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What Works in Equity Markets

Hedge Rotational Risk via GARP

CITI'S TAKE

Current market conditions have made it difficult for investors to position their Value/Growth exposure. The high volatility and macro uncertainty has driven the average volatility of this pair of styles to historical highs. One way to avoid making a decision on how to position your Value/Growth exposure is via a GARP strategy – Growth at a Reasonable Price.

Macro Driving Rotational Risk — The influence of macro on equities is at an historical high. Given the different underlying macro exposures of Value and Growth, this has resulted in dispersion of these styles. More volatility on the macro front is making it hard to position Value/Growth exposure.

GARP... — A GARP strategy aims to find the 'sweet spot' of stocks that have both attractive Value and Growth characteristics, implicitly avoiding the need to make a decision on whether to have more/less Value or Growth exposure.

...As a Style Hedge — GARP is not a strategy that works well all the time, especially in the US and Europe. It does however, tend to work well when style volatility is high or consistent style trends are absent. We show that for the last 12-18 months, the market relative returns of GARP have been relatively high and with a lower return volatility than either Value or Growth.

GARP Buy Stocks, DARP Sell Stocks — We show the current GARP stocks for US, Europe and Asia ex Japan that are rated 'Buy' by our Fundamental Analysts. In addition we also show the DARP (low growth/poor value) stocks that are rated 'Sell' or 'Neutral'. While current GARP stocks are in a diverse mix of sectors, there is a bias towards the more cyclical part of the market which could be a risk given the near-term potential for negative growth revisions.

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See Appendix A-1 for Analyst Certification, Important Disclosures and Research Analyst Affiliations.

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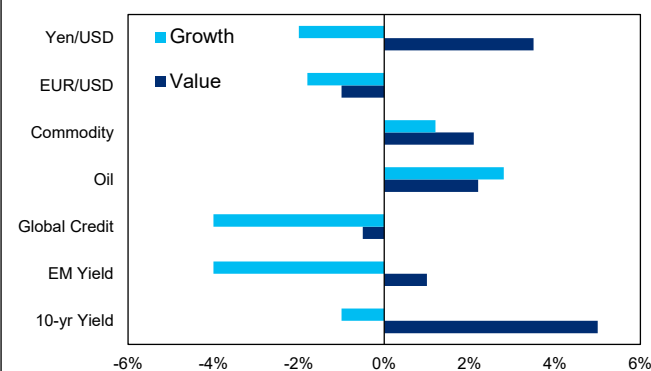
GARP

Current market conditions have made it difficult for investors to position their Value/Growth exposure. The high volatility and macro uncertainty has driven the average volatility of this pair of styles up to historical highs. One way to avoid making a decision on how to position your Value/Growth exposure is via a GARP strategy – Growth at a Reasonable Price. While conceptually the idea of GARP makes sense, practically it can be implemented in a number of different ways. In this note we examine our version of a GARP strategy via its historical short and long-term performance across different regions and suggest sectors and stocks that could be considered as GARP candidates.

It's all about the Macro

Over the past ten years the macro environment and in turn the underlying macro exposure of Value and Growth has resulted in a polarization of the two styles (Figure 1). At a performance level, the past two years has seen Value outperform Growth by 29%, while the prior two years Growth outperformed Value by 30%. This style reversal is clearly seen in Figure 2 in the context of history. We expect this volatility to continue over the coming months until there is some form of macro stability allowing either of the styles to establish a trend. Currently the economic forecasts are heading in the direction of lower GDP growth and higher inflation although with some disparity across countries. At a base level, this does not bode particularly well for Value as in times of scarce growth, investors will pay a premium for Growth companies. Having said that, the de-rating pressures on some stocks due to higher interest rates will likely continue, so not all Growth stocks are likely to outperform and investors will still focus on valuation as well.

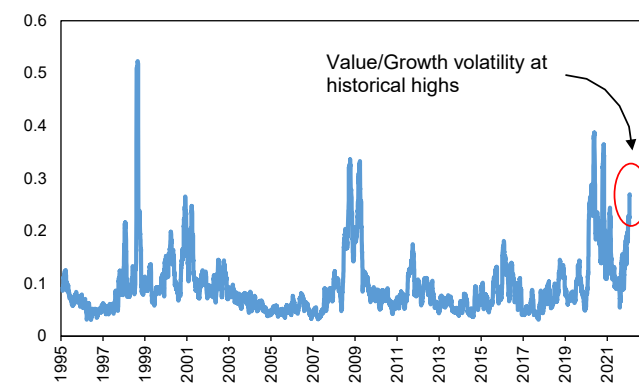
Figure 1. Different Macro Exposures for Global Value & Growth



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Source: Citi Research

Figure 2. Global Value/Growth Volatility back to Historical Highs



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Source: Citi Research

What is the definition of GARP?

The concept of GARP is not new. The idea is simply to identify companies that are growing, but are still 'reasonably' priced. For many fundamental investors this concept is intrinsic in their process and metrics such as PEG ratios are used to confirm a growth stocks valuation attractiveness. From a quantitative investment perspective, a multi-factor investment strategy (that is using both Value and Growth, as well as other factors) by construction can provide exposure to stocks with GARP attributes.

Our Asian Quant Team have been using GARP-type strategies for many years on the basis that the empirical performance of GARP in Asian markets is very strong.

For example, in [Asia Quantitative Insights: May 2021 – GARP for a Better Balanced Approach](#) and [Asia Quantitative Insights: March 2022 – GARP for Sharpe](#) they present the performance over time and in their recent note show that since 2021, GARP has had a Sharpe of 2.0 (+26% returns), and 2022 YTD returns of +10% for stocks in the MSCI AC Asia ex Japan index. While this is ‘paper’ performance, and transaction costs are not incorporated, it still shows the general trend that a focus on a blend of Value/Growth can avoid rotation risk which has been a key feature of markets this year.

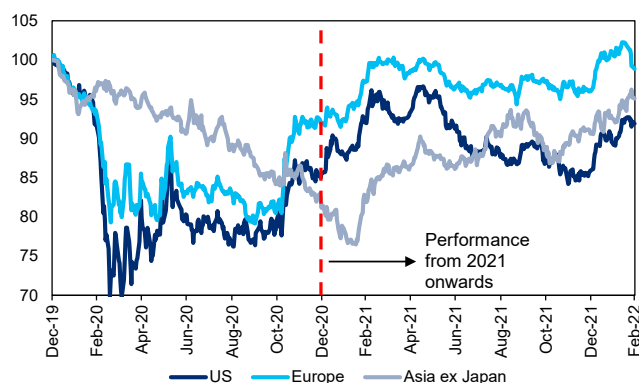
How is GARP constructed in this context? This GARP approach is based on the average of each stock’s Value and Growth scores with stocks scoring highly (top quintile) deemed GARP, while those scoring poorly (bottom quintile) DARP (no growth/no value – Decline at a Ridiculous Price). In this analysis we show two sets of performance: the long-short performance (GARP-DARP) and the GARP relative performance. We show analysis for three regions – US, Europe and Asia ex Japan. All returns are in local currency. Lastly we show the stocks that currently meet the criteria of GARP (and the opposite).

GARP Performance

Across the regions that are analyzed in this note, over the long term GARP is generally not a strategy that delivers consistent performance. This is particularly true for the US and Europe while for Asia ex Japan performance has been much better. What is consistent across regions is that over the past 12-18 months performance has been positive. Figure 3 shows the performance of GARP (relative to market) back to the start of 2020, but given the turmoil of 2020, we measure the performance summary statistics from Dec 2020 onwards. The top panel in Figure 4 shows the long/short performance. The IRs over this time have been particularly strong with low growth/expensive stocks being a contributor to the overall performance. More relevant to this note is the performance of the long side – GARP stocks. As per our Asian team’s research, Asia ex Japan risk adjusted performance is strong, with the next best being Europe (note at lower volatility) and lastly the US.

On the growth component of this GARP measure, we consider a range of different growth measures such that growth is not all forecast nor all historical. While economic growth expectations are currently being revised down, we are yet to see the bottom-up earnings growth expectations come down. Our equity strategists believe (particularly for Europe) that earnings downgrades for 2022 are likely to build momentum over the coming months, but much of this is already in the price.

Figure 3. GARP Market Relative Historical Performance



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Source: Citi Research, MSCI

Figure 4. GARP Market Relative Performance – Dec 2020 Onwards

GARP minus DARP

	US	Europe	Asia ex Japan
Ann. Return	15.3%	15.6%	20.4%
Ann. Volatility	10.5%	10.2%	11.1%
IR	1.45	1.53	1.83

GARP minus Market

	US	Europe	Asia ex Japan
Ann. Return	6.0%	6.2%	13.8%
Ann. Volatility	10.2%	6.9%	10.2%
IR	0.59	0.90	1.35

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Source: Citi Research, MSCI

The important aspect of this strategy is that investors are not required to take a view on whether Value or Growth will outperform. Figure 5 shows the GARP performance relative to the Value and Growth performance over the same period. In all cases the volatility of the GARP strategy is lower than either of the Value or Growth strategies, but also with lower returns. Obviously with perfect foresight, being long Value has been the best strategy over time but this is where prescience come into play. In the absence of any model or information to tell you when to rotate in or out of Value/Growth, GARP can be seen as a hedge on this decision. To be clear, GARP is not a strategy that has always worked – in a clearly trending market, being in one style or the other is preferred, but when the return volatility between Value and Growth is high and a decision needs to be made on the relative portfolio exposure of each of these styles, GARP tends to perform well, because market timing is hard.

Figure 5. GARP, Value, Growth Market Relative Performance Comparison – Dec 2020 Onwards

	US			Europe			Asia ex Japan		
	GARP	Value	Growth	GARP	Value	Growth	GARP	Value	Growth
Ann. Return	6.0%	13.1%	-12.9%	6.2%	8.2%	-9.3%	13.8%	17.3%	-0.1%
Ann. Volatility	10.2%	13.2%	13.4%	6.9%	9.1%	8.6%	10.2%	11.4%	10.3%
IR	0.59	0.99	-0.96	0.90	0.90	-1.08	1.35	1.52	-0.01

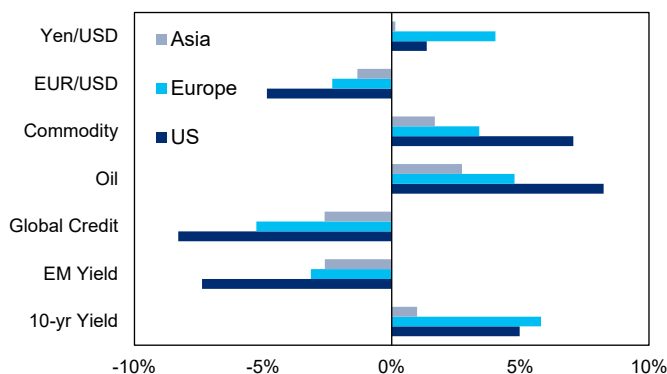
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Source: Citi Research, MSCI

Underlying Macro Exposures

As we mentioned before, macro is an important part of what is driving global equities returns. The GARP strategy doesn't hedge the inherent macro exposure found in Value and Growth (see: Figure 1) but depending on the composition of stocks that represent GARP at a point in time, the exposures can be reduced. Figure 6 shows the active exposures of current GARP portfolios. Across regions, the exposures are consistent in direction with the US having a larger magnitude of sensitivity to macro factors. GARP portfolio exposures show a more pro-cyclical tilt, with performance benefiting from higher Oil/Commodities and higher developed market yields. In this sense, this suggest that the portfolio is ideally positioned for the current macro environment.

Figure 6. Macro Sensitivities for Current GARP Market Relative Portfolio



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Source: Citi Research

US Performance Analysis

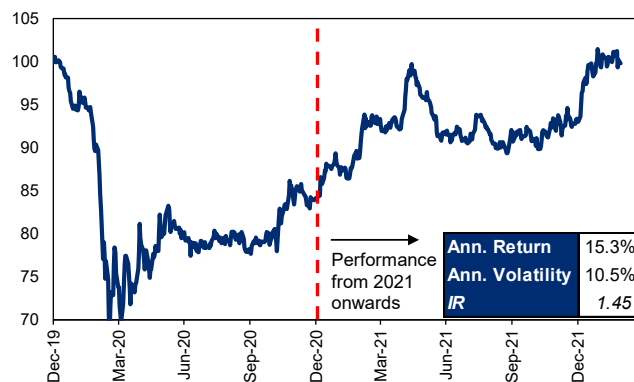
Figure 7. GARP versus DARP – Perf. from 1995 – MSCI US



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Source: Citi Research, MSCI

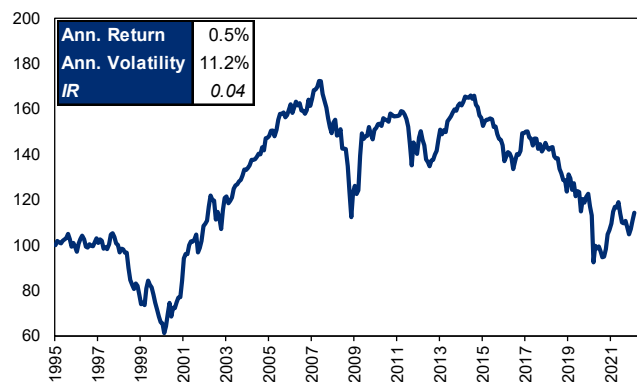
Figure 8. GARP versus DARP – Perf. from Dec 19 – MSCI US



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Source: Citi Research, MSCI

Figure 9. GARP versus Market – Perf. from 1995 – MSCI US



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Source: Citi Research, MSCI

Figure 10. GARP versus Market – Performance from Dec 19 – MSCI US



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Source: Citi Research, MSCI

US GARP & DARP Stock Screen

Figure 11. MSCI US – Attractive GARP Stocks with Citi Fundamental Buy Rating

SEDOL	Company Name	Sector	Price Loc	Mkt Cap US\$mn	12m ADV US\$mn	Rating	Percentile Rank		
							Growth	Value	GARP
270884	PulteGroup, Inc.	Consumer Discretionary	48.4	12,262	139.4	Buy	88.6%	97.6%	100.0%
225068	D.R. Horton, Inc.	Consumer Discretionary	85.7	30,383	282.8	Buy	85.3%	95.0%	99.5%
284947	Steel Dynamics, Inc.	Materials	84.2	16,109	137.6	Buy	72.0%	98.2%	99.3%
204136	Valero Energy Corporation	Energy	90.4	37,013	303.7	Buy	94.8%	84.8%	98.7%
B72XK0	Ally Financial Inc	Financials	45.0	14,980	172.6	Buy	60.7%	97.7%	98.5%
B3K3L4	Marathon Petroleum Corporation	Energy	78.3	43,748	416.4	Buy	93.9%	85.3%	98.2%
265446	Capital One Financial Corp	Financials	138.2	57,172	452.4	Buy	66.2%	96.0%	98.0%
221292	NRG Energy, Inc.	Utilities	37.9	9,282	101.9	Buy	60.0%	96.1%	97.7%
240796	Goldman Sachs Group, Inc.	Financials	345.4	116,712	1,034.5	Buy	56.7%	95.3%	96.9%
258818	Micron Technology, Inc.	Information Technology	79.4	88,922	1,633.5	Buy	94.4%	77.6%	96.1%
B0G4K5	CF Industries Holdings, Inc.	Materials	95.3	19,746	180.1	Buy	93.7%	76.9%	95.8%
268571	ConocoPhillips	Energy	99.6	129,433	598.8	Buy	93.2%	78.1%	95.6%
216234	Coterra Energy Inc.	Energy	24.9	20,222	189.1	Buy	87.2%	84.1%	94.5%
248067	Devon Energy Corporation	Energy	58.3	38,703	435.6	Buy	95.6%	70.7%	94.2%
B7Y8YR	Diamondback Energy, Inc.	Energy	131.5	23,321	268.0	Buy	86.5%	81.7%	93.4%
214278	FedEx Corporation	Industrials	218.9	58,004	642.1	Buy	52.5%	92.3%	93.1%
231802	EOG Resources, Inc.	Energy	115.8	67,788	395.1	Buy	89.2%	77.4%	92.9%
B05MZT	Celanese Corporation	Materials	142.9	15,432	121.0	Buy	75.7%	85.7%	92.4%
BYWH07	VICI Properties Inc	Real Estate	27.5	20,611	170.8	Buy	59.1%	90.7%	92.3%
235211	Freeport-McMoRan, Inc.	Materials	48.1	69,946	794.0	Buy	94.0%	65.1%	92.0%
292378	Universal Health Services, Inc. Class B	Health Care	146.8	10,736	93.5	Buy	56.5%	88.1%	90.0%
269083	Pioneer Natural Resources Company	Energy	239.9	58,258	415.7	Buy	91.6%	66.9%	89.7%
BDHLTQ	Baker Hughes Company Class A	Energy	35.3	33,643	230.7	Buy	84.3%	71.4%	87.3%
BKRTG5	Carlisle Group Inc	Financials	47.3	16,854	99.4	Buy	59.9%	81.6%	85.1%
BN44JF	Apollo Global Management Inc.	Financials	62.6	35,728	190.5	Buy	76.5%	74.2%	84.9%
B4MGBG	HCA Healthcare Inc	Health Care	260.7	78,730	334.0	Buy	75.5%	73.4%	84.1%
BG1FRR	KKR & Co. Inc.	Financials	59.5	35,155	182.8	Buy	78.9%	70.2%	83.2%
298930	TJX Companies Inc	Consumer Discretionary	62.4	74,483	444.4	Buy	84.6%	61.1%	82.4%
282201	Advance Auto Parts, Inc.	Consumer Discretionary	206.3	12,607	153.9	Buy	61.8%	77.7%	82.1%
BMVP7Y	Royalty Pharma Plc Class A	Health Care	39.3	17,024	87.2	Buy	86.9%	56.8%	81.9%
211622	C.H. Robinson Worldwide, Inc.	Industrials	104.9	13,512	110.3	Buy	51.1%	80.9%	81.4%
225910	Target Corporation	Consumer Discretionary	226.1	104,530	803.4	Buy	58.1%	78.4%	81.3%
213478	United Rentals, Inc.	Industrials	346.2	24,996	227.6	Buy	71.5%	70.9%	80.6%

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Source: Citi Research, MSCI, FactSet

Figure 12. MSCI US – Unattractive DARP (Low Growth/Expensive) Stocks with Citi Fundamental Sell/Neutral Rating

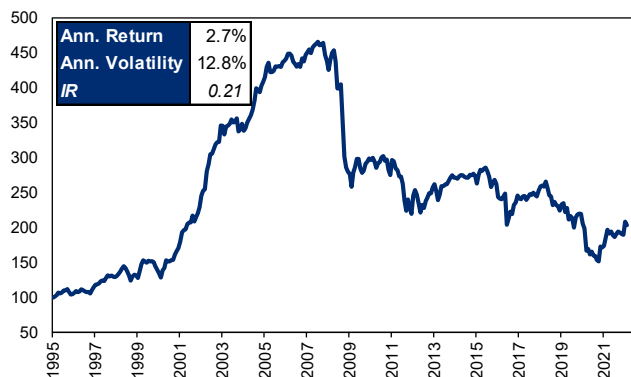
SEDOL	Company Name	Sector	Price Loc	Mkt Cap US\$m	12m ADV US\$m	Rating	Percentile Rank		
							Growth	Value	GARP
BH4HLL	AMC Entertainment Holdings, Inc. Class A	Communication Services	15.8	8,165	2,895.3	Sell	3.6%	0.1%	0.0%
B7JYSG	Guidewire Software, Inc.	Information Technology	93.7	7,826	57.1	Neutral	0.1%	7.0%	0.4%
B42449	Splunk Inc.	Information Technology	128.0	20,326	296.1	Neutral	4.4%	2.7%	0.7%
252304	Carnival Corporation	Consumer Discretionary	19.5	19,195	802.1	Neutral (High Risk)	25.5%	1.2%	1.2%
271995	Exact Sciences Corporation	Health Care	67.0	11,662	155.6	Neutral	28.7%	1.9%	1.5%
231661	Essex Property Trust, Inc.	Real Estate	341.6	22,299	101.3	Neutral	1.1%	45.0%	2.3%
213117	AvalonBay Communities, Inc.	Real Estate	245.4	34,292	148.7	Neutral	1.7%	49.3%	2.8%
272791	UDR, Inc.	Real Estate	57.2	18,211	95.5	Neutral	6.0%	28.1%	3.3%
261399	Illumina, Inc.	Health Care	346.1	54,339	355.5	Neutral	28.2%	13.0%	3.6%
214683	Brown-Forman Corporation Class B	Consumer Staples	64.8	30,492	68.3	Neutral	25.2%	20.4%	5.4%
204562	ANSYS, Inc.	Information Technology	318.6	27,791	143.1	Neutral	40.0%	16.6%	6.2%
267445	Paychex, Inc.	Information Technology	128.1	46,224	184.0	Neutral	29.3%	26.1%	7.6%
217047	Constellation Brands, Inc. Class A	Consumer Staples	225.9	42,399	243.1	Neutral	14.3%	39.2%	8.3%
220665	Coca-Cola Company	Consumer Staples	60.1	260,533	911.3	Neutral	19.8%	35.7%	8.9%
258913	Mid-America Apartment Communities, Inc.	Real Estate	206.8	23,849	108.3	Neutral	23.0%	35.9%	10.2%
270440	Procter & Gamble Company	Consumer Staples	150.2	359,919	1,146.6	Neutral	21.5%	37.8%	10.8%
230422	Ecolab Inc.	Materials	171.1	49,075	236.0	Neutral	33.7%	27.9%	11.1%
219584	Church & Dwight Co., Inc.	Consumer Staples	96.9	23,527	133.1	Neutral	33.3%	30.1%	11.6%
256312	Equity LifeStyle Properties, Inc.	Real Estate	76.0	14,135	59.8	Neutral	36.7%	26.8%	12.3%
BDRXDB	Booking Holdings Inc.	Consumer Discretionary	2186.3	89,393	847.5	Neutral	47.4%	19.9%	12.6%
220910	Colgate-Palmolive Company	Consumer Staples	72.2	60,854	346.0	Neutral	23.4%	42.1%	14.3%
B28TS4	Ulta Beauty Inc	Consumer Discretionary	391.2	21,173	259.3	Neutral	35.4%	30.9%	14.6%
208780	Becton, Dickinson and Company	Health Care	262.0	74,621	345.8	Neutral	22.8%	44.7%	15.3%
230584	PerkinElmer, Inc.	Health Care	182.4	23,010	140.8	Neutral	26.8%	41.5%	16.2%
206530	Automatic Data Processing, Inc.	Information Technology	214.7	90,180	346.2	Neutral	32.2%	38.0%	17.5%
222263	Cooper Companies, Inc.	Health Care	421.3	20,771	117.6	Neutral	44.7%	26.9%	17.7%
216632	Camden Property Trust	Real Estate	164.8	17,040	103.1	Neutral	43.6%	27.7%	18.0%
B3P2CN	Xylem Inc.	Industrials	88.1	15,844	107.2	Neutral	34.6%	36.9%	18.3%

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Source: Citi Research, MSCI, FactSet

Europe Performance Analysis

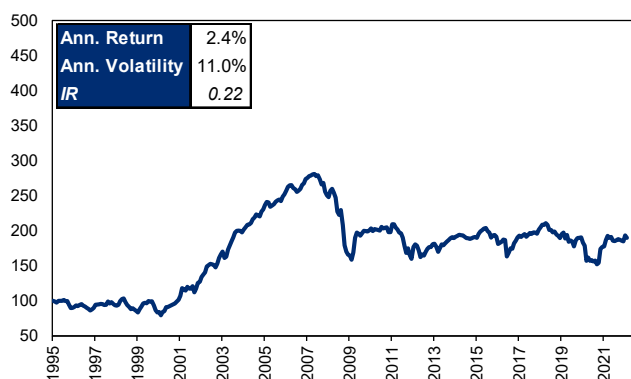
Figure 13. GARP versus DARP – Perf. from 1995 – MSCI Europe



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Source: Citi Research, MSCI

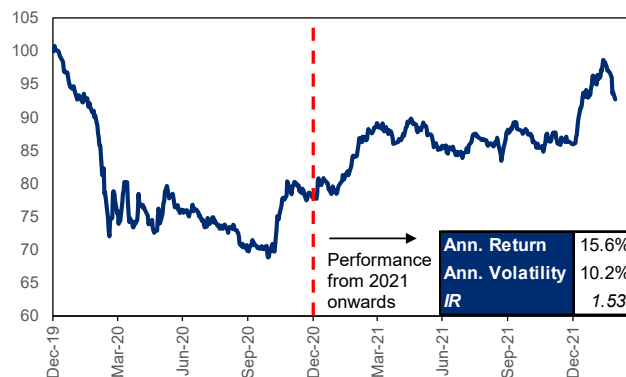
Figure 15. GARP versus Market – Perf. from 1995 – MSCI Europe



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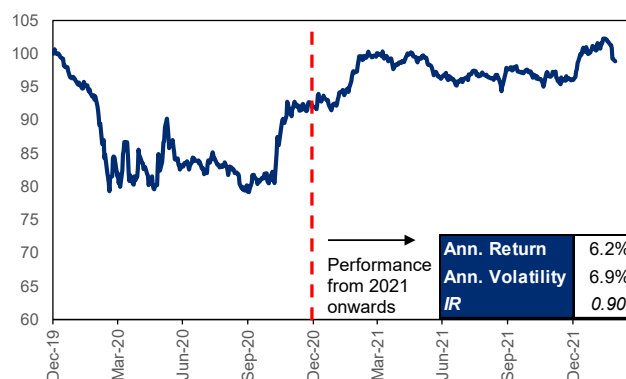
Figure 14. GARP versus DARP – Perf. from Dec 19 – MSCI Europe



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Source: Citi Research, MSCI

Figure 16. GARP versus Market – Perf. from Dec 19 – MSCI Europe



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Source: Citi Research, MSCI

Europe GARP & DARP Stock Screen

Figure 17. MSCI Europe – Attractive GARP Stocks with Citi Fundamental Buy Rating

SEDOL	Company Name	Country	Sector	Price Loc	Mkt Cap US\$mn	12m ADV US\$mn	Rating	Percentile Rank		
								Growth	Value	GARP
425304	A.P. Moller - Maersk A/S Class B	Denmark	Industrials	22880.0	64,208	80.0	Buy	95.3%	97.1%	100.0%
566935	Repsol SA	Spain	Energy	11.2	18,931	112.7	Buy	86.8%	98.3%	99.5%
BMD8KX	Stellantis N.V.	Netherlands	Consumer Discretionary	14.7	50,756	237.6	Buy	79.1%	98.8%	99.2%
425305	A.P. Moller - Maersk A/S Class A	Denmark	Industrials	21840.0	64,208	19.2	Buy	86.6%	96.7%	99.0%
596651	Societe Generale S.A. Class A	France	Financials	24.5	22,660	123.4	Buy (High Risk)	58.0%	99.7%	98.8%
B4T3BW	Glencore plc	Switzerland	Materials	4.8	83,169	159.0	Buy	90.3%	92.4%	98.3%
BYMXPS	UniCredit S.p.A.	Italy	Financials	9.7	23,321	261.3	Buy (High Risk)	72.1%	97.6%	98.1%
552902	Mercedes-Benz Group AG	Germany	Consumer Discretionary	62.6	74,029	274.9	Buy	55.7%	97.8%	97.1%
B15C55	TotalEnergies SE	France	Energy	45.5	131,209	331.6	Buy	84.7%	93.4%	96.9%
BZ5739	ING Groep NV	Netherlands	Financials	9.5	41,020	222.8	Buy	66.9%	96.2%	95.7%
550190	Banco Bilbao Vizcaya Argentaria, S.A.	Spain	Financials	5.3	38,898	152.3	Buy	76.5%	94.8%	95.5%
B1YW44	3i Group plc	United Kingdom	Financials	13.6	17,425	22.4	Buy	74.9%	93.6%	94.8%
008118	Barratt Developments PLC	United Kingdom	Consumer Discretionary	5.6	7,549	21.4	Buy	91.5%	80.9%	94.3%
B1XZ58	Anglo American plc	United Kingdom	Materials	36.8	64,903	127.4	Buy	85.4%	81.9%	93.4%
BMTVQK	Siemens Energy AG	Germany	Industrials	21.5	17,221	72.0	Buy	98.5%	63.3%	93.2%
B545MG	Swiss Re AG	Switzerland	Financials	85.8	29,188	109.3	Buy	95.0%	70.8%	92.7%
457481	Mediobanca S.p.A.	Italy	Financials	9.3	8,875	39.3	Buy	55.2%	92.7%	92.2%
BNGN92	FincoBank SpA	Italy	Financials	14.0	9,454	34.9	Buy	98.8%	54.6%	90.1%
458882	Danske Bank A/S	Denmark	Financials	113.0	14,460	43.7	Buy	52.4%	89.9%	89.9%
BYZR01	Amundi SA	France	Financials	64.1	14,371	12.4	Buy	69.7%	82.6%	89.4%
BF0CK4	Aroundtown SA	Luxembourg	Real Estate	5.6	9,476	19.7	Buy	87.1%	70.4%	88.5%
458836	Compagnie Generale des Etablissements Michelin SCA	France	Consumer Discretionary	122.0	24,064	67.6	Buy	68.6%	76.9%	86.4%
BRJL17	UBS Group AG	Switzerland	Financials	17.2	68,279	171.3	Buy	55.9%	77.9%	83.6%

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Source: Citi Research, MSCI, FactSet

Figure 18. MSCI Europe – Unattractive DARP (Low Growth/Expensive) Stocks with Citi Fundamental Sell/Neutral Rating

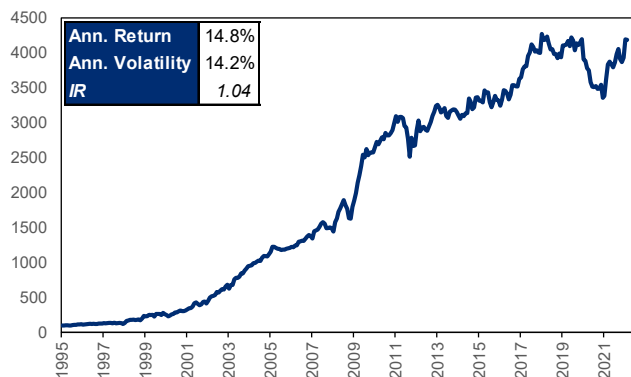
SEDOL	Company Name	Country	Sector	Price Loc	Mkt Cap US\$mn	12m ADV US\$mn	Rating	Percentile Rank		
								Growth	Value	GARP
B292JQ	Getlink SE	France	Industrials	15.6	9,452	14.8	Neutral	9.3%	2.5%	1.6%
BVRZ8L	Aena SME SA	Spain	Industrials	150.0	24,859	30.6	Neutral	27.6%	6.5%	2.8%
B03851	Ferrovial, S.A.	Spain	Industrials	25.6	20,782	38.6	Sell	21.0%	12.2%	3.2%
567151	Wolters Kluwer NV	Netherlands	Industrials	96.4	27,966	51.7	Neutral	16.8%	17.1%	3.9%
BX90C0	Cellnex Telecom S.A.	Spain	Communication Services	44.0	32,987	102.2	Neutral	49.4%	4.6%	5.1%
B798FW	Novozymes A/S Class B	Denmark	Materials	451.4	15,299	28.2	Neutral	40.9%	11.7%	5.8%
484628	SAP SE	Germany	Information Technology	103.7	140,753	294.6	Neutral	12.6%	34.0%	6.3%
BYYHL2	Anheuser-Busch InBev SA/NV	Belgium	Consumer Staples	54.8	105,237	109.5	Neutral	12.8%	39.6%	8.4%
B39J2M	United Utilities Group PLC	United Kingdom	Utilities	10.9	9,770	18.4	Neutral	9.8%	41.5%	9.1%
BP9DL9	Industria de Diseno Textil, S.A.	Spain	Consumer Discretionary	20.9	71,899	164.7	Neutral	22.7%	34.9%	11.2%
023740	Diageo plc	United Kingdom	Consumer Staples	37.4	113,795	121.3	Neutral	48.7%	17.6%	11.9%
709732	Groupe Bruxelles Lambert SA	Belgium	Financials	94.3	16,283	17.5	Neutral	3.5%	58.4%	14.2%
B09M9D	Kone Oyj Class B	Finland	Industrials	50.1	25,085	55.4	Neutral	29.2%	36.1%	14.7%
553397	Swisscom AG	Switzerland	Communication Services	551.0	30,568	67.7	Neutral	6.5%	53.9%	16.8%
092232	Smith & Nephew PLC	United Kingdom	Health Care	12.5	14,461	34.6	Neutral	37.0%	35.4%	18.0%
B1FH8J	Severn Trent Plc	United Kingdom	Utilities	29.4	9,701	17.5	Neutral	41.2%	32.6%	18.2%
B11WWH	Schindler Holding AG	Switzerland	Industrials	207.6	24,053	7.5	Neutral	48.4%	28.6%	18.5%
BDR05C	National Grid plc	United Kingdom	Utilities	11.3	54,348	71.6	Neutral	18.0%	45.5%	19.2%

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Source: Citi Research, MSCI, FactSet

Asia ex Japan Performance Analysis

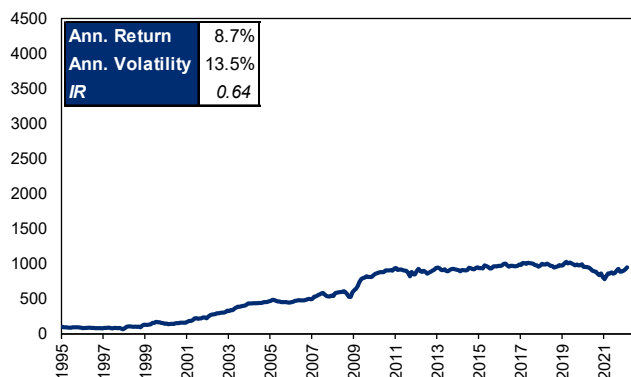
Figure 19. GARP versus DARP – Perf. from 1995 – MSCI Asia ex Jap.



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Source: Citi Research, MSCI

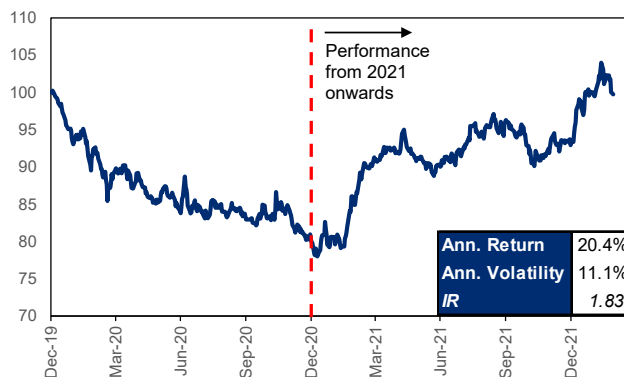
Figure 21. GARP versus Market – Perf. from 1995 – MSCI Asia ex Jap.



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Source: Citi Research, MSCI

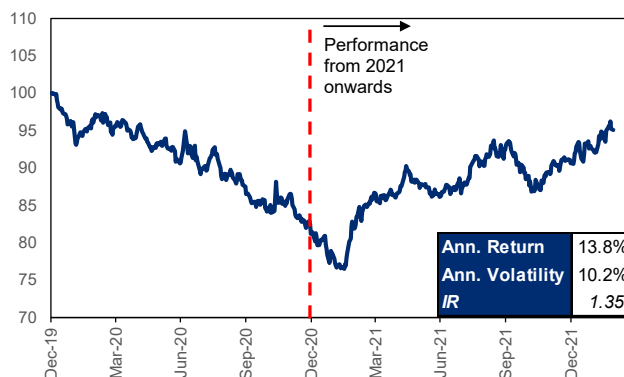
Figure 20. GARP versus DARP – Perf. from Dec 19 – MSCI Asia ex Jap.



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Source: Citi Research, MSCI

Figure 22. GARP versus Market – Perf. from Dec 19 – MSCI Asia ex Jap.



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Source: Citi Research, MSCI

Asia ex Japan GARP & DARP Stock Screen

Figure 23. MSCI Asia ex Japan – Attractive GARP Stocks with Citi Fundamental Buy Rating

SEDOL	Company Name	Country	Sector	Price Loc	Mkt Cap US\$m	12m ADV US\$m	Rating	Percentile Rank		
								Growth	Value	GARP
B39Z8G	LG Innotek Co., Ltd	South Korea	Information Technology	382000.0	7,487	75.4	Buy	100.0%	87.3%	99.9%
B67QFW	PTT Global Chemical Public Company Limited	Thailand	Materials	50.5	6,832	37.9	Buy	78.9%	92.6%	99.3%
677168	Samsung Electro-Mechanics Co., Ltd	South Korea	Information Technology	161000.0	10,177	83.0	Buy	94.3%	75.8%	99.1%
B0300P	Thai Oil Public Co. Ltd.	Thailand	Energy	51.0	3,122	22.6	Buy	84.5%	85.3%	99.0%
B29SHS	BYD Electronic (International) Co., Ltd.	China	Information Technology	18.8	5,421	44.0	Buy	85.4%	81.8%	98.8%
BD0BDH	PTT Public Co., Ltd.	Thailand	Energy	39.0	33,422	70.1	Buy	79.4%	87.8%	98.8%
BL3N3C	JOYY, Inc. Sponsored ADR Class A	Singapore	Communication Services	42.8	2,637	72.4	Buy	82.0%	80.1%	98.4%
669323	POSCO Holdings Inc.	South Korea	Materials	287000.0	20,723	121.8	Buy	65.3%	96.4%	98.2%
652073	LG Electronics Inc.	South Korea	Consumer Discretionary	123500.0	17,569	144.9	Buy	73.0%	88.2%	98.0%
622487	SK Telecom Co., Ltd.	South Korea	Communication Services	58100.0	10,529	72.3	Buy	63.6%	95.5%	97.8%
BF1343	China Education Group Holdings Limited	Hong Kong	Consumer Discretionary	6.6	2,000	15.2	Buy (High Risk)	83.6%	75.1%	97.5%
691662	United Microelectronics Corp.	Taiwan	Information Technology	52.8	23,261	361.9	Buy	85.4%	73.4%	97.5%
BK0SBL	China Feihe Limited	China	Consumer Staples	8.5	9,619	49.2	Buy	88.0%	68.6%	97.3%
632450	Evergreen Marine Corp. (Taiwan) Ltd.	Taiwan	Industrials	141	26,330	1,123.1	Buy	88.6%	67.0%	97.2%
B1YBF0	KWG Group Holdings Limited	Hong Kong	Real Estate	3.4	1,391	8.0	Buy	56.3%	98.5%	97.0%
645026	SK hynix Inc	South Korea	Information Technology	124000.0	74,760	389.4	Buy	84.9%	69.2%	96.9%
BFB4HL	Hengli Petrochemical Co., Ltd. Class A	China	Materials	22.1	24,433	188.0	Buy (High Risk)	83.5%	69.6%	96.7%
BD95QN	BGF retail CO., LTD.	South Korea	Consumer Staples	177500.0	2,541	4.9	Buy	74.9%	77.7%	96.6%
BP3R2Y	Baoshan Iron & Steel Co., Ltd. Class A	China	Materials	6.7	23,374	179.8	Buy	58.6%	93.6%	96.5%
BZ04KX	Yadea Group Holdings Ltd.	China	Consumer Discretionary	9.9	3,779	11.9	Buy	95.3%	56.7%	96.4%
672712	PT Bank Negara Indonesia (Persero) Tbk Class B	Indonesia	Financials	8300.0	10,793	13.5	Buy	83.9%	68.1%	96.3%
B0RNRH	Hana Financial Group Inc.	South Korea	Financials	47750.0	11,873	44.5	Buy	53.9%	97.8%	96.2%
B0B8Z1	COSCO SHIPPING Holdings Co., Ltd. Class H	China	Industrials	15.0	39,143	109.2	Buy	73.7%	77.3%	95.9%
609972	Bharat Petroleum Corporation Limited	India	Energy	364.2	10,420	2.4	Buy	56.7%	93.5%	95.7%
BSQC82	State Bank of India	India	Financials	501.8	59,061	9.2	Buy	92.6%	57.2%	95.5%

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Source: Citi Research, MSCI, FactSet

Figure 24. MSCI Asia ex Japan – Unattractive DARP (Low Growth/Expensive) Stocks with Citi Fundamental Sell/Neutral Rating

SEDOL	Company Name	Country	Sector	Price Loc	Mkt Cap US\$m	12m ADV US\$m	Rating	Percentile Rank		
								Growth	Value	GARP
BLF9YV	SK Biopharmaceuticals Co., Ltd.	South Korea	Health Care	91900.0	5,960	26.2	Neutral (High Risk)	0.0%	0.8%	0.0%
681173	Singapore Airlines Ltd.	Singapore	Industrials	5.2	11,330	28.3	Sell	0.8%	1.7%	0.2%
620842	Beijing Capital International Airport Co., Ltd. Class H	China	Industrials	4.3	1,031	5.0	Neutral	1.6%	3.1%	0.7%
BYYZ7D	InterGlobe Aviation Ltd	India	Industrials	1896.5	9,636	1.8	Sell	5.9%	1.4%	0.9%
BNXKTM	KakaoBank Corp.	South Korea	Financials	52800.0	20,777	238.3	Neutral (High Risk)	1.8%	11.8%	1.8%
BD5CN7	Beijing Enlight Media Co., Ltd. Class A	China	Communication Services	8.1	3,564	33.0	Neutral (High Risk)	3.7%	17.5%	2.3%
BZ0W5W	PT Merdeka Copper Gold Tbk	Indonesia	Materials	4300.0	6,868	15.3	Neutral	27.3%	7.9%	3.0%
BDF57C	360 Security Technology, Inc. Class A	China	Information Technology	10.2	11,430	89.5	Neutral	3.4%	32.4%	3.2%
677221	Samsung Heavy Industries Co., Ltd	South Korea	Industrials	5530.0	4,059	41.1	Sell	2.7%	34.8%	3.3%
644033	HOTEL SHILLA CO., LTD.	South Korea	Consumer Discretionary	79700.0	2,637	36.5	Neutral	1.2%	38.5%	3.6%
BYWFSB	United Spirits Limited	India	Consumer Staples	920.0	8,817	1.5	Neutral	50.5%	10.2%	7.6%
668718	PT Unilever Indonesia Tbk	Indonesia	Consumer Staples	3360.0	8,938	8.0	Neutral	26.5%	35.3%	8.2%
B068DB	SM Investments Corporation	Philippines	Industrials	902.5	20,771	5.5	Neutral	28.9%	34.7%	9.0%
B09QQ1	Ambuja Cements Limited	India	Materials	306.6	8,030	1.1	Neutral	7.9%	56.7%	9.5%
BKXLD7	Intouch Holdings Public Company Limited	Thailand	Communication Services	77.8	7,480	24.2	Neutral	29.6%	35.2%	9.5%
607574	CIMB Group Holdings Bhd	Malaysia	Financials	5.4	13,066	14.0	Sell	4.8%	61.7%	10.0%
690580	Tsingtao Brewery Co., Ltd. Class H	China	Consumer Staples	64.8	14,999	38.6	Neutral	35.7%	31.0%	10.4%
B2QKXW	Bajaj Auto Limited.	India	Consumer Discretionary	3649.1	13,927	1.1	Sell	20.5%	46.6%	10.9%
BTFRHX	Foshan Haitian Flavouring & Food Co., Ltd. Class A	China	Consumer Staples	92.0	60,923	113.8	Neutral	56.1%	11.9%	11.1%
609701	CLP Holdings Limited	Hong Kong	Utilities	75.9	24,496	28.1	Neutral	10.2%	57.8%	11.1%
BFF1YN	Juwei Food Co., Ltd. Class A	China	Consumer Staples	43.8	4,233	55.1	Sell	42.3%	26.9%	11.8%
B0JGGP	ITC Limited	India	Consumer Staples	244.9	39,796	4.4	Neutral	19.9%	49.5%	11.9%
B0JJV5	Pidilite Industries Limited	India	Materials	2510.2	16,828	1.1	Neutral	62.8%	6.9%	12.2%
643655	Hong Kong & China Gas Co. Ltd.	Hong Kong	Utilities	11.4	27,287	27.0	Sell	33.3%	37.1%	12.5%

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Source: Citi Research, MSCI, FactSet

Previously Published Research

Figure 25. Research Reports (since 2009)

Date	Research Theme	Report Link
24-Feb-22	Event	What Works in Equity Markets: Buy Backs – Back in Vogue
26-Jul-21	Factor	What Works in Equity Markets: Risky Value vs. Quality Value Revisited
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: Overlaying 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: Digging For Dividends: QUARL - 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

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Source: Citi Research

Citi Quant Research Team

Figure 26. Citi Quant Research Team

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 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 Anheuser Busch Inbev SA on at least one occasion since 1 Jan 2021.

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

Citigroup Global Markets Limited is mandated as advisor to Parques Reunidos Servicios Centrales SA in relation to the announced tender offer for the company from Piolin Bidco SAU, a subsidiary ultimately controlled by EQT AB and participated by Corporación Financiera Alba SA and Groupe Bruxelles Lambert SA. Citigroup Global Markets Limited is acting as Joint Global Coordinator on the announced GBL exchangeable bond into the shares of LafargeHolcim Ltd. The Firm has made a market in the publicly traded equity securities of Groep Brussel Lambert NV on at least one occasion since 1 Jan 2021.

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

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

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

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

Citi acted as an advisor on the announced sale of 69.11% stake in Glow Energy, a subsidiary of Engie SA, to Global Power Synergy Public Company Limited, of which key shareholders include PTT Public Company Ltd, PTT Global Chemical PCL, Thai Oil PCL (the 'Company') and Thai Oil Power Company. Citi Research restricted publication of new research reports on PTT Public Company Ltd on 18 June 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 2 May 2019, when Citi Research resumed full coverage.

Citi acted as an advisor on the announced sale of 69.11% stake in Glow Energy, a subsidiary of Engie SA, to Global Power Synergy Public Company Limited, of which key shareholders include PTT Public Company Ltd, PTT Global Chemical PCL, Thai Oil PCL (the 'Company') and Thai Oil Power Company. Citi Research restricted publication of new research reports on 18 June 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 16 April 2019, when Citi Research initiated coverage.

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

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

The Firm has made a market in the publicly traded equity securities of Siemens Energy 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.

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

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 United Rentals Inc on at least one occasion since 1 Jan 2021.

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

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

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

Due to Citi's involvement in advising Devon Energy Corporation (the Company) on the sale or spin of its Barnett assets restricted publication of new research reports on the Company, and suspended its rating and target price of the Company on December 18, 2019 (the Suspension Date). Please note that 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 January 13, 2020 when Citi Research resumed full coverage. The Firm has made a market in the publicly traded equity securities of Devon Energy Corp on at least one occasion since 1 Jan 2021. Due to Citi's involvement in merger of equals involving Devon Energy Corporation (DEV) and WPX Energy, Inc. (WPX), Citi suspended its rating and target price for both companies on September 28, 2020 (the "Suspension Date"). The combined company will operate under the name Devon Energy. 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 February 8, 2021 when Citi Research resumed full coverage.

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

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

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

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

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

Due to Citi's involvement in the acquisition of Energen Corp by Diamondback Energy, Inc (the Company), Citi Research suspended its rating and target price on 14 August, 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 10 December, 2018, when Citi Research resumed full coverage. The Firm has made a market in the publicly traded equity securities of Diamondback Energy Inc on at least one occasion since 1 Jan 2021.

Due to Citigroup Global Markets Limited's involvement as a financial advisor to SK Telecom Ltd ('the Company') for the merger between SK Broadband and TBroad, Citi Research restricted publication of new Research reports, and suspended its rating and target price on 21 February 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 28 February 2020, when Citi Research resumed full coverage.

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

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

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

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

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

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

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

The Firm has made a market in the publicly traded equity securities of TotalEnergies SE 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 Compagnie Generale des Etablissements Michelin SCA on at least one occasion since 1 Jan 2021.

Due to Citigroup Global Markets Limited's involvement as advisor to 3i Group Plc on its acquisition Elenia Oy and its acquisition of Tampnet. Citi Research restricted publication of new research reports and suspended its rating and target price on the 13th December 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 October 2019, when Citi Research resumed full coverage. The Firm has made a market in the publicly traded equity securities of 3i Group PLC on at least one occasion since 1 Jan 2021.

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

Due to Citigroup Global Markets Limited's involvement as advisor to Fiat Chrysler Automobiles NV on the announced 50/50 merger with Peugeot SA, Citi Research restricted publication of new research reports and suspended its rating and target price on Fiat Chrysler Automobiles NV and Peugeot SA on 12th November 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 on the merged entity Stellantis between the Suspension Date and the 23rd February 2021, when Citi Research resumed full coverage. The Firm has made a market in the publicly traded equity securities of Stellantis NV on at least one occasion since 1 Jan 2021.

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

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

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

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

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

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

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

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

The Firm has made a market in the publicly traded equity securities of Marathon Petroleum Corp 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.

Due to a compliance reason, Citi Research restricted publication of new research reports and suspended its rating and target price on the 13th May 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 28th January 2020 when Citi Research resumed full coverage. The Firm has made a market in the publicly traded equity securities of Arountown SA on at least one occasion since 1 Jan 2021.

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

Citigroup Global Markets Inc. is acting as sole bookrunner in Essex Property Trust Inc's, recently announced 'at-the-market' equity offering program.

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

Citigroup Global Markets Limited is acting as Joint Bookrunner on the announced sell down by TCI FUND MANAGEMENT in AENA - AEROPUERTOS ESPANOL Y NAVEGACION AEREAS. The Firm has made a market in the publicly traded equity securities of Aena SME SA on at least one occasion since 1 Jan 2021.

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 Danske Bank A/S on at least one occasion since 1 Jan 2021.

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

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

Due to Citigroup Global Markets Limited's involvement as advisor to Engie SA on the sale of a stake in Glow Energy, a subsidiary of Engie SA, to Global Power Synergy Public Company Limited, of which key shareholders include PTT Public Company Ltd, PTT Global Chemical PCL, Thai Oil PCL and Thai Oil Power Company, Citi Research restricted publication of new research reports on PTT Global Chemical PCL (the Company) and suspended its rating and target price on the 18th June 2018 (the suspension date). Please note that the Company price charts that appear 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 3 April 2019, when Citi Research resumed full coverage.

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

Due to Citi's involvement in the sale of its 20% interest in Meade Pipeline Co LLC involving Cabot Oil & Gas Corporation (the "Company"), Citi Research suspended its rating and target price on 30 Sept, 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 25 Nov, 2019, when Citi Research resumed full coverage. The Firm has made a market in the publicly traded equity securities of Coterra Energy Inc 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 Societe Generale SA on at least one occasion since 1 Jan 2021.

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

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

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

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

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

Citigroup Global Markets Inc. is acting as a financial advisor to Vici Properties Inc in its announced acquisition of MGM Growth Properties from MGM Resorts International.

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

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

The Firm has made a market in the publicly traded equity securities of Pioneer Natural Resources Co 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 Goldman Sachs Group Inc on at least one occasion since 1 Jan 2021.

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

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

The Firm has made a market in the publicly traded equity securities of Mediobanca Banca di Credito Finanziario SpA on at least one occasion since 1 Jan 2021.

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

Due to Citigroup Global Markets Limited's involvement as advisor to Swiss Re AG regarding the acquisition of 1.1 million life insurance policies from UK financial service provider Legal & General Group PLC, Citi Research restricted publication of new research reports and suspended its rating and target price on the 6TH December 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 8th December 2017 when Citi Research resumed full coverage. Due to Citigroup Global Markets Limited's involvement as advisor to Phoenix Group Holdings PLC in the announced acquisition of ReAssure LTD from Swiss RE AG, Citi Research restricted publication of new research reports and suspended its rating and target price on the 6th December 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 the 24th July 2020 when Citi Research resumed full coverage. The Firm has made a market in the publicly traded equity securities of Swiss Re AG on at least one occasion since 1 Jan 2021.

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

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

Citigroup Global Markets Inc. or its affiliates beneficially owns 1% or more of any class of common equity securities of Target Corp, UniCredit Group, Splunk, C.H. Robinson Worldwide Inc., Ferrovial, S.A., Freeport McMoRan, Glencore PLC, KWG Group. 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 Target Corp, UMC, Severn Trent PLC, China Education, Siemens Energy AG, UniCredit Group, United Utilities PLC, Getlink SE, Splunk, Baker Hughes Co, C.H. Robinson Worldwide Inc., Ferrovial, S.A., TotalEnergies, 3i Group Plc, Freeport McMoRan, Glencore PLC, Hotel Shilla, Novozymes, Aroundtown SA, Micron Technology Inc, Carnival Corporation, NRG, Societe Generale, CF Industries Holdings Inc, Swisscom AG, FedEx Corp., Cellnex Telecom, Goldman Sachs Group, Inc., Swiss Re.

Citigroup Global Markets Inc. or its affiliates beneficially owns 2.0% or more of any class of common equity securities of Splunk.

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 Target Corp, AMC Entertainment, UBS Group, UMC, PerkinElmer, Inc., Royalty Pharma, Ally Financial Inc, UniCredit Group, The Coca-Cola Company, UDR, Inc, Valero Energy Corp, Fineco Bank, Diamondback Energy, Inc., Baker Hughes Co, KakaoBank, Tsingtao Brewery, TotalEnergies, Stellantis, Capital One Financial, Procter & Gamble Co, Anglo American PLC, Bank Negara Indonesia, ING Groep NV, Ecolab Inc, Singapore Airlines, Colgate-Palmolive Co, Aroundtown SA, Becton Dickinson and Company, Advance Auto Parts, Inc., AvalonBay Communities, Inc, Danske Bank A/S, Micron Technology Inc, D.R. Horton, Carnival Corporation, Societe Generale, FedEx Corp., VICI Properties Inc., Pioneer Natural Resources Co., Goldman Sachs Group, Inc., Mediobanca.

Citigroup Global Markets Inc. owns a position of 1 million USD or more in the debt securities of Universal Health Services, Target Corp, UBS Group, PerkinElmer, Inc., Royalty Pharma, Ally Financial Inc, UniCredit Group, The Coca-Cola Company, United Rentals, Inc., Xylem Inc, Devon Energy Corp, UDR, Inc, Apollo Global Management, Inc, Valero Energy Corp, Brown-Forman, Pultegroup Inc, Splunk, Automatic Data Processing Inc, Diamondback Energy, Inc., KKR & Co Inc, Steel Dynamics Inc, Baker Hughes Co, Ferrovial, S.A., Illumina Inc, EOG Resources Inc, Capital One Financial, Freeport McMoRan, Procter & Gamble Co, Booking Holdings, Ecolab Inc, Colgate-Palmolive Co, Marathon Petroleum Corp, Becton Dickinson and Company, AvalonBay Communities, Inc, Danske Bank A/S, ConocoPhillips, Micron Technology Inc, Carnival Corporation, NRG, Societe Generale, CF Industries Holdings Inc, FedEx Corp., VICI Properties Inc., Pioneer Natural Resources Co., Goldman Sachs Group, Inc., Exact Sciences Corporation, Constellation Brands, TJX.

Citigroup Global Markets Inc. or its affiliates has received compensation for investment banking services provided within the past 12 months from LG Electronics, Universal Health Services, AB-InBev, Groupe Bruxelles Lambert SA, ITC, Target Corp, AMC Entertainment, UBS Group, UMC, PerkinElmer, Inc., PTT, Thai Oil, Severn Trent PLC, United Spirits, Siemens Energy AG, SK Biopharmaceuticals, Royalty Pharma, Ally Financial Inc, UniCredit Group, The Coca-Cola Company, United Rentals, Inc., Xylem Inc, Diageo, Amundi, Devon Energy Corp, UDR, Inc, Apollo Global Management, Inc, United Utilities PLC, Getlink SE, Kone, Banco Bilbao Vizcaya Argentaria SA, Valero Energy Corp, Brown-Forman, Pultegroup Inc, HCA Healthcare Inc, Automatic Data Processing Inc, Fineco Bank, SAP SE, Diamondback Energy, Inc., Evergreen Marine, Beijing Capital International Airport, SK Telecom, KKR & Co Inc, National Grid PLC, Repsol, Baker Hughes Co, KakaoBank, Ferrovial, S.A., Barratt Developments, Illumina Inc, TotalEnergies, EOG Resources Inc, Michelin, 3i Group Plc, Ambuja Cements, Celanese Corp, Stellantis, Capital One Financial, Freeport McMoRan, Procter & Gamble Co, Glencore PLC, Anglo American PLC, Baoshan Iron & Steel, Bank Negara Indonesia, Booking Holdings, ING Groep NV, Bharat Petroleum, Ecolab Inc, Singapore Airlines, Colgate-Palmolive Co, BYD Electronic, ANSYS Inc, CLP Holdings, Novozymes, Marathon Petroleum Corp, Mercedes-Benz Group AG, Aroundtown SA, Becton Dickinson and Company, Essex Property Trust Inc, Advance Auto Parts, Inc., SK Hynix, Aena, S.M.E., S.A., SM Investments, The Carlyle Group Inc, AvalonBay Communities, Inc, Danske Bank A/S, A.P. Møller - Mærsk A/S, ConocoPhillips, Micron Technology Inc, D.R. Horton, Carnival Corporation, Hana Financial Group, CIMB, Coterra Energy Inc, NRG, Societe Generale, CF Industries Holdings Inc, Swisscom AG, Cooper Companies Inc, China Feihe, State Bank of India, KWG Group, Wolters Kluwer NV, FedEx Corp., Mid-America Apartment Communities, VICI Properties Inc., COSCO Shipping Holdings Co Ltd, Pioneer Natural Resources Co., Cellnex Telecom, Goldman Sachs Group, Inc., POSCO, Inditex, JOYY, Mediobanca, Swiss Re, Unilever Indonesia, Smith & Nephew.

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 IndiGo Airlines (InterGlobe Aviation Ltd.), AB-InBev, Target Corp, AMC Entertainment, PTT, Thai Oil, Siemens Energy AG, Ally Financial Inc, UniCredit Group, The Coca-Cola Company, Amundi, UDR, Inc, Apollo Global Management, Inc, HCA Healthcare Inc, Fineco Bank, Beijing Capital International Airport, KKR & Co Inc, Baker Hughes Co, KakaoBank, Samsung Electro-Mechanics, TotalEnergies, Ambuja Cements, Stellantis, Glencore PLC, Anglo American PLC, Baoshan Iron & Steel, Bank Negara Indonesia, ING Groep NV, Bharat Petroleum, Ecolab Inc, Singapore Airlines, Mercedes-Benz Group AG, Becton Dickinson and Company, SK Hynix, The Carlyle Group Inc, A.P. Møller - Mærsk A/S, ConocoPhillips, CIMB, Societe Generale, State Bank of India, VICI Properties Inc., COSCO Shipping Holdings Co Ltd, Cellnex Telecom, Goldman Sachs Group, Inc., Mediobanca.

Citigroup Global Markets Inc. or its affiliates received compensation for products and services other than investment banking services from LG Electronics, Universal Health Services, IndiGo Airlines (InterGlobe Aviation Ltd.), AB-InBev, Church & Dwight Co Inc, Groupe Bruxelles Lambert SA, ITC, Target Corp, AMC Entertainment, UBS Group, UMC, PerkinElmer, Inc., PTT, Thai Oil, Severn Trent PLC, Hong Kong & China Gas, United Spirits, Siemens Energy AG,

SK Biopharmaceuticals, Royalty Pharma, Ally Financial Inc, Bajaj Auto, UniCredit Group, The Coca-Cola Company, United Rentals, Inc., Xylem Inc, Diageo, Amundi, Devon Energy Corp, UDR, Inc, Apollo Global Management, Inc, Kone, Samsung Heavy Industries, Banco Bilbao Vizcaya Argentaria SA, Valero Energy Corp, Brown-Forman, Pultegroup Inc, Splunk, HCA Healthcare Inc, Automatic Data Processing Inc, Fineco Bank, SAP SE, Diamondback Energy, Inc., Evergreen Marine, Beijing Capital International Airport, SK Telecom, KKR & Co Inc, Steel Dynamics Inc, National Grid PLC, Repsol, Baker Hughes Co, KakaoBank, Ferrovial, S.A., Samsung Electro-Mechanics, Illumina Inc, TotalEnergies, EOG Resources Inc, Michelin, 3i Group Plc, Ambuja Cements, Celanese Corp, Stellantis, Capital One Financial, Freeport McMoRan, Procter & Gamble Co, Glencore PLC, Anglo American PLC, Baoshan Iron & Steel, Intouch, Bank Negara Indonesia, Booking Holdings, ING Groep NV, 360 Security Technology, Bharat Petroleum, Ecolab Inc, Singapore Airlines, Colgate-Palmolive Co, Paychex Inc, BYD Electronic, ANSYS Inc, Hotel Shilla, CLP Holdings, Novozymes, Marathon Petroleum Corp, Mercedes-Benz Group AG, Becton Dickinson and Company, Essex Property Trust Inc, Pidilite Industries, Advance Auto Parts, Inc., SK Hynix, Aena, S.M.E., S.A., LG Innotek, SM Investments, The Carlyle Group Inc, AvalonBay Communities, Inc, Danske Bank A/S, Guidewire Software, A.P. Møller - Mærsk A/S, ConocoPhillips, Micron Technology Inc, D.R. Horton, Carnival Corporation, Hana Financial Group, CIMB, Coterra Energy Inc, NRG, Societe Generale, CF Industries Holdings Inc, Swisscom AG, Cooper Companies Inc, State Bank of India, KWG Group, Wolters Kluwer NV, FedEx Corp., Mid-America Apartment Communities, VICI Properties Inc., Schindler, COSCO Shipping Holdings Co Ltd, Pioneer Natural Resources Co., Cellnex Telecom, Goldman Sachs Group, Inc., POSCO, Inditex, JOYY, Mediobanca, Swiss Re, Unilever Indonesia, Smith & Nephew in the past 12 months.

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