J.P.Morgan

Global Equity Strategy and Quantitative Research
19 April 2022

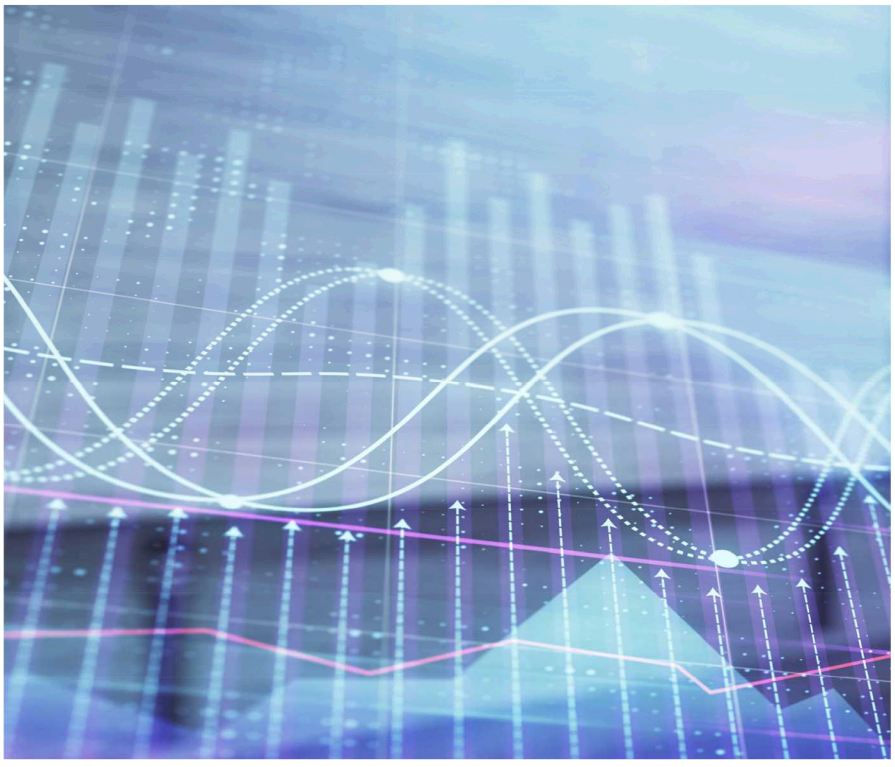
Data-Driven

LatAm Equity Strategy

A Primer on Style Investing in LatAm

We introduce key equity factors for Latin America, analyze historical behavior and provide our latest style views and recommendations. We found that MARP is the best performing factor for Latin America over the past 15 years (long-short), followed closely by Value. While both performed well in 2021 (+37% and +30% respectively, compared to -10% for MSCI LatAm), we continue to think that they have room to keep rising. The underlying reason for that is a long lasting cycle of higher commodity prices. We draw three observations from our study: 1) The current positive correlation of Value and Momentum (not the norm) could remain in positive territory for as long as the high commodity price cycle lasts. 2) Quality is cheap and the sticky characteristic of the factor should make it attractive. Still, as quality becomes expensive, it should start to trade lower. 3) Low-Vol is where investors are expressing risk aversion. We look at correlation between factors and economic variables, which indicate that Value is the best one to be invested at times of rising bond yields, high commodity prices and weaker USD.

It's important to note the challenge of doing quant analysis in LatAm due to limitations of sample size and historical data availability. This work is part of a long tradition of Quantitative and Derivative Strategy research of J.P. Morgan, which can be found on the Morgan Markets' Global Macro QDS page.



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See page 42 for analyst certification and important disclosures, including non-US analyst disclosures.

Key research reports that the global team has produced in the recent years:

Primers

- Big Data and AI Strategies (2017)
- Cross Asset Momentum Strategies (2015)
- US Style Framework (2015)
- Equity Risk Premia Strategies (2014)
- Framework for Regional Equity Allocation (2014)
- Sector Selection Model (2014)
- Cross Asset Risk Premia Strategies (2013)

Factor Reference Books:

- US Factor Reference Book (2011)
- European Factor Reference Book (2017)
- India Factor Reference Book (2015)
- China Factor Reference Book (2014)
- Asia-ex Japan Factor Reference Book (2012)
- Australia Factor Reference Book (2008)
- Japan Factor Reference Book (2008)

Other Selected Factor Research Pieces

- Extracting Sentiment from News (2017)
- Enhancing Reversals with News and Neutralization (2017)
- Global Lending Risk Premia (2017)
- Value Everywhere (2016)
- Environmental, Social & Governance Investing (2016)
- Purifying Momentum (2015)
- Harvesting the Quality Risk Premium (2015)
- Game of Accruals (2014)
- Enhanced Price Momentum (2012)
- The Trend Is Your Friend (2013)
- Beta Aware Alpha (2013)
- Minimum-Variance Strategies (2013)
- Dynamic Factor Selection (2013)
- Harnessing Geographic Revenue Exposure (2013)
- Short Interest Signal Ideas (2012)
- Stock Selection via CDS Market (2012)
- Dynamic Peer Groups (2012)
- Credit Rating Signal Ideas (2011)
- Importance of Financial Strength for Value Investing (2011)
- News Analytics add value to your Quant process (2011)
- Stock Seasonality Trading Model (2011)
- Style timing using Macro Indicators (2010)
- Return on Equity (2010)
- Stock Level Periodic Seasonality (2010)
- Negative earners outperform expensive stocks (2009)
- Identifying the most effective valuation factors within sectors (2009)
- How to Improve Earnings Momentum Strategies (2009)
- Value/Growth - Introducing our Style Switching Model (2008)

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Executive Summary

We explore factor investing in LatAm and look at 5 specific factors: Value, Growth, Quality, Momentum and Momentum at a Reasonable Price (MARP).

In our analysis, we use Long/Short portfolios based on terciles (3 n-tiles) of the MSCI LatAm universe. Portfolios are equal weighted among constituents and given equal cash notional (Cash Neutral) at every monthly rebalance. The total return time series since January 2007 are evaluated. We do not take into account borrow cost or slippage inefficiencies. We also assume the factor scores are available on the 1st business day of the month.

For performance and correlation analysis we have included Low-Vol, Size and High Beta on the exercise.

Factor Definition, Components and Top Stocks

- **Value:** Value strategies are mean reverting – stocks with market value below their intrinsic worth are expected to appreciate while those with market value higher than intrinsic worth are expected to lose value. Components used for Value: 1 Year Forward Earnings Yield (inverse of P/E ratio), Historical Book Value Yield, Historical Sales Yield.
- **Growth:** Growth Risk Factors provide exposure to companies that are expected to deliver (or have delivered in the past) strong Growth regarding some aspects such as sales, earnings, dividends, cash flow and margins. Growth factors are important as they often complement (hedge) the performance of Value factors. Components used for Growth: FY2 Sales Growth and Average FY1 and FY2 EPS Growth.
- **Quality:** Quality factors are safe players and often times trade at stretched valuations. Still, quality stocks have superior fundamentals in addition to providing countercyclical/defensive exposure from a business cycle perspective. . Components used for Quality: Return on Equity and EPS Forecast Certainty.
- **Momentum:** Momentum investing follows the old adage, "Trend is your friend." Factors are derived from price time series by identifying trends and patterns as a mean to chase the winners within the stock market. Components used for Momentum: 6-Month Price Momentum, 12-Month Price Momentum, Earnings Momentum 3-Month.
- **MARP (Momentum at a Reasonable Price):** This style is a combination of Momentum and Value factors which targets stocks with stronger performance and that trades at cheaper valuations. In our regional analysis, we constructed this factor given the strong performance of Value and Momentum separately. MARP Score is an equal weights combination of Value Score and Momentum Score.

Table 1: Top 5 Value Stocks

Stock	Ticker	JPM Rating
Banco do Brasil	BBAS3 BZ	N
Coca-Cola Femsa Local	KOFUBL MM	N
Fibra Uno	FUNO11 MM	OW
Alfa	ALFAA MM	
Petrobras PN	PETR4 BZ	OW

Source: Bloomberg Finance L.P; J.P. Morgan QDS

Table 2: Top 5 Growth Stocks

Stock	Ticker	JPM Rating
Femsa Local	FEMSAUBD MM	OW
Inter	BIDI11 BZ	OW
Credicorp	BAP PE	N
SQM	SQM/B CI	OW
JBS	JBSS3 BZ	OW

Source: Bloomberg Finance L.P; J.P. Morgan QDS

Table 3: Top 5 Quality Stocks

Stock	Ticker	JPM Rating
KC Mexico	KIMBERA MM	OW
Localiza	RENT3 BZ	N
Braskem	BRKM5 BZ	OW
Vale ON	VALE3 BZ	OW
Vibra Energia	VBBR3 BZ	OW

Source: Bloomberg Finance L.P; J.P. Morgan QDS

Table 4: Top 5 Momentum Stocks

Stock	Ticker	JPM Rating
Braskem	BRKM5 BZ	OW
BRF	BRFS3 BZ	N
Petrobras PN	PETR4 BZ	OW
Bimbo	BIMBOA MM	N
JBS	JBSS3 BZ	OW

Source: Bloomberg Finance L.P; J.P. Morgan QDS

Table 5: Top 5 MARP Stocks

Stock	Ticker	JPM Rating
Banco do Brasil	BBAS3 BZ	N
Braskem	BRKM5 BZ	OW
Petrobras PN	PETR4 BZ	OW
Petrobras ON	PETR3 BZ	OW
JBS	JBSS3 BZ	OW

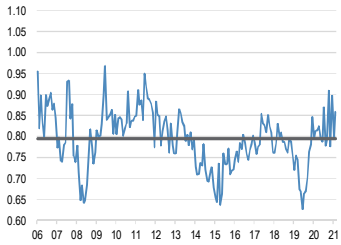
Source: Bloomberg Finance L.P; J.P. Morgan QDS

Table 6: Performance of LatAm factors

	LS				LM			
Factor	**IR**	**Ann Rtn**	**Vol**	**Max DD**	**IR**	**Ann Rtn**	**Vol**	**Max DD**
Value	0.52	6.1%	11.6%	-38.0%	0.57	3.9%	6.8%	-25.4%
Book Value Yield	0.04	0.6%	13.8%	-62.9%	0.07	0.6%	8.0%	-41.2%
Sales	0.27	3.5%	12.8%	-38.1%	0.29	2.3%	7.9%	-26.2%
Earnings Yield	0.39	4.6%	11.7%	-37.6%	0.34	2.3%	6.9%	-31.2%
Growth	-0.22	-2.1%	9.8%	-45.4%	-0.25	-1.3%	5.1%	-23.9%
Quality	0.13	1.6%	12.0%	-44.7%	0.11	0.6%	5.3%	-16.7%
Low Vol	-0.09	-2.1%	24.3%	-83.4%	-0.06	-0.7%	11.8%	-55.9%
High Beta	0.32	5.3%	16.8%	-52.2%	0.30	2.9%	9.7%	-33.0%
Size	-0.22	-2.1%	9.6%	-52.0%	-0.30	-1.4%	4.7%	-32.6%
Momentum	0.40	5.3%	13.2%	-34.8%	0.29	2.0%	6.8%	-15.8%
6M Momentum	0.27	4.4%	16.2%	-34.5%	0.30	2.5%	8.2%	-20.3%
9M Momentum	0.15	2.4%	16.7%	-39.6%	0.30	2.4%	8.0%	-19.5%
12M Momentum	0.24	4.2%	17.5%	-49.8%	0.33	2.8%	8.4%	-26.0%
12M Momentum (Adj 1M Reversal)	0.30	5.2%	17.3%	-45.6%	0.35	3.0%	8.4%	-23.7%
Vol adj Abs 12M Momentum	0.53	5.9%	11.2%	-30.0%	0.61	3.7%	6.1%	-11.6%
Momentum at a Reasonable Price (MARP)	0.97	9.1%	9.4%	-17.4%	0.96	5.1%	5.4%	-9.6%

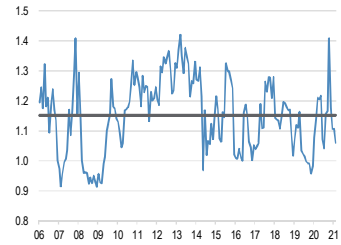
Source: Bloomberg Finance L.P; J.P. Morgan QDS. Note: Definitions on the annex

Figure 1: Long-Basket Value 12mo Fwd. P/E vs MSCI LatAm (Value/MSCI LatAm)



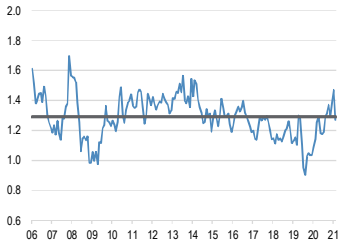
Source: Bloomberg Finance L.P; J.P. Morgan QDS

Figure 2: Long-Basket Quality 12mo Fwd. P/E vs MSCI LatAm (Quality/MSCI LatAm)



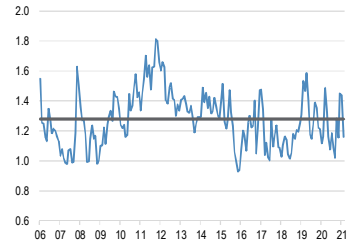
Source: Bloomberg Finance L.P; J.P. Morgan QDS

Figure 3: Long-Basket Low-Vol 12mo Fwd. P/E vs MSCI LatAm (Low-Vol/MCSI LatAm)



Source: Bloomberg Finance L.P; J.P. Morgan QDS

Figure 4: Long-Basket Momentum 12mo Fwd. P/E vs. MSCI LatAm (Momentum/MSCI LatAm)



Source: Bloomberg Finance L.P; J.P. Morgan QDS

Style Strategy: Main Conclusions

MARP and Value Backed by Commodity Cycle: While MARP and Value were the best performing factors in 2021, we think that they can continue to outperform going forward, until we see the current high commodity price cycle come to an end. To express a more cautious views on mounting risks (Fed, high inflation, local elections, etc.), investors are taking a positive view of Low-Vol stocks, which are now positive correlated to Momentum, something that only takes place in times of macro distress (GFC, Taper Tantrum, etc.). Last but not least, we found that quality became so cheap that it is now positive correlated to value. The level of this positive correlation is the highest ever, so likely to be reverted once quality becomes more expensive.

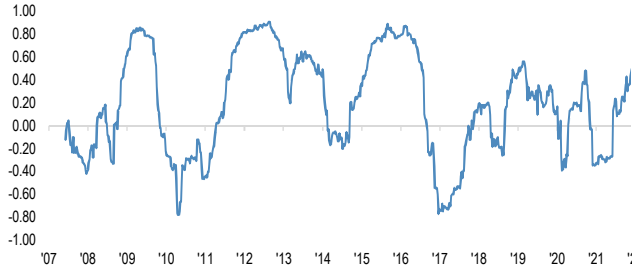
- **Commodities super-cycle bodes well for Value-Momentum correlation:** We look back into the latest commodity super-cycle (from 2003-2008) and found that the correlation between Vale and Momentum which is negative was mostly positive. The two factors had three positive peaks (similar to the current one) before moving to a definite negative territory once the GFC hit. Still, the China rebound post GFC brought commodity prices higher and also allowed for the correlation between Value and Momentum to once more move to a positive peak. This was repeated in 2017, at a time of the synchronized global growth. At this point, we believe that the positive correlation between Value and Momentum can remain in place, with sporadic reversions taking place, as it was the case during the commodity super cycle. Still, once commodity prices go down for good, the correlation between Value and Momentum should move to negative territory, where it typically belongs.
- **Quality stocks became cheap, and are currently an opportunity:** Value and Quality are negatively correlated, and this relationship very rarely breaks down. Currently, however, Value and Quality have the highest positive correlation ever. Indeed, when we look into the Quality P/E relative to the MSCI, it is trading below the average ratio. Still, Quality is the factor that is the stickiest, meaning that trends on that factor remain in place for a significant period. Our view is that the current relationship between Value and Quality should breakdown as quality becomes more expensive.
- **Risk aversion is being expressed through Low-Vol.** Historically, Momentum and Low-Vol have a positive correlation. Since mid-2021, however, this relationship is moving into even further positive territory, now at almost double de 15 year average. Once the correlation between both factors turns positive, it remains positive for some time. This could be a sign of risk aversion and an indication of a rising probability of recession. As seen in the past, periods of high correlation between Low-Vol and momentum indicates protection in periods of significant macro distress.

Factor vs. Factor correlation:

Figure 5: Value vs. Momentum

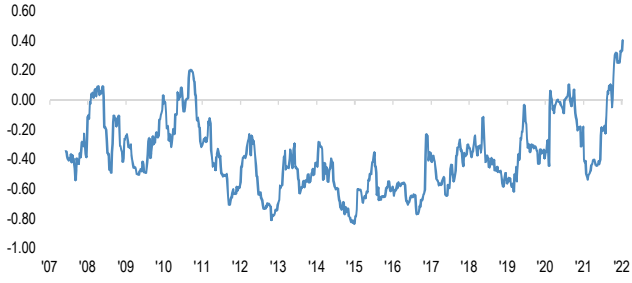
Source: Bloomberg Finance L.P., J.P. Morgan Quantitative Derivatives Strategy

Figure 6: Low-Vol Vs. Momentum



Source: Bloomberg Finance L.P., J.P. Morgan Quantitative Derivatives Strategy

Figure 7: Value vs. Quality



Source: Bloomberg Finance L.P., J.P. Morgan Quantitative Derivatives Strategy

Figure 8: Quality vs. Momentum

Source: Bloomberg Finance L.P., J.P. Morgan Quantitative Derivatives Strategy

Long-Term Factor Performance

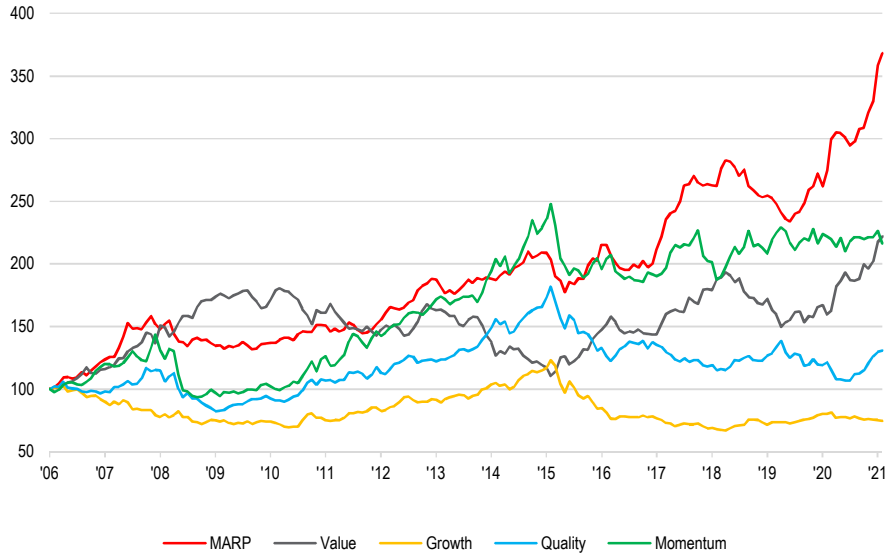
- **In Latin America, Momentum and Value are the two factors that have the best performance separately, from 2007 onwards.** Given this outcome we decided to try a combination of both styles: Momentum at a Reasonable Price (MARP) which turns out to be the best factor in the region, registering gains of 259% since 2007 (annualized return of +9.1%). There were only three periods in which MARP returns were negative (single digits), which is 2009, 2017 and 2019. The best yearly performance for MARP was 2021 when it gained +37%.
- **Momentum** gained 126% since 2007 (annualized return of +5.3%, posting only 3 negative yearly performances, notably in 2009 (post-GFC), and in 2016 and 2017, when the MSCI LatAm had two stellar years, mostly Value driven. Momentum is negatively correlated with Value, thus usually positive years for one translates into negative years for the other. That was clearly the case in 2021.
- **Value** gained 117% from 2007 to December 2021 (annualized return of +6.1%), even though it recorded negative returns in 8 of the 15 years period under analysis. Value had a stellar performance (30%) in both 2008 and 2021. In 2021, the reopening from the Covid-19 pandemic along with record liquidity coming from both fiscal and monetary easing globally has allowed Value to gain on the back of higher commodity prices. Not only that, but as our global strategists extensively wrote, the performance and valuation gap between Value and Growth were the largest since the beginning of the century (see Figure 20).
- **Growth has the worst performance in LatAm:** Since 2007, Growth has declined by 25% (annualized return of -2.1%), the only one of the four major factors analyzed to have a negative performance. It is interesting to note that

Latin America has not produced above potential economic growth since 2014 and it has impeded the Growth factor to post positive performances in several years since then (2016, 2017, 2018 and 2021).

- **Quality** increased by 30% over the past 15 years (annualized return of +1.6%), similar to the index performance. During that time, it only had 5 periods of negative results. Quality was the second best performer in 2021 as it became particularly cheap. It could also be that over the past couple of years, the strong free cash flow positions of Value companies have led some of them to enter into the Quality bucket (Vale, for example).

Figure 9: Style Cumulative Performance Index

Long-Short, Cash Neutral, Tercile Portfolios for MSCI LatAm (12/29/2006 = 100)



Source: Bloomberg Finance L.P., J.P. Morgan Quantitative Derivatives Strategy

Table 7: Factors performance table (y/y)

	Value	Growth	Quality	Momentum	Low Vol	High Beta	Size	MSCI	MARP
2007	16%	-10%	-2%	20%	5%	-2%	6%	27%	24%
2008	30%	-13%	17%	9%	32%	-15%	4%	-47%	20%
2009	15%	-4%	-28%	-26%	-33%	46%	-17%	110%	-9%
2010	-1%	-1%	12%	5%	21%	-10%	-9%	25%	2%
2011	-6%	1%	16%	24%	34%	-21%	-3%	-16%	10%
2012	-8%	10%	5%	12%	-3%	-8%	-2%	15%	3%
2013	10%	11%	8%	21%	-4%	-4%	-2%	-13%	21%
2014	-16%	14%	22%	13%	19%	-11%	5%	-12%	0%
2015	-15%	13%	16%	22%	30%	-14%	3%	-30%	11%
2016	26%	-27%	-23%	-17%	-42%	36%	-13%	35%	3%
2017	-3%	-10%	2%	-3%	-10%	11%	3%	24%	-2%
2018	25%	-10%	-12%	6%	-27%	22%	-15%	-5%	24%
2019	-4%	4%	6%	4%	-23%	15%	0%	17%	-3%
2020	-3%	12%	-6%	8%	-23%	12%	11%	-14%	3%
2021	30%	-6%	9%	1%	26%	-2%	-7%	-10%	37%
2007-2021	117%	-25%	30%	126%	-38%	36%	-33%	31%	259%

Source: Bloomberg Finance L.P., J.P. Morgan Quantitative Derivatives Strategy

Sensitivity Analysis to Macro Variables

We look into the correlation of the factors analyzed versus macro variables to better understand in what circumnstaces factor does better than others. **Value is the best performer in periods of weaker broad USD, higher commodity prices and rising bond yields. On the same token, Value underperforms all other factors when variables go in the opposite direction.**

- **All factors have negative performance during periods of broad USD appreciation, but Quality is the one that has the least negative performance**, falling on average 0.9%. The same is true in periods of commodity price declines, with Quality having the least bad performance among factors.
- **Value is the top performer when US 10y Treasury rises**, followed by Growth. Momentum is the worst performer. This is important because we think that Fed liftoffs don't necessarily damage the Value trade.
- **Growth has a positive performance during periods of both rising and falling UST. Quality and Momentum have a negative performance in both.** Value is negative correlated to all factors and this is very clear when looking into broad USD effects. For commodity prices, when it decreases, Growth is the only one to register positive returns while Momentum and Quality both underperform together with Value.

Table 8: Summary of average performance during periods analyzed

	Broad USD		Commodities Future Prices		10YR Treasury	
	Rise	*Fall*	*Rise*	*Fall*	*Rise*	*Fall*
Value	-5.2%	4.5%	3.6%	-6.0%	8.7%	-3.3%
Growth	9.4%	-5.8%	-2.6%	7.5%	5.3%	7.0%
Quality	2.4%	-2.5%	-0.7%	-2.5%	-1.3%	3.2%
Momentum	4.1%	-6.0%	-4.5%	-6.0%	-5.2%	5.8%

Source: Bloomberg Finance L.P., J.P. Morgan Quantitative Derivatives Strategy. Note: Methodology is Long-Short portfolios based on 3 n-tiles of MSCI LatAm. Portfolios are Equal Weighted and Cash Neutral.

- **Sector wise**, on average, the conclusion is pretty straightforward: At times of weak USD, high commodity prices and rising bond yields both **Materials** and **Energy** tend to over perform other sectors. Financials also do well in periods of weak USD. The conclusion is also valid for the underperformance of commodity sectors at times of strong dollar, falling commodity prices and falling bond yields, with the interesting underperformance of real estate also.

Introduction to Factor Investing

The below section is an excerpt from US Factor Reference Book from May 2018.

Over the past several decades, quantitative factor investing has evolved from a simple approach based on two or three styles to multi-factor "smart or exotic beta" products that incorporate several styles using sophisticated portfolio construction and risk management methodology. Though innovations in factor investing have been an enduring feature of money management business since early 1990s, the process appears to have accelerated in the post-financial crisis period due to several reasons including unusually long period of low interest rates, greater need for diversification, persistent active manager underperformance, commoditization and proliferation of passive investment products made possible by investor demand, low computation costs and new distribution channels. We begin this section by briefly discussing the evolution of factor investing, followed by how the aforementioned dynamics have accelerated the factor investing process. We close this section by highlighting the opportunities and, equally important, the risks inherent in factor investing and conjecture the role of factor investing in money management business going forward.

Evolution, Not Revolution

A factor is a quantifiable signal, attribute, or any variable which has been correlated with forward stock returns historically and is expected to remain correlated in future. Good factors, therefore, exhibit a relationship with forward stock returns that not only are stable and persistent over time but also have a fundamental and/or theoretical basis for driving those stock returns. The initial interest in the quant risk factors during late 1970s to early 1980s was primarily confined to Value, Growth and Size factors and was promoted by consultants and embraced by large institutional clients. These early risk factors were relatively simple consisting of Price/Book and/or Price/Earnings ratios for Value and Large-Mid-Small caps for Size. Value investors were primarily concerned with price component of valuation ratios with little emphasis on expected change in earnings or book value (denominator of the ratio). Value investors believed that the price of low P/E stock is "too low" given the level of current or expected earnings. Market pessimism about the prospects of the company will likely dissipate once a suitable catalyst like an upturn in business cycle appears and the price would rise to appropriate level. Growth investors, by contrast, care more about the change in earnings. If the price earnings ratio does not fall, Growth investors expect to gain from earnings growth as stock price chases the improving fundamentals. In early days of quantitative style investing, Value and Growth styles were considered diametrically opposite - Growth stocks were categorized as reverse of Value stocks i.e. expensive stocks.

Investment and index research firms formalized style investing in early 1990s by introducing style boxes (Value/Growth x Size) that to this day are used by financial advisors, consultants, pension funds, endowments and other asset allocators to analyze basic risk exposure of funds. Vendors also introduced indices based on simple Value, Growth and Size (VGS) factors which worked as benchmarks for mutual funds offering exposure to respective VGS styles. Over time even retail investors and financial advisors became comfortable with these styles in addition to sector-focused funds. The acceptance of basic VGS styles by retail investors is unsurprising since the concept of value and growth has been part of Wall Street zeitgeist long before the 1980s. Graham-Dodd's Security Analysis first published in 1934 is fundamentally about value investing with a quality overlay. The

Nifty-Fifty buy-and-hold list of stocks in 1960s was essentially about large-cap growth investing. Factor investing is incorporated into mutual funds in two "pure" methods: through passive index funds that replicate a factor or style benchmark and through active funds which attempt to add manager-alpha by tilting the stock weights of the factor or style benchmark.

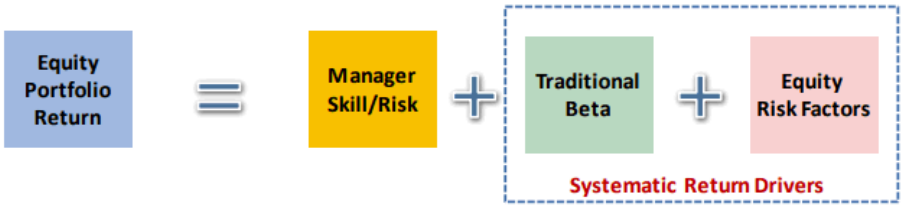
In parallel, there were advances in systematic factor investing as academics and practitioners reported new return anomalies (momentum, volatility, quality, accruals) that were apparently in contradiction to the efficient market hypothesis. The race to exploit many of these anomalies began earnestly in 1990s when hedge funds and other private funds began incorporating non-traditional factors into their investment process. Their methodology was often viewed as a black box approach that combined expanded set of quant factors, manager-alpha, efficient portfolio construction and sophisticated risk management to create investible portfolios. Since investing in these private funds is not tightly regulated (e.g. unlike mutual funds, hedge funds are not required to register with SEC though fraud and fiduciary laws apply), only accredited individuals and institutional investors had access to some of the non-traditional factors.

By early 1990s, equity style management was in the mainstream of the institutional money management business with VGS still the predominant factors though exposure to Price Momentum and Quality factors like debt-to-equity, return on assets, return on equity were also seen as important drivers of performance. In an influential paper, William Sharpe (1992) demonstrated how style return based analysis can help investors better understand and manage the sources of performance of their portfolios. Fund sponsors adopting the quantitative approach were still left with important choices: What style benchmarks would be appropriate for their portfolio? How many styles should be used to achieve diversification? Which constraints on style portfolios under what conditions would add incremental value (e.g. maximum position size on individual securities, limits on sector exposure, market beta exposure, turnover limits)? Should the sponsor be involved with risk management decisions of the manager? How much resource should be spent in monitoring the style of the managers? Underlying each of these decisions is cost-benefit analysis. While asset allocators and fund sponsors were pondering these issues, **a powerful impetus to adoption of factor investing by financial practitioners also came from the behavior of asset prices since late 1990s – namely, the dot com bubble, the financial crisis spawned by housing bubble and subsequent period of unconventional global monetary policy.**

Motivation 1 for Factor Investing: Proliferation of Quantitative Methods

In our report "Equity Risk Premia Strategies: Risk Factor Approach to Portfolio Management", we noted that returns of an Equity Portfolio can be attributed to Broad Market and Sector Exposures (Traditional Beta), exposure to various Equity Risk Factors (Alternative Beta) and Manager-Specific Risk (Idiosyncratic Risk, Alpha) (see Figure 7). Traditional Beta can be attributed to the portfolio's exposures to certain regional equity markets, sectors or industries. Equity Risk Factor exposures are a result of active biases towards stocks with High Momentum, Low-Volatility, Cheap Valuations, etc. Equity Risk Factor exposures are defined to be independent of Traditional Beta. Manager-Specific Risk is attributable to the manager's discretionary selection and timing of stocks, sectors, countries/regions and themes.

Figure 10: Drivers of Equity Portfolio Returns



Source: J.P. Morgan Quantitative and Derivatives Strategy

While this framework is a convenient way of decomposing portfolio returns**, diverse types of fund managers may employ the framework in different manner to describe their investment process.** A Fundamental manager may primarily focus on Manager Skill/Risk component especially emphasizing stock-specific alpha while lumping the other two components (Traditional and Alternate beta) together as primarily a source of risk that needs managing but is not central to generating outperformance. A Quantitative manager may try to use all three components – for example, try to time sector tilts using quantitative models, vary beta exposure using a market timing model and use a style rotation model to vary factor tilts. A "Quantamental" manager may take a hybrid approach using tools from both Fundamental and Quantitative toolboxes.

The interest in factor investing since the 1990s is a sign that there has been growing emphasis on alternate beta component of the decomposition among industry practitioners. There are two likely reasons for this development – a longer term structural trend in greater use of quantitative methods and the asset price bubbles of the last two decades. **The structural trend is driven by: (a) the accelerating decline in the cost of financial data** (macro, flows, company financials, derivatives, and more recently unstructured big data) and its easy access through internet infrastructure, **(b) the appearance of relatively cheap yet powerful computing hardware and software**. In the last 20 years, price of computer/peripherals and software has witnessed an annual decline of 15% and 5% respectively, and **(c) increased hiring by the Street of talented professionals trained in advanced quantitative techniques** (with degrees in econometrics, mathematics, physics, engineering and computer science; interestingly, a master's program in Computational Finance was first offered by a US university in 1990).

This is not to suggest that quantitative methods were not prevalent in finance before 1990s – Black-Scholes model for pricing options was invented in 1973. However, the academic evidence in the 1970s was mostly in favor of validity of efficient markets and CAPM. Work of Black, Jensen and Scholes (1972), Fama and MacBeth (1973), and Blume and Friend (1973) among others implied that market beta was sufficient in explaining the difference in cross-sectional expected returns of stocks. However the confluence of three developments mentioned above (easier access to data, cheaper computing and greater availability of quantitatively trained employees) accelerated the diffusion and acceptance of quantitative methods in the asset management industry providing a boost to factor based investing.

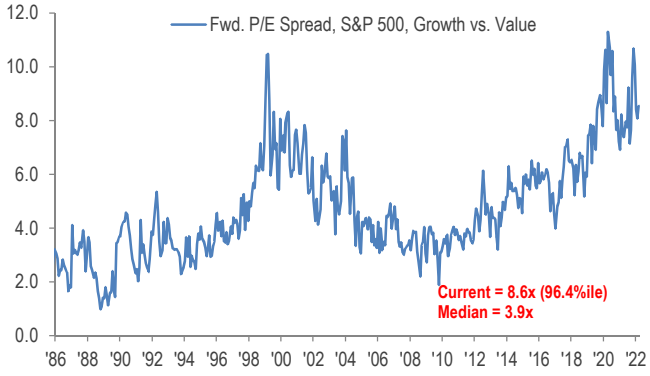
Both academics and practitioners continued to report many anomalous factors in 1980s and 1990s that explained the cross-section of returns beyond the market beta. In an important paper Fama and French (1992) essentially reversed Fama's earlier view on CAPM and showed that size and book-to-price provided additional explanatory power for cross-sectional stock returns. As a result, **the share of quantitative investors in driving stock market trading has grown several folds**

during the past two decades. According to a Tabb Group study (The Wall Street Journal, May 21, 2017), quant hedge funds accounted for ~28% of stock trading volume in 2017 compared to ~22% for other hedge funds and ~19% for traditional asset managers. This compares with ~12.5% stock trading share of quant hedge funds in 2010. Whether it is the quantitative manager overlaying their process with fundamental research or the fundamental manager starting to adopt quantitative techniques in their stock selection, such as testing a valuation metric historically to determine whether it has been effective in anticipating future returns, quantitative investing methods are being used in a multitude of ways, more so than ever before.

Motivation 2 for Factor Investing: TMT Bubble, Financial Crisis, QE/ZIRP

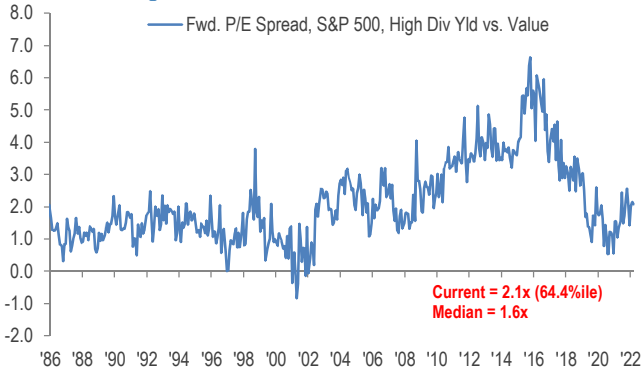
While the structural uptrend in quantitative methods explains the rise of factor investing, the role of dot com bubble, financial crisis and subsequent period of extremely low yield has also been a crucial ingredient in spurring factor investing. Asset bubbles, usually triggered by massive economic dislocations (e.g. internet revolution, housing boom) combined with rapid growth in credit creation, result in lopsided momentum in favor of one or two styles that eventually results in huge valuations spreads and ultimately a sharp reversal. Investors who monitor the style exposures in their portfolio and either manage the style tilts or are better style diversified can potentially reduce the loss reversals can cause.

Figure 11: Tech Bubble Led to Unjustifiable Valuation Spread Between Growth and Value



Source: J.P. Morgan US Quantitative Strategy

Figure 12: Prolonged Low Rates post-Financial Crisis Drove Valuations of High Dividend Yield Stocks to Unsustainable Levels



Source: J.P. Morgan US Quantitative Strategy

Figure 11 shows the widening gap in Growth and Value portfolios' forward P/Es as the tech bubble was inflating in the second half of 1990s which was then followed by reversal. A fundamental manager with undiversified large exposure to Value would have experienced hefty losses in 1990s. Conversely, portfolios overloaded on Growth would have done in late 1990s but would have experienced very painful reversal in first half of 2000s.

As noted above, bubbles typically originate from major economic dislocations. The global financial crisis triggered very easy monetary policy including Quantitative Easing by major central banks. Prolonged low interest rates led to a bubble in Low-Volatility and high dividend yield stocks as investors chased yield. Figure 12 shows that by 2016 the high valuation multiples for High Dividend Yield stocks became unjustifiable based on fundamentals. These two examples highlight a striking feature of the financial landscape during the past two decades. Investors have gradually

recognized that most appropriate theoretical construct to understand the impact of macro and policy dislocations on their portfolio performance is the style investing framework. We believe this has been an important impetus in driving interest in factors.

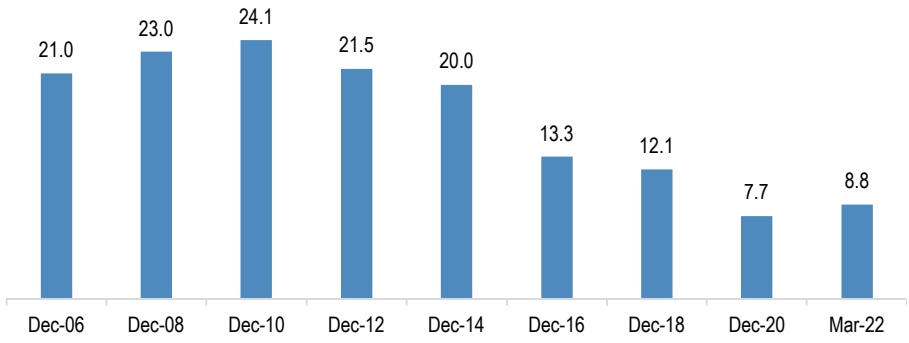
When J.P. Morgan published the US factor reference reports seven years ago, terms like "smart beta," "exotic beta," and "alternate beta" were not yet part of common financial market vocabulary. Since then there has been considerable progress in research on factors along with introduction of vendor products including liquid ETFs based on single and multiple factors. A manifest symptom of this interest is the nearly exponential growth in interest in learning more about risk premia factors and portfolio construction. The explosion of tailored factor products to institutional investors and plain vanilla factor ETFs for retail market has led many skeptics to ask the question: will this whole new factor investing industry have staying power or will it soon fade off as many fads and bubbles do? Our view is that factor premia are either compensation for specific risks or reflect systemic mispricing due to behavioral biases. If one is mindful of potential pitfalls related to factor lifecycle (cyclical drivers, crowding risks are covered in the next section) there is reason to be optimistic that factors will remain an important part of quantitative investing toolbox. **We do not expect smart beta products to replace hedge funds or active managers since these products cannot effectively replace the timing and selection ability of a skilled active manager.**

The MSCI Latin America

Before we dive further into factor investing in LatAm, we find it important to understand the premise of the universe under analysis, that is, the MSCI LatAm.

The LatAm MSCI index is composed of 92 companies, weighted by free float market capitalization with a weight of 8.8% in the MSCI Emerging Markets. LatAm has been losing share in the index after the advent of China and also due to years of economic downturn, which has led the capitalization of the region's markets to decline substantially.

Figure 13: LatAm participation in the MSCI EM (% of total)



Source: Bloomberg Finance L.P.; J.P. Morgan

The country composition of the MSCI LatAm has changed little over the past few years. Brazil is the largest contribution, with a weight of 62%, followed by Mexico with 26%. Brazil has always been the largest one in the index, albeit its share today is

almost 10% higher than in 2006, mostly at the expense of Mexico, which in turn is the second largest. Among the Andean countries, Chile is the largest, but currently only with a 6% share, the lowest in 15 years. Peru and Colombia have maintained their low participation in the index. Argentina was removed from the index in 2009 and re-accepted ten years later. That, however, didn't last as the country was once more removed in November 2021. Venezuela was part of the index until 2Q 2006.

Table 9: MSCI LatAm Country Composition over Time (% of total)

	Argentina	Brazil	Chile	Colombia	Mexico	Peru	Other
Dec-06	1.6	52.6	8.0	1.6	31.2	2.5	2.5
Dec-08	0.7	62.7	6.7	2.8	24.3	2.8	
Dec-10		67.7	7.1	3.8	18.3	3.2	
Dec-12		59.2	8.9	5.7	23.2	3.1	
Dec-14		55.1	8.2	4.8	29.3	2.6	
Dec-16		57.9	9.1	3.5	26.6	3.0	
Dec-18		62.4	9.2	3.4	21.6	3.4	
Dec-20	0.3	63.6	6.6	2.2	22.8	3.2	1.3
Current		62.6	5.9	2.4	25.9	3.2	

Source: Bloomberg Finance L.P.; J.P. Morgan. Current = March 21, 2022

- Different from countries, the sector composition in the index has changed a lot over time, albeit commodities always had a dominant position, especially Materials. While 15 years ago Communication Services was responsible for 18% of the index, today it accounts for 7%. On the other hand, financials, which used to make up less than 14% of the index, has ballooned to over 30% by 2018, falling to about 25% currently. Materials today has the same size roughly as during the commodity super cycle, albeit it declined very significantly at times of lower materials prices. Energy fell from almost 19% to 12% currently, pretty much driven by a decline of more than 40% in the participation of Petrobras in the index.

Table 10: MSCI LatAm Sector Weights (% of total)

	Materials	Energy	Comm. Serv.	Financials	Staples	Utilities	Industrials	Discretionary	Real Estate	Health Care	IT
Dec-06	23.9	18.7	17.9	13.6	11.4	5.9	5.1	3.1	0.2	0.2	
Dec-08	23.7	17.2	17.5	19.2	10.1	7.8	2.9	1.6			
Dec-10	24.4	17.0	10.2	22.1	11.5	5.6	3.7	3.7	0.5	0.5	
Dec-12	20.4	12.8	10.0	22.0	17.3	6.1	4.5	3.4	1.3	0.9	1.3
Dec-14	14.3	7.9	10.0	28.2	18.1	5.3	6.2	4.8	1.8	1.0	2.0
Dec-16	15.1	9.4	7.8	30.2	17.2	6.5	5.9	3.8	1.4	1.0	1.7
Dec-18	16.8	10.7	6.5	33.3	14.7	4.9	5.9	4.7	1.3	0.6	0.5
Dec-20	19.9	9.3	6.8	25.6	14.8	5.7	7.0	6.7	0.9	2.0	1.4
Current	25.2	11.7	7.0	24.4	13.9	4.0	6.4	3.3	0.8	2.7	0.5

Source: Bloomberg Finance L.P.; J.P. Morgan

- The number of companies that make up the index decreased from 162 in 2000 to 92 today. Still, the market cap of the MSCI LatAm increased from about USD 250 million in 2000 to USD 1.1 trillion today. At its high, the index reached a market capitalization of USD 1.8 trillion. The decline should be mainly attributed to FX devaluation in the region.

Figure 14: MSCI LatAm Market Cap since 2000 (USD, trillion)

Source: MSCI, Bloomberg Finance L.P.

Figure 15: # of companies in the MSCI LatAm

Source: MSCI, Bloomberg Finance L.P.

- The Top 15 stocks of the MSCI LatAm make up 55% of the index. The largest company by far is Vale, with 12.6% of the index, followed by Petrobras, with 8.8%, shared among preferential and ordinary shares. The largest Mexican stock in the MSCI LatAm is America Movil (4.9%). Among the other LatAm countries, Peru appears in the Top 15 with Credicorp (1.8% of the index) and Chile with SQM (1.7%). It is important to note that stocks that are listed in the US are not part of the MSCI LatAm (for example Mercado Libre), and that Argentina was removed from the MSCI LatAm at the end of 2021.

Table 11: MSCI LatAm - Top 15 members

Company	Bloomberg Ticker	MSCI LatAm Index Weight	JPM Rating	M. Cap USD Mn	P/E 2022E	P/E 2023E	Div Yield 2023E	Earn. Growth 2022E	Earn. Growth 2023E	Analyst
Vale ON	VALE US	12.6	OW	97,506	4.1	5.2	9.3	6%	-22%	Angele, Rodolfo R
America Movil	AMX US	4.9	N	71,585	14.6	10.6	0.1	18%	38%	Santos, Marcelo
Petrobras PN	PBR/A US	4.8	OW	91,895	4.6	4.6	10.6	2%	0%	Angele, Rodolfo R
Itau Unibanco	ITUB4 BZ	4.2	OW	50,718	8.5	7.8	7.7	23%	9%	Falavina, Domingos
Petrobras ON	PBR US	4.0	OW	91,895	5.0	5.0	9.8	2%	0%	Angele, Rodolfo R
Banco Bradesco	BBDC4 BZ	3.4	OW	40,167	7.4	6.8	7.5	5%	8%	Falavina, Domingos
Walmex	WALMEX* MM	3.2	OW	67,958	28.1	25.5	2.4	12%	10%	Giordano, Joseph
Banorte	GFNORTEO MM	3.0	OW	19,713	10.1	9.3	5.9	13%	9%	Falavina, Domingos
B3	B3SA3 BZ	2.8	N	18,611	18.3	18.1	5.0	1%	1%	Falavina, Domingos
Grupo Mexico	GMEXICOB MM	2.8	N	41,840	12.0	12.5	NA	-3%	-4%	Angele, Rodolfo R
Femsa	FMX US	2.5	OW	26,178	20.4	18.6	0.3	-7%	10%	Giordano, Joseph
Ambev	ABEV3 BZ	2.2	N	48,813	20.9	17.6	4.8	2%	19%	Ferreira, Lucas
Credicorp	BAP US	1.8	N	13,736	9.5	8.5	5.8	26%	13%	Falavina, Domingos
Weg	WEGE3 BZ	1.8	OW	28,600	35.8	30.4	2.0	21%	18%	Motta, Marcelo Garaldi
SQM	SQM US	1.7	OW	23,186	9.8	7.8	NA	326%	25%	Ferreira, Lucas
Hapvida	HAPV3 BZ	1.6	OW	15,808	40.6	25.0	NA	532%	63%	Giordano, Joseph

Source: MSCI, Bloomberg Finance L.P.; J.P. Morgan. As of April 13, 2022

Factors and Their Components: Definitions and Stocks for LatAm

In this report, we apply the Risk Factors framework to LatAm Equities and study its correlation and portfolio properties. For that purpose, we designed a number of Risk Factor benchmarks in each of the 4 styles: Value, Growth, Quality, and Momentum. Selection of elements in each of these factors is based on the most well-known examples that capture the main properties of the factor in question. Below, we present the components being used and also their definition, which is sourced from the JPM 2014 report "Equity Risk Premia Strategies: Risk Factor Approach to Portfolio Management" by Marko Kolanovic. We then present stock lists for each of the factors that we cover. Considering the properties of the LatAm markets, we have tested also a few more styles: Low-Vol, Size, High Beta and MARP (momentum at reasonable price).

Methodology: The analysis we make is with the MSCI LatAm equal weighted (so as to remove the bias that large caps can have on the result), taking into account daily data for the past 15 years (100=12/29/2006), broken down in terciles. The strategy is long short.

Value

Value strategies select stocks by comparing their market value with their fundamental intrinsic worth. In essence, Value strategies are mean reverting – stocks with market value below their intrinsic worth are expected to appreciate while those with market value higher than intrinsic worth are expected to lose value. Since intrinsic value of a firm is not directly observable, proxies such as book value, net income or earnings, free cash flow, sales and dividends are used as substitutes even though investors are obviously aware that any one of these proxies in itself is an imperfect measure of the intrinsic worth of a firm. The efficacy of any value strategy during a period depends on the phase of the cycle and presence of catalysts that trigger investor buying of bargain stocks. Components used for Value:

- **1 Year Forward Earnings Yield (inverse of P/E ratio):** Measures how cheap or expensive a stock price is compared to its forecasted (forward) earnings. Cheap companies (relative to earnings) should be more attractive and are expected to outperform expensive ones.
- **Historical Book Value Yield:** Measures the last reported annual book Value per share divided by monthly-end price. Cheap stocks with the highest BV/P ratio (or lowest P/BV ratio) are allocated to the top portfolio. Expensive stocks with the lowest BV/P ratio (or highest P/BV) are allocated to the bottom portfolio.
- **Historical Sales Yield:** The ratio measures the relative valuation of a stock from the perspective of revenue generated. Stocks with the highest historical sales per share to price ratio are favored and expected to outperform, and thus are allocated to the top portfolio.

Expected behavior of Value factors: Value factors are expected to deliver positive risk premia [1]over long time horizons. However, positive and negative Value cycles

[1] *Risk premia is commonly regarded as the difference between the expected return of a risky investment and the riskless return. In general, risk premium is the expected compensation for bearing the risk of losses on an investment.*

can be expected over time. In a market down cycle (e.g. 2008-09 global financial crisis), investors pay higher multiples for stocks they perceive as relatively "safe", i.e. those stocks they think can maintain or grow earnings. In that type of environment, Value underperforms Quality and Growth. The historical performance of Value components varies by region. In the US, Free Cash Flow Yield was one of the most effective Value components. Dividend Yield was the best-performing Value component in Europe. In Asia ex-Japan, the consensus forecasted Earnings Yield was the best-performing Value factor, and in Japan historically P/B has had the most consistent performance.

Rationale and Limitations

The risk premia of Value stocks is attributable to their pay-off being more risky than the average stock. Returns of Value stocks are more positively correlated with business cycle than the average stock. They underperform the market in "bad times," precisely when investors need higher returns to smooth their consumption spending. Therefore, in equilibrium, investors require a premium to hold Value stocks i.e. higher average excess returns over the full cycle. An alternate explanation of Value outperformance is based on mispricing due to investors' behavioral biases (over-reaction, herding) or liquidity effects (temporary market impact, long term supply/demand friction). Value strategies capitalize on the mean-reversion of prices to their 'fair value'. The premise is that prices are only temporarily driven away from 'fair value'. Value factors can be vulnerable to market cycles – e.g. a classic episode of Value failure was during the Tech bubble. Another risk in equity value investing is related to "Value traps" – companies whose valuations are cheap due to rapidly deteriorating fundamentals. To mitigate these risks, investors can combine value factors with risk factors such as Growth and Quality. Examples of these approaches include growth-at-reasonable-price (GARP) and quality-at-reasonable-price (QARP) factors.

There are two types of market phenomena that can affect the performance of Value factors: cyclical and structural. The cyclical aspect of value investing relates to periods when Value comes in and out of favor, driven by the prevailing market risk sentiment. While this cyclicality can affect the performance of all valuation factors, it can have great influence on the performance of certain factors within the valuation family (i.e., Price/Book, Price/Earnings, Price/Sales, Price/Cash Flow, etc.). For example, investors tend to favor book value when they lose confidence in earnings. As a result, P/B tends to act more as a crisis metric and is favored over P/E when earnings are very low or negative, especially in the first few months of a market recovery. Price/Book will often falter after it has had its run, at which point Price/Earnings factors begin outperforming. This can be seen as a temporary decline in correlation between the two Value factors. Performance of Value factors can also vary due to region-specific (e.g., Japan) and structural reasons relating to sectors (e.g., Energy P/B has been depressed for years), or broader investor perceptions.

Stock list: As expected, banks and commodities make up the bulk of the Value basket, but utilities also appear on the list, among a few other stocks.

Table 12: Value Portfolio for MSCI LatAm (Top 10 stocks of the Top-Tercile Portfolio)

Company	Bloomberg Ticker	JPM Rating	Price			M. Cap (USD Mn)	Performance			Earnings Growth		Subsector
			14-Apr-22	Target	Upside		1M	3M	6M	2021E	2022E	
Banco do Brasil	BBAS3 BZ	N	35.19	36	3%	21,385	5%	16%	15%	18%	-1%	Banks
Coca-Cola Femsa Local	KOFUBL MM	N	110.42	128	16%	11,595	4%	-3%	-3%	-6%	8%	Beverages
Fibra Uno	FUNO11 MM	OW	22.98	28	25%	4,540	9%	7%	9%	259%	11%	Equity Real Estate Investment
Alfa	ALFAA MM	NC	14.76	18.84	28%	3,619	0%	0%	-3%	209%	-12%	Industrial Conglomerates
Petrobras PN	PETR4 BZ	OW	13.285	18.5	27%	91,895	7%	16%	24%	2%	0%	Oil, Gas & Consumable Fuels
Braskem	BRKM5 BZ	OW	43.39	64	45%	7,347	-4%	-17%	-25%	-68%	-8%	Chemicals
Petrobras ON	PETR3 BZ	OW	14.695	18.5	18%	91,895	9%	17%	34%	2%	0%	Oil, Gas & Consumable Fuels
Eletrobras PN	ELET6 BZ	OW	42.59	50	21%	11,595	3%	9%	-10%	16%	-7%	Electric Utilities
Enel Chile	ENELCHIL CI	OW	22.95	40	69%	1,950	-3%	-30%	-36%	129%	51%	Electric Utilities
Eletrobras ON	ELET3 BZ	OW	43.23	47	10%	14,355	28 %	37%	8%	16%	-7%	Electric Utilities

Source: Bloomberg Finance L.P., J.P. Morgan Quantitative Derivatives Strategy.Note: NC = not covered at JPM. Estimates for these stocks derive from Bloomberg consensus.

Table 13: Value Portfolio for MSCI LatAm (Top 10 stocks of the Bottom-Tercile Portfolio)

Company	Bloomberg Ticker	JPM Rating	Price			M. Cap (USD Mn)	Performance			Earnings Growth		Subsector
			14-Apr-22	Target	Upside		1M	3M	6M	2021E	2022E	
Engie Brasil Energia	EGIE3 BZ	N	43.86	46	5%	7,594	10%	14%	14%	55%	25%	Independent Power and Renewabl
Lojas Renner	LREN3 BZ	OW	26.54	36	35%	5,569	19%	11%	-16%	87%	42%	Multiline Retail
AmBev	ABEV3 BZ	N	14.61	15.5	4%	48,813	10%	-3%	-6%	2%	19%	Beverages
BTG Pactual	BPAC11 BZ		25.05	34	36%	20,388	6%	26%	1%	20%	12%	Capital Markets
CCR	CCRO3 BZ	N	13.5	13.5	-1%	5,787	15%	19%	8%	82%	18%	Transportation Infrastructure
Klabin	KLBN11 BZ	OW	22.61	33	42%	5,576	-11%	-11%	-1%	-14%	-18%	Containers & Packaging
CCU Local	CCU CI	UW	5795.9	6500	10%	2,630	6%	-16%	-7%	-9%	-8%	Beverages
Americanas SA	AMER3 BZ	N	28.07	32	12%	5,403	18%	-7%	-18%	-98%	3260%	Internet & Direct Marketing Re
Totvs	TOTS3 BZ	OW	35.06	43.5	22%	4,590	9%	39%	-3%	39%	37%	Software
Banco de Chile	CHILE CI	N	21.39	23	11%	10,804	2%	16%	30%	-3%	9%	Banks

Source: Bloomberg Finance L.P., J.P. Morgan Quantitative Derivatives Strategy.

Growth

Growth Risk Factors provide exposure to companies that are expected to deliver (or have delivered in the past) strong Growth regarding some aspects like sales, earnings, dividends, cash flow and margins. Growth factors are important as they often complement (hedge) the performance of Value factors in a quant portfolio. The design of Growth components can be based on historical earnings data or on sell-side analysts' earnings forecasts. Growth factors were initially seen as anti-Value i.e. expensive stocks. However, recent characterization of Growth style is more direct in defining factors as growth in some fundamental aspect of the companies like sales, earnings, dividends, cash flow and margins.

- **FY2 Sales Growth:** Stocks with high anticipated sales Growth from FY1 to FY2 are allocated to the Long portfolio and the ones with lowest Growth are allocated to the Short portfolio.
- **Average FY1 and FY2 EPS Growth:** Using consensus net income forecasts for FY1 and FY2 we calculate the forecast earnings Growth and then use the Growth rate to rank stocks. Analysts' Growth forecasts are likely already reflected in the current price, and this may be the reason for poor performance of this factor in most test universes.

Expected behavior of Growth factors: Growth-based factors are expected to deliver long-term positive risk premia. **On average, Growth factors have exhibited the lowest predictive power of returns among all styles, showing poor payoff consistency.** Relative to other Growth components, cash flow appears to be one of the most effective. Earnings Growth components, both trailing and forward, have been the worst performing. Growth factor components have low correlation among themselves, which is a positive for the style. Efficacy of Growth factors is best during mid-to-late cycle (i.e. mid-Expansion and Slowdown). **Overall Growth factors do better in Risk-Off than Risk-On environments.** Growth factors also tend to exhibit low sensitivity to changes in the Yield Curve and USD.

Stock list: Staples and transportation make up some of the names in the Growth basket. Still, we were surprised to find there banks and some commodity names as well.

Table 14: Growth Portfolio for MSCI LatAm (Top 10 stocks of the Top-Tercile Portfolio)

Company	Bloomberg Ticker	JPM Rating	Price			M. Cap (USD Mn)	Performance			Earnings Growth		Subsector
			14-Apr-22	Target	Upside		1M	3M	6M	2021E	2022E	
Femsa Local	FEMSAUBD MM	OW	156.41	203	28%	26,034	-5%	-7%	-9%	-1%	13%	Beverages
Inter	BIDI11 BZ	OW	16.46	36	91%	3,012	3%	-31%	-68%	319%	94%	Banks
Credicorp	BAP PE	N	145.54	146	0%	13,736	-11%	0%	13%	26%	13%	Banks
SQM	SQM/B CI	OW	83.2479	107	25%	23,186	18%	47%	58%	326%	25%	Chemicals
JBS	JBSS3 BZ	OW	38.33	61	57%	18,249	9%	3%	1%	-11%		Food Products
Energisa	ENGI11 BZ	N	47.46	51	6%	4,272	11%	16%	3%	-55%	32%	Electric Utilities
Banorte	GFNORTEO MM	OW	136.77	145	4%	19,713	-3%	-6%	1%	13%	9%	Banks
Localiza	RENT3 BZ	N	57	64	11%	9,172	7%	11%	3%	3%	1%	Road & Rail
Petrobras ON	PETR3 BZ	OW	14.695	18.5	18%	91,895	9%	17%	34%	2%	0%	Oil, Gas & Consumable Fuels
Ecopetrol	ECOPETL CB	N	19.62	17.5	-9%	40,335	16%	39%	27%	83%	-13%	Oil, Gas & Consumable Fuels

Source: Bloomberg Finance L.P., J.P. Morgan Quantitative Derivatives Strategy.

Table 15: Growth Portfolio for MSCI LatAm (Top 10 stocks of the Bottom-Tercile Portfolio)

Company	Bloomberg Ticker	JPM Rating	Price			M. Cap (USD Mn)	Performance			Earnings Growth		Subsector
			14-Apr-22	Target	Upside		1M	3M	6M	2021E	2022E	
Banco de Chile	CHILE CI	N	21.39	23	11%	10,804	2%	16%	30%	-3%	9%	Banks
Southern Copper	SCCO PE	UW	73.13	51.5	-30%	56,536	5%	8%	16%	-10%	-5%	Metals & Mining
Enel Americas	ENELAM CI	N	90.67	129	42%	11,947	0%	-7%	-10%	77%	-4%	Electric Utilities
America Movil	AMXL MM	N	22.315	21	-4%	71,585	20%	9%	26%	18%	38%	Wireless Telecommunication Ser
Equatorial	EQTL3 BZ	OW	25.9	29	12%	6,205	1%	15%	4%	-38%	29%	Electric Utilities
Fibra Uno	FUNO11 MM	OW	22.98	28	25%	4,540	9%	7%	9%	259%	11%	Equity Real Estate Investment
Ultrapar	UGPA3 BZ	N	14.97	16	17%	3,542	23%	14%	0%	-103%	Loss	Oil, Gas & Consumable Fuels
Orbia	ORBIA* MM	N	50.51	62	17%	5,075	-2%	4%	-7%	5%	-39%	Chemicals
Americanas SA	AMER3 BZ	N	28.07	32	12%	5,403	18%	-7%	-18%	-98%	3260%	Internet & Direct Marketing Re
BB Seguridade	BBSE3 BZ	N	26.18	26	-1%	11,111	17%	35%	23%	32%	5%	Insurance

Source: Bloomberg Finance L.P., J.P. Morgan Quantitative Derivatives Strategy.

Quality

Quality factors rely on balance sheet and income statement items that indicate one or more of the following: high profit or cash flow margins, an ability to sustain earnings over time (competitiveness), operating efficiency, and financial strength. It is generally accepted that it is desirable to tilt portfolios towards businesses with high quality. The

market also appears to reward relative earnings certainty and penalize those stocks that carry a large degree of earnings volatility. Most Quality factors (16 out of 18) have positive ICs. However, Quality factors as standalone investments tend to have countercyclical performance and often times trade at stretched valuations as investors pay a premium to minimize potential downside. For this reason, Quality factors are often combined with other Risk Factors using a multi-factor approach. The most popular combination with Quality is Value, resulting in the common investment philosophy of 'Quality at a Reasonable Price' (QARP). Quality factors (long-short) will often have negative market exposure (negative beta). Negative beta is a result of long exposure to high quality stocks that also tend to be less volatile and short exposure to more volatile, low-quality names. For this reason, Quality factors are often positively correlated with Low-Volatility, Growth and Momentum factors, and negatively correlated with Value and broad market exposure. The negative beta of Quality factors needs to be taken into account when evaluating and attributing performance of this factor. In the discussion on Construction and Implementation we show that neutralizing beta improves the performance of Quality factors. Because of their counter-cyclical behavior, Quality factors can be used to construct a portfolio of factors to hedge broad equity exposure. Components used for Quality:

- **Return on Equity**: Stocks are ranked based on their historical return on equity. Those stocks with the highest ROE are allocated to the top portfolio and the stocks with the lowest ROE are allocated to the bottom.
- **EPS Forecast Certainty:** It is the average standard deviation in the EPS forecasts for FY1 and FY2. We look for high certainty or low standard deviation in forecasts.

Expected behavior of Quality factors: In that regard Quality factors tend to outperform during Slowdown and Contraction phases of the business cycle, but tend to struggle during Recovery and Expansion phases. Overall, Quality factors are often positively correlated with Low-Volatility, Growth and Momentum factors, and negatively correlated with Value and broad market exposure.

Rationale and Limitations

Explanation of Quality factor outperformance usually rests on the notion that superior fundamentals (sustained profitability, steady growth in cash flow, prudent leveraging, low need for capital market financing, low financial risk) tend to support price of Quality companies in the long run. For this argument to be reasonable, it still needs to be explained why the current stock price of high quality companies does not fully reflect these advantages. The most plausible explanation is a behavioral one i.e. investor behavior reflects under reaction to information about quality. This is an argument similar to the rationale for Momentum where investors chase winners and sell losers. Indeed, if one orders the correlation of long-term Momentum factor (say, 3-year) with all factors (excluding Momentum), the correlation is highest for Quality and change in Quality factors. Another argument for Quality premia is a herding argument similar to Growth stocks. Fund managers may find it easier to justify buying a company with strong fundamentals even when it is getting expensive rather than a more volatile (risky) Value stock.

During cyclical Slowdown and Contraction, investors seek Quality stocks as safe havens. This may make many Quality stocks very expensive. In the Recovery phase of the business cycle, sticking to these stocks may lead to underperformance (a Quality trap) especially during a junk rally.

Stock list: A good amount of staples are part of the Quality basket, but once more there are cyclical names in there, such as banks and commodities.

Table 16: Quality Portfolio for MSCI LatAm (Top 10 stocks of the Top-Tercile Portfolio)

Company	Bloomberg Ticker	JPM Rating	Price			M. Cap (USD Mn)	Performance			Earnings Growth		Subsector
			14-Apr-22	Target	Upside		1M	3M	6M	2021E	2022E	
KC Mexico	KIMBERA MM	OW	156.41	203	28%	4,864	7%	-7%	-13%	27%	8%	Household Products
Localiza	RENT3 BZ	N	16.46	36	91%	9,172	7%	11%	3%	3%	1%	Road & Rail
Braskem	BRKM5 BZ	OW	145.54	146	0%	7,347	-4%	-17%	-25%	-68%	-8%	Chemicals
Vale ON	VALE3 BZ	OW	83.2479	107	25%	97,506	10%	27%	35%	6%	-22%	Metals & Mining
Vibra Energia	VBBR3 BZ	OW	38.33	61	57%	5,602	6%	14%	-9%	-1%	-16%	Specialty Retail
CSN	CSNA3 BZ	OW	47.46	51	6%	7,430	13%	16%	9%	2%	-34%	Metals & Mining
Southern Copper	SCCO PE	UW	136.77	145	4%	56,536	5%	8%	16%	-10%	-5%	Metals & Mining
Itau Unibanco	ITUB4 BZ	OW	57	64	11%	50,718	4%	12%	9%	23%	9%	Banks
WalMex	WALMEX* MM	OW	14.695	18.5	18%	67,958	2%	9%	9%	12%	10%	Food & Staples Retailing
Petrobras PN	PETR4 BZ	OW	19.62	17.5	-9%	91,895	7%	16%	24%	2%	0%	Oil, Gas & Consumable Fuels

Source: Bloomberg Finance L.P., J.P. Morgan Quantitative Derivatives Strategy.

Table 17: Quality Portfolio for MSCI LatAm (Top 10 stocks of the Bottom-Tercile Portfolio)

Company	Bloomberg Ticker	JPM Rating	Price			M. Cap (USD Mn)	Performance			Earnings Growth		Subsector
			14-Apr-22	Target	Upside		1M	3M	6M	2021E	2022E	
BanColombia	PFBCOLO CB	OW	10.45	15	36%	10,929	17%	32%	21%	4%	7%	Banks
ASUR	ASURB MM	N	21.39	23	11%	6,224	3%	-5%	4%	21%	14%	Transportation Infrastructure
Totvs	TOTS3 BZ	OW	73.13	51.5	-30%	4,590	9%	39%	-3%	39%	37%	Software
Falabella	FALAB CI	OW	90.67	129	42%	7,861	5%	-4%	6%	-20%	4%	Multiline Retail
Cemex	CEMEXCPO MM	OW	22.315	21	-4%	6,810	-2%	-32%	-35%	-19%	18%	Construction Materials
Rede D'Or	RDOR3 BZ	OW	25.9	29	12%	18,050	-16%	3%	-36%	35%	22%	Health Care Providers & Servic
Magazine Luiza	MGLU3 BZ	OW	22.98	28	25%	8,593	13%	-5%	-58%	-86%	207%	Multiline Retail
Eletrobras PN	ELET6 BZ	OW	14.97	16	17%	14,355	28%	37%	6%	16%	-7%	Electric Utilities
B3	B3SA3 BZ	N	50.51	62	17%	18,611	8%	18%	13%	1%	1%	Capital Markets
Televisa	TLEVICPO MM	OW	28.07	32	12%	6,192	12%	5%	-7%	-105%	1962%	Media

Source: Bloomberg Finance L.P., J.P. Morgan Quantitative Derivatives Strategy.

Momentum

Momentum factors are derived from price time series by identifying trends and patterns as a mean to chase the winners within the stock market. Momentum effect can be driven by Behavioral Biases such as under- and over-reaction to news, and lagged time response to market news. Price Momentum can also develop as a result of a Positive Feedback Loop between stock price performance and availability of capital to fund future corporate Growth, or on a macro level, positive feedback between the economy and stock market performance. Momentum investing follows the old adage, "Trend is your friend" or "Let your winners run." The underlying exposure of Momentum to other styles varies over the business cycle. For instance, Momentum usually has positive correlations with Growth and Quality but this alignment increases when the business cycle is slowing or contracting (risk-off period) and stocks ranked high by Growth and Quality show up high on Momentum ranking as well. By contrast, Momentum is almost always negatively correlated with Value but this correlation tends to shrink close to zero in cyclical Recovery (risk-on period) typically accompanied by a Value rally.

Momentum risk factors are designed to buy assets that performed well and sell assets that performed poorly over a certain historical time period. The premise of this investment style is that asset prices develop trends (i.e. returns have positive correlations). The existence of such a price Momentum effect would go against the hypothesis of efficient markets which states that past price returns alone cannot predict future performance. Below are the components we use for the Momentum factor:

- **6-Month Price Momentum:** Stocks are ranked based on their total return over the past 6-months. A long-short portfolio is constructed by buying the top stocks and shorting the bottom stocks as ranked by the Momentum metric.
- **12-Month Price Momentum:** Stocks are ranked based on their total return over the past 12-months. A long-short portfolio is constructed by buying the top stocks and shorting the bottom stocks as ranked by the Momentum metric.
- **Earnings Momentum 3-Month:** Stocks are ranked based on their 3-month Forward Earnings Momentum. A higher ratio is more desirable.

Expected behavior of Momentum factors: Momentum factors are expected to have positive long-term performance. Momentum factors do well in extended Expansion and Slowdown phases of the cycle. In addition, the factor can do very well during initial phases of contraction/recession, but it is subject to abnormally high drawdowns as the cycle turns, as asset rotation takes hold.

Stock list: The Momentum basket is very diverse sector wise and might reflect long standing special situations. Still, it is important to note that the Momentum Portfolio would change more frequently than other factor portfolios due to price movements. Other factors are dependent on fundamentals that change slowly. Commodity names make up most of the Momentum basket.

Table 18: Momentum Portfolio for MSCI LatAm (Top 10 stocks of the Top-Tercile Portfolio)

			Price				Performance			Earnings Growth		
Company	Bloomberg Ticker	JPM Rating	14-Apr-22	Target	Upside	M. Cap (USD Mn)	1M	3M	6M	2021E	2022E	Subsector
Braskem	BRKM5 BZ	OW	43.39	64	45%	7,347	-4%	-17%	-25%	-68%	-8%	Chemicals
BRF	BRFS3 BZ	N	15.19	30	72%	3,487	0%	-37%	-41%	489%	23%	Food Products
Petrobras PN	PETR4 BZ	OW	13.285	18.5	27%	91,895	7%	16%	24%	2%	0%	Oil, Gas & Consumable Fuels
Bimbo	BIMBOA MM	N	57.78	63	6%	12,925	5%	-13%	1%	-14%	14%	Food Products
JBS	JBSS3 BZ	OW	38.33	61	57%	18,249	9%	3%	1%	-11%		Food Products
Petrobras ON	PETR3 BZ	OW	14.695	18.5	18%	91,895	9%	17%	34%	2%	0%	Oil, Gas & Consumable Fuels
Inbursa	GFINBURO MM	UW	40.58	22	-46%	12,527	9%	59%	99%	-14%	8%	Banks
Cencosud	CENCOSUD CI	NC	1502	NA	NA	5,282	4%	8%	25%	NA	NA	Food & Staples Retailing
Enel Americas	ENELAM CI	N	90.67	129	42%	11,947	0%	-7%	-10%	77%	-4%	Electric Utilities
Klabin	KLBN11 BZ	OW	22.61	33	42%	5,576	-11%	-11%	-1%	-14%	-18%	Containers & Packaging

Source: Bloomberg Finance L.P., J.P. Morgan Quantitative Derivatives Strategy. Note: NC = not covered at JPM. Estimates for these stocks derive from Bloomberg consensus.

Table 19: Momentum Portfolio for MSCI LatAm (Top 10 stocks of the Bottom-Tercile Portfolio)

			Price				Performance			Earnings Growth		
Company	Bloomberg Ticker	JPM Rating	14-Apr-22	Target	Upside	M. Cap (USD Mn)	1M	3M	6M	2021E	2022E	Subsector
Coca-Cola Femsa Local	KOFUBL MM	N	110.42	128	16%	11,595	4%	-3%	-3%	-6%	8%	Beverages
BanColombia - ADR	BCOLO CB	OW	44.03	44	3%	10,929	17%	32%	21%	4%	7%	Banks
BCI	BCI CI	OW	28700	40000	37%	5,495	5%	6%	11%	12%	0%	Banks
Grupo Mexico	GMEXICOB MM	N	107.52	98	-12%	41,840	-1%	16%	20%	-3%	-4%	Metals & Mining
Femsa Local	FEMSAUBD MM	OW	156.41	203	28%	26,034	-5%	-7%	-9%	-1%	13%	Beverages
Orbia	ORBIA* MM	N	50.51	62	17%	5,075	-2%	4%	-7%	5%	-39%	Chemicals
Vale ON	VALE3 BZ	OW	19.505	26.5	32%	97,506	10%	27%	35%	6%	-22%	Metals & Mining
Jose Cuervo (Becle)	CUERVO* MM	OW	47.87	58	21%	8,593	4%	-10%	9%	9%	8%	Beverages
Pinfra	PINFRA* MM	N	158.18	205	30%	3,223	0%	1%	8%	5%	13%	Transportation Infrastructure
Lojas Renner	LREN3 BZ	OW	26.54	36	35%	5,569	19%	11%	-16%	87%	42%	Multiline Retail

Source: Bloomberg Finance L.P., J.P. Morgan Quantitative Derivatives Strategy

MARP – Momentum at a Reasonable Price

In pursuit of all-weather factor for investing in Latam, we experimented with the equal parts combination of both Momentum and Value styles to construct "Momentum at a Reasonable Price" (MARP), which targets the stocks with stronger recent performance still trading at reasonable valuations. Value and Momentum are typically negatively correlated (-0.46 avg.), but this has turned positive at the start of 2022 and currently stands at 0.20 (Figure 25).

We look into Long-Short strategy and found that, MARP has an annualized return of 9.1% (IR of 0.97) over the past 15 years, pretty much above all other factors we discuss in this report, including standalone Momentum (annual return of 5.3% and IR of 0.40) and Value (annual return of 6.1% and IR of 0.52). Not only MARP offers superior performance, but the drawdown is relatively comfortable at -17% compared to Value at -38% and Momentum at -35%.

In the table below we look at performance for Value and Momentum and their components to figure out which one is the best MARP combination. The conclusion we found is that for the Value side, a combination of all the three sub-factors analyzed, is the best strategy considering that it provides the highest annualized return, the lowest drawdown and the highest IR. Looking into Momentum variations, all of them have positive annualized return, but the best one is the Volatility Adjusted Absolute 12 month Momentum, followed by the Momentum factor itself.

Table 20: Performance of Alternative Momentum and Value Constructions

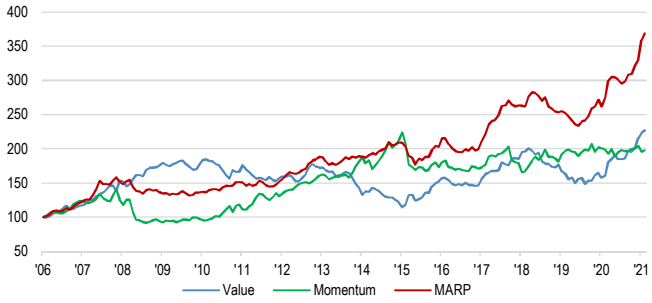
	LS				LM			
Factor	**IR**	**Ann Rtn**	**Vol**	**Max DD**	**IR**	**Ann Rtn**	**Vol**	**Max DD**
Value	0.52	6.1%	11.6%	-38.0%	0.57	3.9%	6.8%	-25.4%
Book Value Yield	0.04	0.6%	13.8%	-62.9%	0.07	0.6%	8.0%	-41.2%
Sales	0.27	3.5%	12.8%	-38.1%	0.29	2.3%	7.9%	-26.2%
Earnings Yield	0.39	4.6%	11.7%	-37.6%	0.34	2.3%	6.9%	-31.2%
Growth	-0.22	-2.1%	9.8%	-45.4%	-0.25	-1.3%	5.1%	-23.9%
Quality	0.13	1.6%	12.0%	-44.7%	0.11	0.6%	5.3%	-16.7%
Low Vol	-0.09	-2.1%	24.3%	-83.4%	-0.06	-0.7%	11.8%	-55.9%
High Beta	0.32	5.3%	16.8%	-52.2%	0.30	2.9%	9.7%	-33.0%
Size	-0.22	-2.1%	9.6%	-52.0%	-0.30	-1.4%	4.7%	-32.6%
Momentum	0.40	5.3%	13.2%	-34.8%	0.29	2.0%	6.8%	-15.8%
6M Momentum	0.27	4.4%	16.2%	-34.5%	0.30	2.5%	8.2%	-20.3%
9M Momentum	0.15	2.4%	16.7%	-39.6%	0.30	2.4%	8.0%	-19.5%
12M Momentum	0.24	4.2%	17.5%	-49.8%	0.33	2.8%	8.4%	-26.0%
12M Momentum (Adj 1M Reversal)	0.30	5.2%	17.3%	-45.6%	0.35	3.0%	8.4%	-23.7%
Vol adj Abs 12M Momentum	0.53	5.9%	11.2%	-30.0%	0.61	3.7%	6.1%	-11.6%
Momentum at a Reasonable Price (MARP)	0.97	9.1%	9.4%	-17.4%	0.96	5.1%	5.4%	-9.6%

Source: Bloomberg Finance L.P., J.P. Morgan Quantitative Derivatives Strategy

Figure 16: MARP: Long-Short Strategy

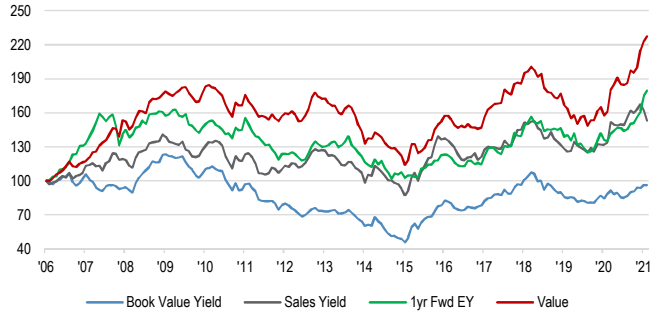
Source: Bloomberg Finance L.P., J.P. Morgan Quantitative Derivatives Strategy.

Figure 17: Value, Momentum and MARP – Long-Short



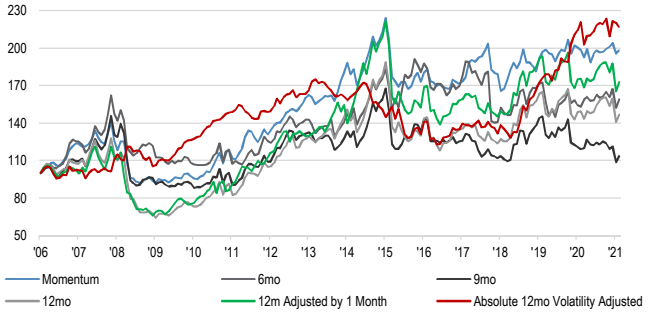
Source: Bloomberg Finance L.P., J.P. Morgan Quantitative Derivatives Strategy.

Figure 18: Value Variations – Long-Short



Source: Bloomberg Finance L.P., J.P. Morgan Quantitative Derivatives Strategy.

Figure 19: Momentum Variations – Long-Short



Source: Bloomberg Finance L.P., J.P. Morgan Quantitative Derivatives Strategy.

Table 21: MARP Portfolio for MSCI LatAm (Top 10 stocks of the Top-Tercile Portfolio)

Company	Bloomberg Ticker	JPM Rating	Price			M. Cap (USD Mn)	Performance			Earnings Growth		Subsector
			14-Apr-22	Target	Upside		1M	3M	6M	2021E	2022E	
Banco do Brasil	BBAS3 BZ	N	35.19	36	3%	21,385	5%	16%	15%	18%	-1%	Banks
Braskem	BRKM5 BZ	OW	43.39	64	45%	7,347	-4%	-17%	-25%	-68%	-8%	Chemicals
Petrobras ON	PETR4 BZ	OW	14.695	18.5	18%	91,895	9%	17%	34%	2%	0%	Oil, Gas & Consumable Fuels
Petrobras ON	PETR3 BZ	OW	14.695	18.5	18%	91,895	9%	17%	34%	2%	0%	Oil, Gas & Consumable Fuels
JBS	JBSS3 BZ	OW	38.33	61	57%	18,249	9%	3%	1%	-11%		Food Products
Coca-Cola Femsa Local	KOFUBL MM	N	110.42	128	16%	11,595	4%	-3%	-3%	-6%	8%	Beverages
Petrobras ON	ENELAM CI	N	90.67	129	42%	11,947	0%	-7%	-10%	77%	-4%	Electric Utilities
BRF	BRFS3 BZ	N	15.19	30	72%	3,770	-8%	-25%	-29%	489%	23%	Food Products
Cencosud	CENCOSUD CI	NR	1502	NA	NA	5,282	4%	8%	25%	NA	NA	Food & Staples Retailing
Gerdau	GGBR4 BZ	OW	29.24	43	46%	9,879	1%	3%	4%	-47%	-28%	Metals & Mining

Source: Bloomberg Finance L.P., J.P. Morgan Quantitative Derivatives Strategy.Note: NC = not covered at JPM. Estimates for these stocks derive from Bloomberg consensus.

Table 22: MARP Portfolio for MSCI LatAm (Top 10 stocks of the Bottom-Tercile Portfolio)

Company	Bloomberg Ticker	JPM Rating	Price			M. Cap (USD Mn)	Performance			Earnings Growth		Subsector
			14-Apr-22	Target	Upside		1M	3M	6M	2021E	2022E	
Localiza	RENT3 BZ	N	57	64	11%	9,172	7%	11%	3%	3%	1%	Road & Rail
BTG Pactual	BPAC11 BZ		25.05	34	36%	20,388	6%	26%	1%	20%	12%	Capital Markets
Engie Brasil Energia	EGIE3 BZ	N	43.86	46	5%	7,594	10%	14%	14%	55%	25%	Independent Power and Renewabl
Southern Copper	SCCO PE	UW	73.13	51.5	-30%	56,536	5%	8%	16%	-10%	-5%	Metals & Mining
Enel Chile	ENELCHIL CI	OW	22.95	40	69%	1,950	-3%	-30%	-36%	129%	51%	Electric Utilities
Femsa Local	FEMSAUBD MM	OW	156.41	203	28%	26,034	-5%	-7%	-9%	-1%	13%	Beverages
CCU Local	CCU CI	UW	5795.9	6500	10%	2,630	6%	-16%	-7%	-9%	-8%	Beverages
Suzano	SUZB3 BZ	N	53.33	72	32%	15,411	-11%	-15%	7%	-4%	-46%	Paper & Forest Products
Banco de Chile	CMPC CI	OW	1375	2300	64%	4,222	-2%	-5%	12%	-35%	-21%	Paper & Forest Products
B3	B3SA3 BZ	N	14.38	15	-4%	18,611	8%	18%	13%	1%	1%	Capital Markets

Source: Bloomberg Finance L.P., J.P. Morgan Quantitative Derivatives Strategy.Note: NC = not covered at JPM. Estimates for these stocks derive from Bloomberg consensus.

Correlation Analysis

We look into correlation analysis to identify trends and how different styles fit within different macro phases. This is a key session of our report, as it brings clear recommendations. Our conclusion: 1) the correlation of Value and Momentum could remain in positive territory for as long as the high commodity price cycle lasts. 2) The abnormal positive correlation between Value and Quality indicates that Quality is cheap and goes in line with the sticky characteristic of the Quality factor (when it performs well, it tends to continue to perform well). Still, this is the one correlation that we think it is poised for reversion, with quality becoming expensive and starting to move south. 3) The increasingly positive correlation between Low-Vol and Momentum is a sign of risk aversion and could be pointing out to a rising probability of recession. This relationship remains high and could be long lasting in periods of macro/ market distress.

Factor vs. Factor Correlation

In general terms, Value is negatively correlated to all other factors, with exception of High-Beta. There is some level of positive correlation between Growth, Momentum and Quality. The table below shows correlations among factors. It takes into account the 12 week rolling correlation over the past 15 years for the styles we analyze in this report.

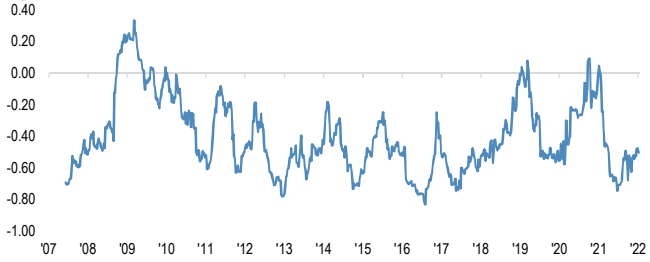
Table 23: Pairwise correlation between styles (15yr correlation)

Factors	Value	Growth	Quality	Momentum	Low Vol	High Beta	Size	MSCI LatAm
Value		-0.38	-0.32	-0.46	-0.32	0.48	-0.14	0.29
Growth	-0.38		0.42	0.25	0.19	-0.23	0.08	-0.10
Quality	-0.32	0.42		0.25	0.42	-0.41	0.11	-0.30
Momentum	-0.46	0.25	0.25		0.36	-0.45	0.31	-0.23
Low Vol	-0.32	0.19	0.42	0.36		-0.76	-0.04	-0.59
High Beta	0.48	-0.23	-0.41	-0.45	-0.76		0.06	0.62
Size	-0.14	0.08	0.11	0.31	-0.04	0.06		0.05
MSCI LatAm	0.29	-0.10	-0.30	-0.23	-0.59	0.62	0.05	

Source: Bloomberg Finance L.P., J.P. Morgan Quantitative Derivatives Strategy.

- **Value and Growth** are negatively correlated. If the correlation between Value and Growth turns positive, a reversal should be expected to take place. Value is the highest beta to the market, thus, when risk appetite goes up, so does Value.
- **Value and Momentum** by definition have a negative correlation. Any positive change in this correlation is usually an outcome of a building risk appetite, when Value is the outperforming factor. In recent months, Value and Momentum are positively correlated (94%ile vs 15yrs history), indicating a reversal risk at some point (discussed further next). JPM call is that commodities prices are to remain supportive for the medium-term, which is a key driver for sustained Value outperformance and for the continuation of a positive correlation between Momentum and Value.

Figure 20: Value vs. Growth



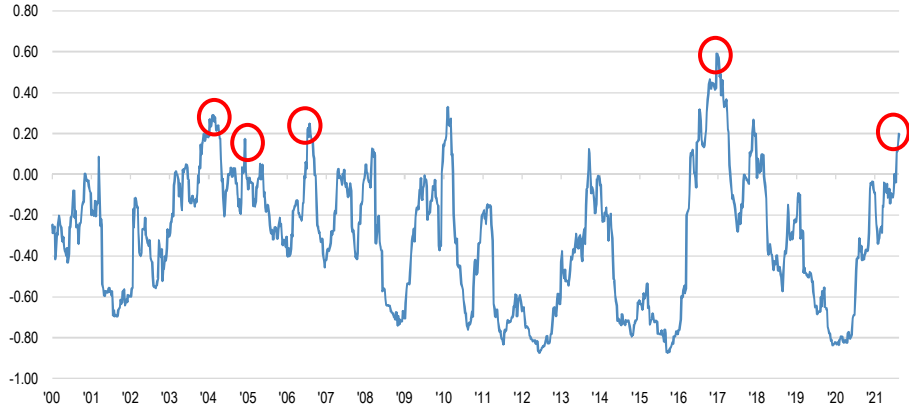
Source: Bloomberg Finance L.P., J.P. Morgan Quantitative Derivatives Strategy.

Figure 21: Value vs. Momentum

Source: Bloomberg Finance L.P., J.P. Morgan Quantitative Derivatives Strategy.

- **Commodities super-cycle bodes well for Value-Momentum correlation:** We look back into the latest commodity super-cycle (from 2003-2008) and found that the correlation between Vale and Momentum was typically positive. The two factors had three positive peaks (similar to the current one) before moving to a definite negative territory once the GFC hit. Still, the China rebound post GFC brought commodity prices higher and also allowed for the correlation between Value and Momentum to once more move to a positive peak. This was repeated in 2017, at a time of the synchronized global growth. At this point, we believe that the positive correlation between Value and Momentum can remain in place, with sporadic reversions taking place, as it was the case during the commodity super cycle. Moreover, the peak correlation of 0.3 observed in 2004 and 2007 was not yet reached, much less the 0.6 from 2017 (now at 0.2). Still, once commodity prices go down for good, the correlation between Value and Momentum should move to negative territory, where it typically belongs.

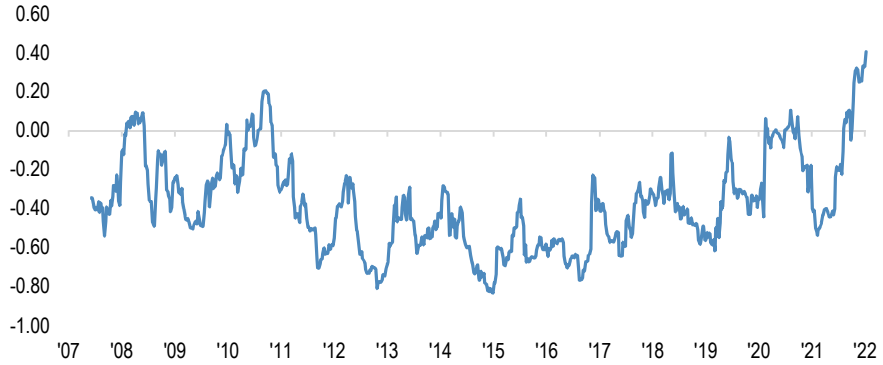
Figure 22: Value vs. Momentum correlation: Correlation to break when commodities super-cycle ends



Source: Bloomberg Finance L.P., J.P. Morgan Quantitative Derivatives Strategy

- **Value and Quality** are negatively correlated, and this relationship very rarely breaks down. Currently, however, Value and Quality have the highest positive correlation since 2007, suggesting that quality stocks are becoming cheap, together with Value names. Indeed, when we look into the Quality P/E chart we see that since 2020, it is becoming cheaper, currently trading 2 SD below 15yr historical average (Value is trading 1.3 SD below avg.). Still, Quality is the factor that is the stickiest, meaning that trends on that factor remain in place for a significant period.Momentum is the least sticky factor.

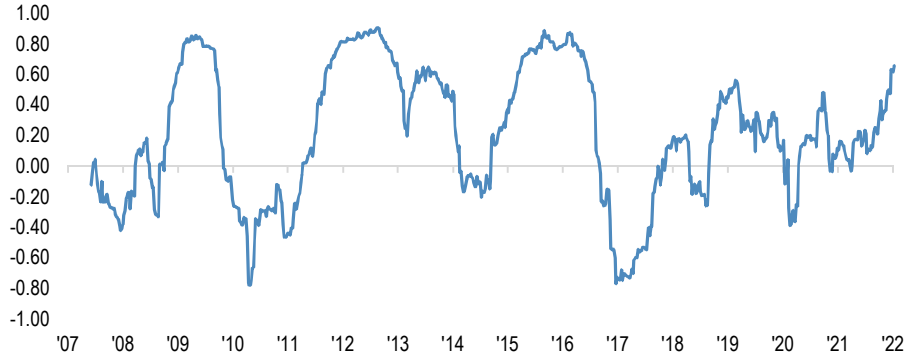
Figure 23: Value vs. Quality correlation



Source: Bloomberg Finance L.P., J.P. Morgan Quantitative Derivatives Strategy

Momentum and Low-Vol: Historically, both factors have a positive correlation. Since mid-2021 it has been moving further into positive territory, currently at 0.66, almost double the 15 year average of 0.36. Looking at past years, one notes that once correlation between both factors turns positive, it remains positive for some time, with Low-Vol continue to move up. This could be a sign of risk aversion and an indication of a rising probability of recession. This is because the correlation between the two factors remains at high positive levels for significant periods at times of economic distress.

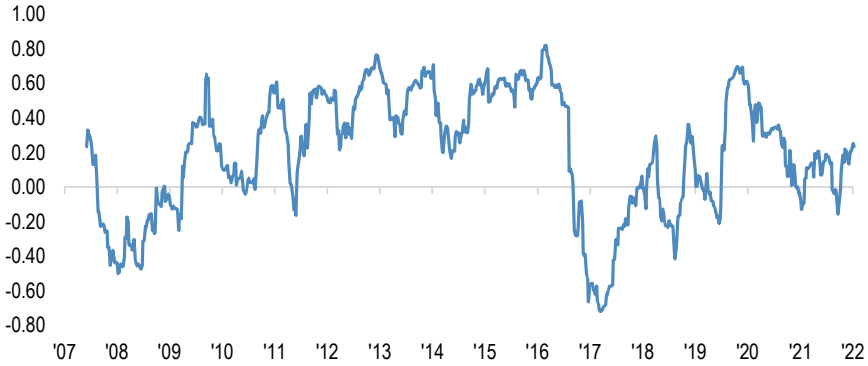
Figure 24: Low-Vol vs. Momentum correlation



Source: Bloomberg Finance L.P., J.P. Morgan Quantitative Derivatives Strategy

- **Growth and Momentum** are positively correlated. The most important point when this positive correlation broke was in 2017, when the Fed started to systematically hike interest rates for the first time since the GFC. Thus, one would expect this correlation to break down again as the Fed moves to hike rates once more.

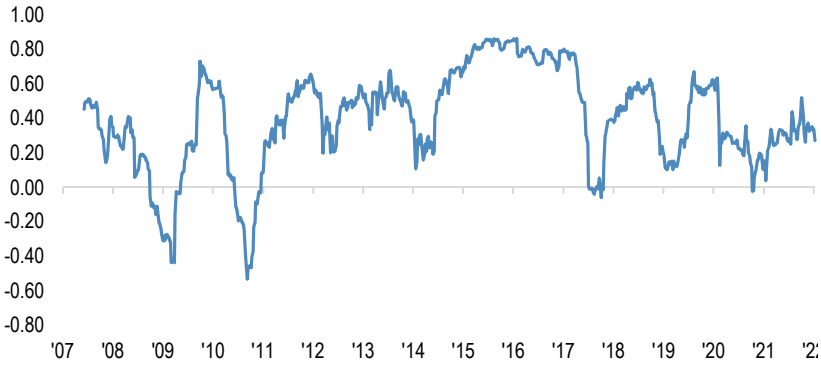
Figure 25: Growth vs. Momentum correlation



Source: Bloomberg Finance L.P., J.P. Morgan Quantitative Derivatives Strategy

- **Growth and Quality** Since 2011, Growth and Quality have always been positively correlated. This relationship also appears to be impacted by global interest rates, considering that there is a steep correlation decline when rates rise. Thus, one would expect this correlation (which has been lower since the onset of Covid-19) to decline even more now, considering that the Fed is moving to hike rates.

Figure 26: Growth vs. Quality correlation



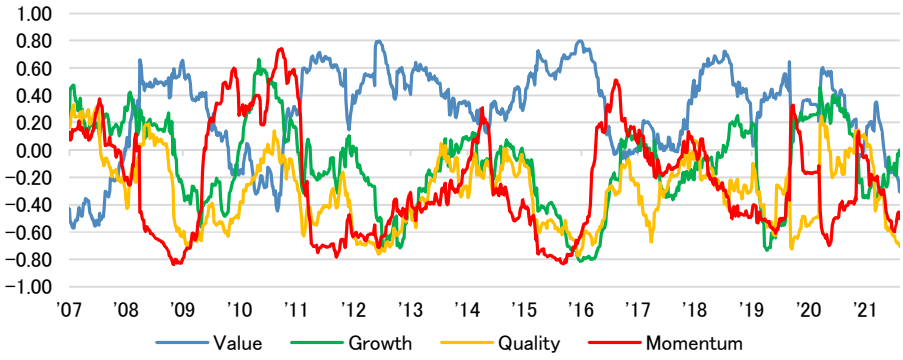
Source: Bloomberg Finance L.P., J.P. Morgan Quantitative Derivatives Strategy

- **Low-Vol and High-Beta** are negatively correlated while Low-Vol and Momentum are positively correlated. **Value** and **Low-Vol** are positively correlated, which is not a common relationship, thus one should expect a reversal.

MSCI LatAm vs Factor Correlation

Below we look at how factors correlate with the MSCI LatAm. The analysis is most useful to determine which factor has the highest or lowest beta to the index. Before the GFC, there was no clear factor differentiation, as all appear to have more or less the same correlation with the MSCI LatAm. Thus, this was not an interesting method to maximize portfolio performance in a higher risk/higher return strategy. The story changes in 2008. **Value became more correlated to the index, while all other factors presented the same negative correlation trend with the index**.

Figure 27: Factor correlation vs MSCI LatAm

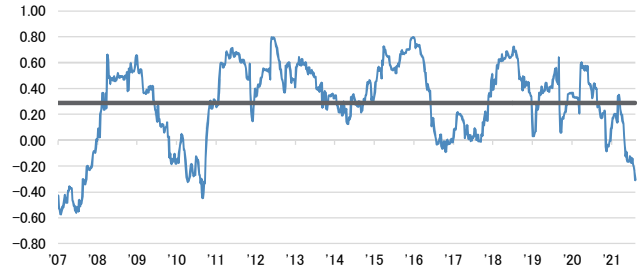


Source: Bloomberg Finance L.P., J.P. Morgan Quantitative Derivatives Strategy

- The **positive correlation between Value and the index** might be because the MSCI LatAm is highly tilted towards Value sectors. Currently, 37% of the index is made of commodities. An additional 24% is financials. Thus, all in all, one would have to see all the other less cyclical sectors outperform commodities and financials to reduce the correlation between Value and the index. Indeed, it is the high concentration of Value in the index that makes LatAm an interesting market to invest in during reflation. Having said that, at the end of 2021 the correlation between Value and the MSCI LatAm reached the lowest level since 2010, with Value posting a strong performance of +30% in 2021 and the MSCI falling by

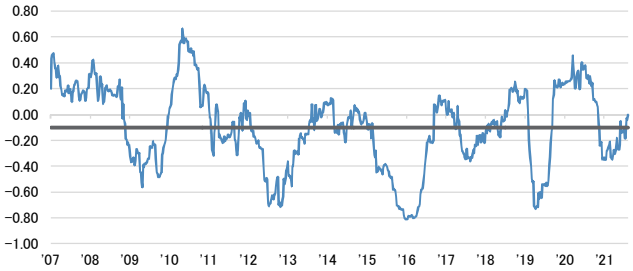
10%. **Our view is that the MSCI LatAm is likely to lift off along with Value, thus reestablishing the positive correlation between Value and the index.**

Figure 28: Value vs MSCI LatAm (Gray line = 15yr average)



Source: Bloomberg Finance L.P., J.P. Morgan Quantitative Derivatives Strategy

Figure 29: Growth vs MSCI LatAm (Gray line = 15yr average)

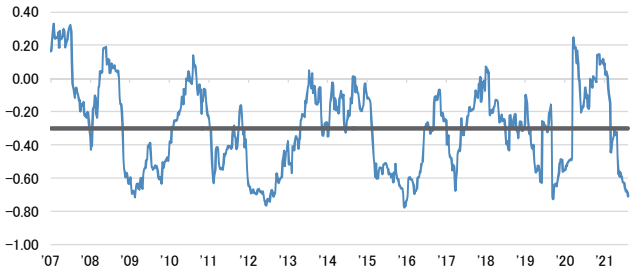


Source: Bloomberg Finance L.P., J.P. Morgan Quantitative Derivatives Strategy

Figure 30: Momentum vs MSCI LatAm (Gray line = 15yr average)

Source: Bloomberg Finance L.P., J.P. Morgan Quantitative Derivatives Strategy

Figure 31: Quality vs MSCI LatAm (Gray line = 15yr average)

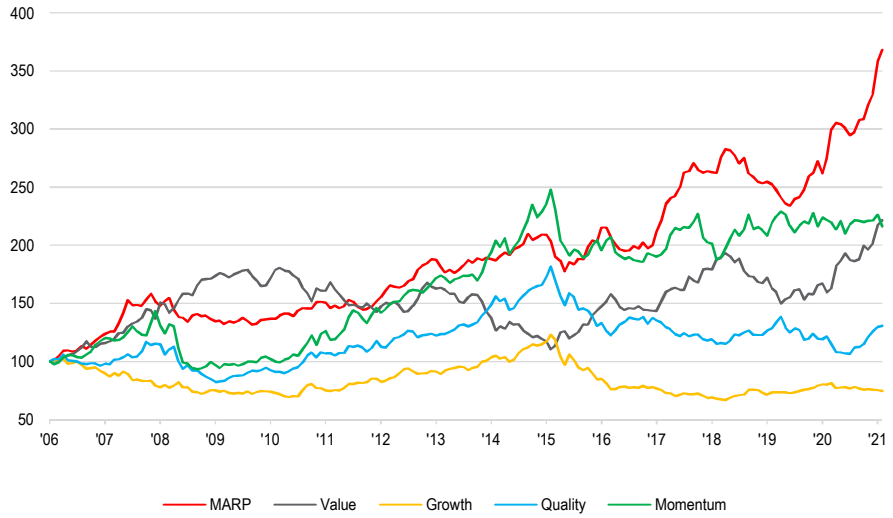


Source: Bloomberg Finance L.P., J.P. Morgan Quantitative Derivatives Strategy

Long-Term Performance

We look into performance of each of the analyzed factors for the past 15 years (100 = 12/29/2006). The strategy is long-short, cash neutral. During the commodity boom that lasted from 2003 until the global financial crisis, Value was the best performing factor. Since then, it did well in 2016, 2018 and 2021. Growth has struggled because the very low growth observed since 2015 has made it difficult for earnings to multiply. Quality has done very well in times of stress, such as in 2015, when Brazil lost investment grade rating and a political crisis that peaked with the impeachment of President Dilma Rousseff was under way. Momentum is the second top performer factor with consistent gains after the GFC and the most stable performance in the last few years. Lastly, we look into MARP (Momentum at a Reasonable Price), a combination of Value and Momentum which is turns out to be by far the outperformer in LatAm.

Figure 32: Factor Cumulative Performance Index, Long-Short, Cash Neutral, Tercile Portfolios for MSCI LatAm (12/29/2006 = 100)



Source: Bloomberg Finance L.P., J.P. Morgan Quantitative Derivatives Strategy

Table 24: Factors performance table (y/y)

	Value	Growth	Quality	Momentum	Low Vol	High Beta	Size	MSCI	MARP
2007	16%	-10%	-2%	20%	5%	-2%	6%	27%	24%
2008	30%	-13%	17%	9%	32%	-15%	4%	-47%	20%
2009	15%	-4%	-28%	-26%	-33%	46%	-17%	110%	-9%
2010	-1%	-1%	12%	5%	21%	-10%	-9%	25%	2%
2011	-6%	1%	16%	24%	34%	-21%	-3%	-16%	10%
2012	-8%	10%	5%	12%	-3%	-8%	-2%	15%	3%
2013	10%	11%	8%	21%	-4%	-4%	-2%	-13%	21%
2014	-16%	14%	22%	13%	19%	-11%	5%	-12%	0%
2015	-15%	13%	16%	22%	30%	-14%	3%	-30%	11%
2016	26%	-27%	-23%	-17%	-42%	36%	-13%	35%	3%
2017	-3%	-10%	2%	-3%	-10%	11%	3%	24%	-2%
2018	25%	-10%	-12%	6%	-27%	22%	-15%	-5%	24%
2019	-4%	4%	6%	4%	-23%	15%	0%	17%	-3%
2020	-3%	12%	-6%	8%	-23%	12%	11%	-14%	3%
2021	30%	-6%	9%	1%	26%	-2%	-7%	-10%	37%
2007-2021	117%	-25%	30%	126%	-38%	36%	-33%	31%	259%

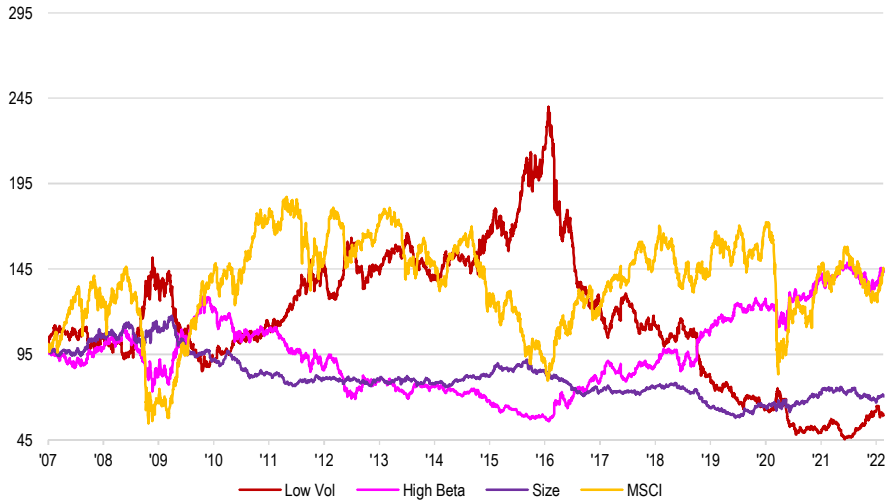
Source: Bloomberg Finance L.P., J.P. Morgan Quantitative Derivatives Strategy

- **In Latin America, Momentum and Value are the two factors that have the best performance from 2007 onwards.** Given this outcome we decided to try a combination of both styles: Momentum at a Reasonable Price (MARP) which turns out to be the best factor in the region, registering gains of 259% since 2007. There were only three periods in which returns were negative (single digits), which is 2009, 2017 and 2019. Last year posted the highest gain of 37% over the period we analyze.
- **Momentum** gained 126% since 2007, posting only 3 negative yearly performances, notably in 2009 (post-GFC), and in 2016 and 2017, when the MSCI LatAm had two stellar years, mostly Value driven. Momentum is negatively correlated with Value, thus usually positive years for one translates into negative years for the other. That was clearly the case in 2021.
- **Value** gained 117% from 2007 to December 2021, even though it recorded negative returns in 8 of the 15 years period under analysis. Value had a stellar

performance (30%) in both 2008 and 2021. In 2021, the reopening from the Covid-19 pandemic along with record liquidity coming from both fiscal and monetary easing globally has allowed Value to gain on the back of higher commodity prices. Not only that, but as our global strategists extensively wrote, the performance and valuation gap between Value and Growth were the largest since the beginning of the century (see Figure 20).

- **Growth has the worst performance in LatAm:** Since 2007, Growth has declined by 25%, the only one of the four major factors analyzed to have a negative performance. It is interesting to note that Latin America has not produced above potential economic growth since 2014 and it has impeded the Growth factor to post positive performances in several years since then (2016, 2017, 2018 and 2021).
- **Quality** increased by 30%, similar to the index performance over the past 15 years. During that time, it only had 5 periods of negative results. Quality was the second best performer in 2021, perhaps as investors hedged their exposure to Value. It could also be that over the past couple of years, the strong free cash flow positions of Value companies have led some of them to enter into the Quality bucket.

Figure 33: Low-Vol High-Beta-Size



Source: Bloomberg Finance L.P., J.P. Morgan Quantitative Derivatives Strategy

Beyond the factors analyzed above, we also look into Low-Vol, High-Beta and Size, because they could fit well with the index characteristics in LatAm: Low-Vol seeks to overweight stocks that have Low-Volatility and short those with high volatility. Size is to overweight large caps and short the smallest caps and High-Beta is a strategy to overweight those stocks that are higher beta and go short on the low beta names.

- **High-Beta** has a very similar performance to the index, which makes sense considering that the index itself is mostly composed of higher beta companies. Relative to EM, Brazil is one of the highest beta markets (1.5). Over the past 15 years, High-Beta gained 36%. **Size and Low-Vol** fell by 33% and 38%, respectively, since 2007. Both are the two worst performing factors in the region. It is interesting however to note that Low-Vol did extremely well in 2021, up by 26%, the second best performing factor.

Sensitivity Analysis to Macro Variables

We look into the correlation of the four factors analyzed versus macro variables to better understand in what circumnstaces one factor does better than others. We analysed the following:

- **Broad Dollar:** We take periods when the Broad USD appreciated or depreciated by more than 5% since 2007. We found 6 periods of dollar depreciation and 9 periods of appreciation.
- **Commodities:** We take periods when commodities (BCOM index) gained or lost 10% since 2007. We found 15 periods of commodity rally, of which 8 during 2008-2010 and 5 during 2020-2021. We found 10 periods of commodity selloff.
- **10 Year Treasury:** We look into periods when the US 10y Treasury gained or lost more than 50bp. We found 7 periods of declines and 10 periods of increases since 2007

The exercise confirmed the intuition that investors already have regarding factor behavior: **Value is the best performer in periods of weaker broad USD, higher commodity prices and rising bond yields. On the same token, Value underperforms all other factors when variables go in the opposite direction.**

Table 25: Summary of average performance during periods analyzed

	Broad USD		Commodities Future Prices		10YR Treasury	
	Rise	*Fall*	*Rise*	*Fall*	*Rise*	*Fall*
Value	-5.2%	4.5%	3.6%	-6.0%	8.7%	-3.3%
Growth	9.4%	-5.8%	-2.6%	7.5%	5.3%	7.0%
Quality	2.4%	-2.5%	-0.7%	-2.5%	-1.3%	3.2%
Momentum	4.1%	-6.0%	-4.5%	-6.0%	-5.2%	5.8%

Source: Bloomberg Finance L.P., J.P. Morgan Quantitative Derivatives Strategy. . Note: Methodology is Long-Short portfolios based on 3 n-tiles of MSCI LatAm. Portfolios are Equal Weighted and Cash Neutral.

- **All factors have negative performance during periods of Broad USD appreciation, but Quality is the one that has the least negative one**, falling on average 0.9%. The same is true in period of commodity price declines, with Quality having the least bad performance among factors.
- **Value is the top performer when US 10y Treasury rises**, followed by Growth. Momentum is the worst performer. This is important because we think that Fed liftoffs don't necessarily damage the Value/risk trade, as many seem to think.
- Interesting is that **Growth has a positive performance during periods of both rising and falling UST. Quality and Momentum have a negative performance in both.** Value is negatively correlated to all factors and this is very clear when looking into Broad USD effects. For commodity prices, when they decrease, Growth is the only one to register positive returns while Momentum and Quality both underperform together with Value.
- **Sector wise**, on average, the conclusion is pretty straightforward: At times of weak USD, high commodity prices and rising bond yields both **Materials** and

Energy tend to over perform other sectors. Financials also do well in periods of weak USD. The conclusion is also valid for the underperformance of commodity sectors at times of strong dollar, falling commodity prices and falling bond yields, with the interesting underperformance of real estate also.

Table 26: Factors and sectors performance during periods of "rally" for the macro variables analyzed

	Value	Quality	Momentum	Growth	MSCI LatAm	Energy	Materials	Industrials	Inf. Tech	Real Estate	Financials	Discretionary	Staples	Healthcare	Utilties	Telecom
Commodities	4%	-1%	-5%	-3%	21%	1%	10%	-1%	4%	-6%	0%	0%	-1%	4%	-2%	-6%
Broad USD Appreciation	-5%	2%	4%	9%	-13%	-9%	2%	-1%	-6%	-9%	1%	-1%	1%	-2%	0%	3%
10yr Treasury	9%	-1%	-5%	5%	3%	8%	23%	1%	-8%	-14%	0%	-9%	-3%	-10%	-6%	-3%

Source: Bloomberg Finance L.P., J.P. Morgan Quantitative Derivatives Strategy. . Note: Methodology is Long-Short portfolios based on 3 n-tiles of MSCI LatAm. Portfolios are Equal Weighted and Cash Neutral.

Table 27: Factors and sectors performance during periods of "sell-off" for the variables analyzed

	Value	Quality	Momentum	Growth	MSCI LatAm	Energy	Materials	Industrials	Inf. Tech	Real Estate	Financials	Discretionary	Staples	Healthcare	Utilties	Telecom
Commodities	-6%	4%	5%	7%	-19%	-15%	-3%	4%	2%	-14%	-2%	-4%	8%	-2%	2%	8%
Broad USD Depreciation	5%	-2%	-6%	-6%	31%	10%	4%	-5%	-7%	-1%	4%	-4%	-5%	7%	-4%	-3%
10yr Treasury	-3%	3%	6%	7%	-6%	-13%	-7%	-1%	-1%	-2%	-1%	-4%	5%	-6%	7%	-2%

Source: Bloomberg Finance L.P., J.P. Morgan Quantitative Derivatives Strategy. . Note: Methodology is Long-Short portfolios based on 3 n-tiles of MSCI LatAm. Portfolios are Equal Weighted and Cash Neutral.

ANNEX

Glossary for performance metrics in the Table 6 and description for the Momentum factors analyzed in that section.

- **Information Ratio**: A measure that aims to capture the potential return of an underlying per unit of risk. It is calculated as the return of an underlying above the returns of a benchmark divided by its volatility.
- **Volatility**: Volatility usually refers to the standard deviation of the returns of a financial instrument within a specific time horizon. It is a widely used measure to express the risk of the financial instrument over the specified time period. Volatility is normally expressed in annualized terms as a percentage. For example, emerging market equities historically exhibit high volatility. On the other hand, short-term treasury bills would be classified as an asset with Low Volatility.
- **Annualized Return**: An annualized rate of return is the return on an underlying converted into an annual equivalent. For example, a 1-month return of 1% could be stated as an annualized rate of return of 12%. Or a five-year return of 10% could be stated as an annualized rate of return of 2%.
- **Maximum Drawdown**: It is the maximum loss observed from a peak to a trough of a stock, portfolio or strategy before a new peak is achieved. The Higher the drawdown indicates that the losses from the investment were small. The worst maximum drawdown would be -100%.

Momentum factor variations:

- **6M Momentum:** The 6 months Price Momentum factor is calculated by ranking stocks by their total return over the previous 6 months. Highest momentum stocks are allocated to the top portfolio.
- **9M Momentum:** The 9 months Price Momentum factor is calculated by ranking stocks by their total return over the previous 9 months. Highest momentum stocks are allocated to the top portfolio.
- **12M Momentum:** The 12 months Price Momentum factor is calculated by ranking stocks by their total return over the previous 12 months. Highest momentum stocks are allocated to the top portfolio.
- **12M Momentum (Adj 1M Reversal):** The 12 months Price Momentum factor is calculated by ranking stocks by their total return over the previous 12 months excluding the last month. Highest momentum stocks are allocated to the top portfolio. Same logic as above applies for excluding the last month from calculations.
- **Vol Adj. Abs. 12M Momentum:** The volatility adjusted absolute 12 months Price Momentum factor is calculated by ranking stocks by absolute value of their total return over the previous 12 months scaled by 3-month volatility. Highest volatility adjusted absolute momentum stocks are allocated to the top portfolio.

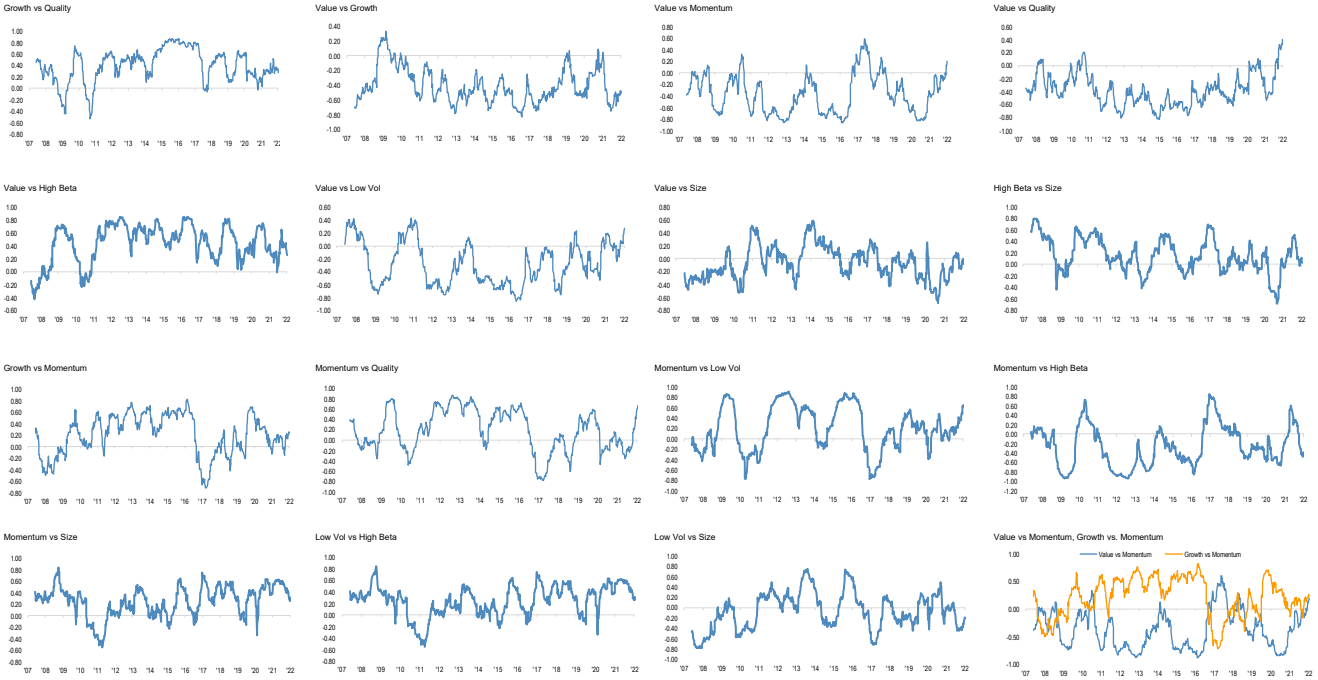
Factor Performance

Table 28: Factor League Table

	Best	2nd Best
2007	Momentum	Value
2008	Low-Vol	Value
2009	High Beta	Value
2010	Low-Vol	Quality
2011	Low-Vol	Momentum
2012	Momentum	Growth
2013	Momentum	MARP
2014	Quality	Low-Vol
2015	Low-Vol	Momentum
2016	High-Beta	Value
2017	High-beta	Size
2018	Value	MARP
2019	High-Beta	Momentum
2020	Growth	Growth
2021	MARP	Low-Vol

Source: Bloomberg Finance L.P.; J.P. Morgan Quantitative and Derivative Strategy

Factor Correlation Charts



Source: Bloomberg Finance L.P., J.P. Morgan Quantitative Derivatives Strategy.

Detailing of the Macro/ Factor Analysis

Broad Dollar

We looked at periods when the Broad USD weakened or strengthened more than 5%.

Table 29: Broad USD Depreciation (Sell-off)

		Length	Price Begin	Price End	Change	Value	Growth	Quality	Momentum	EN	MT	ID	IT	RE	FN	CD	CS	HC	UT	TC
3/6/2009	6/12/2009	96	111.7	102.8	-7.9%	16%	-5%	-17%	-30%	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
8/27/2010	11/5/2010	68	101.3	96.1	-5.2%	-5%	4%	0%	4%	-8%	5%	2%	-21%	NA	5%	5%	2%	NA	-7%	6%
12/17/2010	4/29/2011	132	98.4	92.4	-6.1%	3%	-5%	0%	1%	0%	-9%	1%	10%	NA	-4%	-6%	2%	3%	3%	1%
1/22/2016	4/29/2016	97	122.1	115.4	-5.5%	14%	-21%	-18%	-20%	55%	17%	-19%	-1%	NA	12%	-18%	-21%	-6%	-9%	-28%
4/7/2017	9/8/2017	151	122.0	114.2	-6.3%	-3%	0%	6%	-3%	-9%	3%	-4%	-19%	-1%	4%	3%	-3%	24%	-4%	10%
6/26/2020	1/8/2021	192	127.6	117.8	-7.7%	2%	12%	-8%	13%	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Average		123			-6.0%	5%	-2%	-6%	-6%	10%	4%	-5%	-7%	-1%	4%	-4%	-5%	7%	-4%	-3%

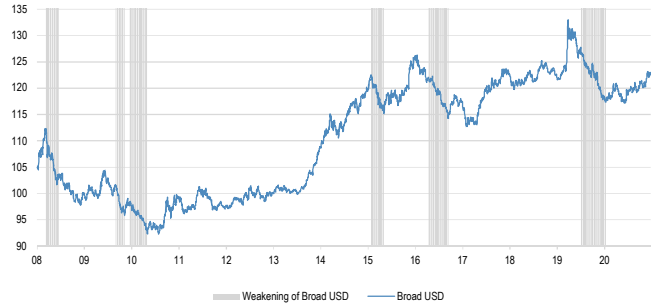
Source: Bloomberg Finance L.P., J.P. Morgan Quantitative Derivatives Strategy. Note: for sector returns, we are using excess of market returns versus the MSCI LatAm. . Note: Methodology is Long-Short portfolios based on 3 n-tiles of MSCI LatAm. Portfolios are Equal Weighted and Cash Neutral.

Table 30: Broad USD Appreciation (Rally)

		Length	Price Begin	Price End	Change	Value	Growth	Quality	Momentum	EN	MT	ID	IT	RE	FN	CD	CS	HC	UT	TC
7/18/2008	9/12/2008	54	93.2	98.5	5.7%	1%	1%	8%	-5%	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
9/26/2008	10/24/2008	28	97.8	107.9	10.3%	0%	-3%	-2%	9%	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
12/19/2008	3/6/2009	77	104.3	111.7	7.0%	-6%	0%	-2%	3%	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
8/19/2011	9/30/2011	41	93.6	98.5	5.3%	-4%	3%	5%	6%	-3%	-1%	1%	9%	NA	4%	-3%	4%	2%	1%	5%
10/17/2014	1/30/2015	103	103.7	111.9	7.9%	-21%	10%	14%	18%	-32%	-7%	1%	9%	NA	-1%	5%	9%	4%	3%	5%
10/16/2015	1/22/2016	96	115.4	122.1	5.8%	-11%	10%	14%	11%	-14%	-15%	3%	0%	NA	1%	7%	5%	1%	6%	-1%
9/30/2016	1/6/2017	96	118.6	125.5	5.8%	13%	-11%	-9%	3%	12%	20%	-7%	-16%	-11%	7%	-11%	-14%	1%	-2%	8%
3/30/2018	9/7/2018	157	113.3	121.3	7.0%	3%	-2%	-3%	7%	-9%	14%	0%	-29%	-8%	-9%	-3%	0%	-19%	-11%	-3%
1/17/2020	4/24/2020	97	121.7	131.3	8.0%	-12%	4%	4%	10%	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Average		98			6.6%	-5%	2%	4%	9%	-9%	2%	-1%	-6%	-9%	1%	-1%	1%	-2%	0%	3%

Source: Bloomberg Finance L.P., J.P. Morgan Quantitative Derivatives Strategy. Note: for sector returns, we are using excess of market returns versus the MSCI LatAm. . Note: Methodology is Long-Short portfolios based on 3 n-tiles of MSCI LatAm. Portfolios are Equal Weighted and Cash Neutral.

Figure 34: Broad Dollar (gray bars are periods analyzed = depreciation of more than 5%)



Source: Bloomberg Finance L.P., J.P. Morgan Quantitative Derivatives Strategy

Figure 35: Broad Dollar (gray bars are periods analyzed = appreciation of more than 5%)

Source: Bloomberg Finance L.P., J.P. Morgan Quantitative Derivatives Strategy

Commodities

We look into periods when commodities future prices increased or decreased by +10%. Important to note that as commodities are positively correlated to the Broad USD, the outcomes in terms of best or worst factor performers are also similar.

Table 31: Commodities rally

		Length	Price Begin	Price End	Change	Value	Growth	Quality	Momentum	EN	MT	ID	IT	RE	FN	CD	CS	HC	UT	TC
8/17/2007	1/11/2008	147	164.2	190.2	15.8%	2%	-11%	-2%	17%	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1/25/2008	4/18/2008	84	187.7	214.3	14.2%	9%	2%	5%	1%	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
5/2/2008	7/4/2008	63	208.1	237.8	14.3%	5%	-12%	0%	8%	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
12/5/2008	1/2/2009	28	106.1	119.8	12.9%	11%	-4%	-2%	-15%	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2/20/2009	6/12/2009	112	102.9	128.9	25.3%	8%	-4%	-12%	-25%	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
7/10/2009	10/23/2009	105	114.0	137.3	20.5%	10%	-9%	-11%	-1%	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
8/20/2010	11/5/2010	77	131.4	153.2	16.6%	-6%	3%	1%	4%	-7%	3%	2%	-20%	NA	5%	2%	1%	NA	-5%	1%
11/19/2010	6/3/2011	196	145.1	165.9	14.3%	6%	-5%	1%	4%	-6%	-9%	-1%	12%	NA	-9%	-6%	4%	NA	7%	-9%
6/22/2012	7/20/2012	28	128.3	146.2	14.0%	-1%	2%	2%	4%	-6%	-1%	0%	5%	NA	2%	1%	2%	-5%	1%	2%
4/1/2016	6/10/2016	70	77.9	88.9	14.1%	-2%	2%	0%	-6%	5%	-2%	-3%	12%	NA	-1%	-1%	-1%	10%	1%	-17%
4/24/2020	8/28/2020	126	60.2	73.1	21.4%	5%	1%	-9%	-6%	16%	19%	9%	26%	-24%	-2%	26%	-15%	6%	-8%	-13%
10/2/2020	3/12/2021	161	69.8	86.0	23.1%	10%	3%	-9%	1%	2%	47%	-9%	-11%	13%	2%	-23%	0%	2%	-10%	-10%
4/2/2021	5/7/2021	35	83.8	93.7	11.8%	3%	1%	-3%	3%	2%	11%	-2%	2%	-6%	0%	2%	0%	6%	-2%	3%
5/21/2021	10/15/2021	147	90.9	104.7	15.2%	1%	-2%	7%	2%	18%	-10%	11%	39%	-10%	-3%	-17%	5%	-9%	-1%	18%
12/3/2021	2/18/2022	77	95.8	111.6	16.5%	8%	0%	3%	-1%	13%	6%	-4%	3%	9%	8%	-6%	-3%	5%	-5%	-9%
Average		101			17.9%	4%	-1%	-5%	-3%	1%	10%	-1%	4%	-6%	0%	0%	-1%	4%	-2%	-6%

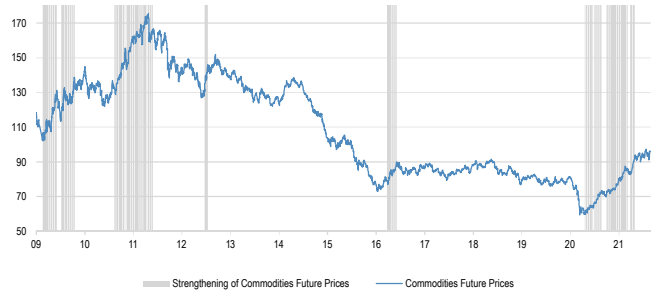
Source: Bloomberg Finance L.P., J.P. Morgan Quantitative Derivatives Strategy. Note: for sector returns, we are using excess of market returns versus the MSCI LatAm. . Note: Methodology is Long-Short portfolios based on 3 n-tiles of MSCI LatAm. Portfolios are Equal Weighted and Cash Neutral.

Table 32: Commodities selloff

		Length	Price Begin	Price End	Change	Value	Growth	Quality	Momentum	EN	MT	ID	IT	RE	FN	CD	CS	HC	UT	TC
7/4/2008	11/21/2008	137	237.8	117.7	-50.5%	4%	-6%	10%	16%	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1/2/2009	3/6/2009	64	119.8	105.8	-11.7%	-10%	2%	-1%	7%	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
6/12/2009	7/10/2009	28	128.9	114.0	-11.6%	-1%	5%	2%	3%	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1/8/2010	2/5/2010	27	142.4	126.6	-11.1%	0%	1%	4%	1%	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4/23/2010	6/4/2010	41	136.1	122.0	-10.3%	1%	1%	3%	-2%	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
9/2/2011	9/30/2011	28	162.5	140.2	-13.7%	-3%	0%	2%	5%	0%	-1%	1%	9%	NA	1%	-5%	6%	4%	3%	5%
2/24/2012	6/22/2012	118	149.4	128.3	-14.1%	-9%	6%	4%	17%	-16%	-5%	6%	5%	NA	-6%	-12%	8%	-3%	3%	15%
6/20/2014	1/30/2015	220	136.6	100.8	-26.2%	-16%	10%	17%	17%	-29%	-8%	3%	-1%	NA	4%	4%	11%	1%	2%	24%
7/3/2015	12/18/2015	165	101.9	77.5	-24.0%	-8%	9%	12%	14%	-18%	-6%	13%	-13%	NA	-4%	-6%	8%	-15%	-2%	-6%
2/21/2020	4/24/2020	63	76.3	60.2	-21.0%	-7%	1%	1%	5%	-14%	7%	-6%	11%	-14%	-7%	-3%	6%	4%	4%	2%
Average		84			-16.0%	-6%	4%	5%	7%	-15%	-3%	4%	2%	-14%	-2%	-4%	8%	-2%	2%	8%

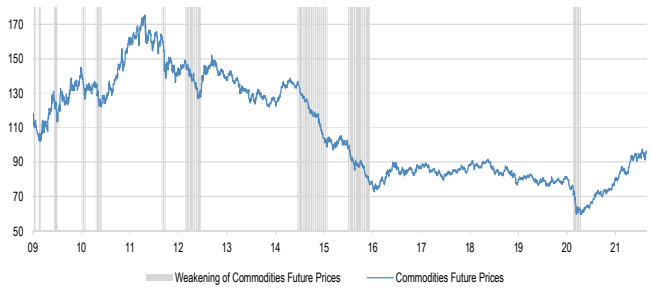
Source: Bloomberg Finance L.P., J.P. Morgan Quantitative Derivatives Strategy. Note: for sector returns, we are using excess of market returns versus the MSCI LatAm. . Note: Methodology is Long-Short portfolios based on 3 n-tiles of MSCI LatAm. Portfolios are Equal Weighted and Cash Neutral.

Figure 36: Bloomberg Commodity Futures Index (Gray bars are period of rally at least +10% upward variation)



Source: Bloomberg Finance L.P., J.P. Morgan Quantitative Derivatives Strategy

Figure 37: Bloomberg Commodity Futures Index (Gray bars are period of rally at least -10% downward variation)



Source: Bloomberg Finance L.P., J.P. Morgan Quantitative Derivatives Strategy

US 10yr Treasury

We looked into the impact of selloffs and rallies caused by a change greater than 50bps into US 10yr Treasury.

Table 33: 10-Y Treasury Fall

		Length	Price Begin	Price End	Change	Value	Growth	Quality	Momentum	EN	MT	ID	IT	RE	FN	CD	CS	HC	UT	TC
10/31/2008	12/31/2008	60	4.0%	2.2%	174	5%	-7%	0%	-2%	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
3/31/2010	8/31/2010	150	3.8%	2.5%	136	1%	-1%	7%	3%	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
3/31/2011	1/31/2012	300	3.5%	1.8%	167	-6%	7%	19%	17%	-10%	-8%	-2%	36%	NA	-4%	-2%	15%	-9%	4%	-9%
3/30/2012	7/31/2012	120	2.2%	1.5%	74	-6%	9%	6%	15%	-14%	-5%	4%	7%	NA	0%	-6%	4%	-6%	3%	11%
12/31/2015	2/29/2016	59	2.3%	1.7%	53	-3%	1%	-2%	-2%	-10%	-5%	-3%	-7%	NA	1%	-3%	-1%	-3%	5%	-2%
10/31/2018	6/28/2019	238	3.1%	2.0%	114	5%	1%	3%	1%	-17%	-21%	1%	-58%	8%	7%	-10%	2%	-13%	17%	-16%
12/31/2019	4/30/2020	120	1.9%	0.6%	128	-11%	3%	2%	9%	-14%	4%	-4%	19%	-12%	-9%	-1%	6%	0%	4%	8%
Average		165			112	-3%	3%	6%	7%	-13%	-7%	-1%	-1%	-2%	-1%	-4%	5%	-6%	7%	-2%

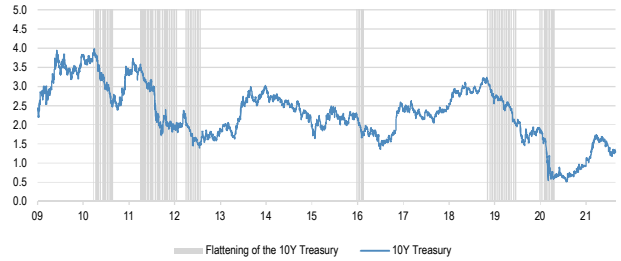
Source: Bloomberg Finance L.P., J.P. Morgan Quantitative Derivatives Strategy. Note: for sector returns, we are using excess of market returns versus the MSCI LatAm. . Note: Methodology is Long-Short portfolios based on 3 n-tiles of MSCI LatAm. Portfolios are Equal Weighted and Cash Neutral.

Table 34: 10-Y Treasury Rise

		Length	Price Begin	Price End	Change	Value	Growth	Quality	Momentum	EN	MT	ID	IT	RE	FN	CD	CS	HC	UT	TC
3/31/2008	5/30/2008	60	3.4%	4.1%	-65	5%	2%	4%	6%	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
12/31/2008	6/30/2009	180	2.2%	3.5%	-132	5%	0%	-16%	-25%	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
9/30/2009	3/31/2010	180	3.3%	3.8%	-52	1%	1%	-4%	3%	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
8/31/2010	3/31/2011	210	2.5%	3.5%	-100	3%	-3%	-2%	2%	0%	3%	2%	-11%	NA	-4%	-7%	6%	NA	0%	11%
4/30/2013	8/30/2013	120	1.7%	2.8%	-111	4%	0%	0%	6%	-7%	1%	2%	9%	NA	-2%	3%	1%	2%	-4%	5%
1/30/2015	12/31/2015	330	1.6%	2.3%	-63	-8%	12%	11%	16%	-8%	-6%	8%	-5%	NA	-6%	3%	11%	-27%	1%	-8%
7/29/2016	1/31/2017	182	1.5%	2.5%	-100	21%	-15%	-13%	5%	14%	36%	-9%	-29%	NA	10%	-12%	-13%	-4%	-7%	5%
8/31/2017	10/31/2018	420	2.1%	3.1%	-103	21%	-9%	-12%	11%	55%	14%	-6%	-38%	-21%	8%	-18%	-13%	-20%	-9%	-13%
4/30/2020	3/31/2021	330	0.6%	1.7%	-110	19%	5%	-16%	-6%	-4%	87%	6%	27%	-7%	-6%	-24%	-8%	0%	-19%	-20%
7/30/2021	1/31/2022	180	1.2%	1.8%	-55	19%	-5%	17%	-2%	35%	-9%	0%	7%	-1%	5%	-36%	-2%	-14%	1%	14%
Average		253			-91	9%	-1%	-5%	5%	8%	23%	1%	-8%	-14%	0%	-9%	-3%	-10%	-6%	-3%

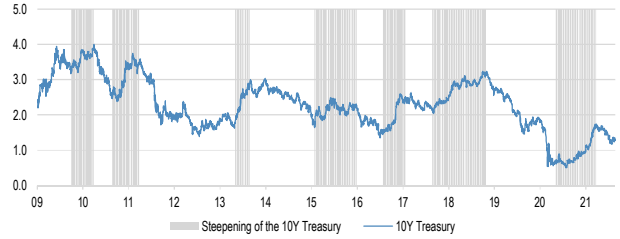
Source: Bloomberg Finance L.P., J.P. Morgan Quantitative Derivatives Strategy. Note: for sector returns, we are using excess of market returns versus the MSCI LatAm. . Note: Methodology is Long-Short portfolios based on 3 n-tiles of MSCI LatAm. Portfolios are Equal Weighted and Cash Neutral.

Figure 38: 10Y Treasury (gray bars are periods of a flattening of at least 50bps)



Source: Bloomberg Finance L.P., J.P. Morgan Quantitative Derivatives Strategy

Figure 39: 10Y Treasury (gray bars are periods of a steepening of at least 50bps)



Source: Bloomberg Finance L.P., J.P. Morgan Quantitative Derivatives Strategy

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