli Lilly, NiSource Inc, Orion, Chevron, Southern Copper Company, EasyJet, Tesla Inc, Duke Energy, American Tower Corp, Novartis AG, Hong Kong Exchanges & Clearing, Exxon Mobil Corp, Vestas, Molson Coors, Hanon Systems, Gamma Communications, American Electric Power Co Inc, NMDC in the past 12 months.

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