NORTHERN TRUST
ASSET MANAGEMENT

RESEARCH INSIGHTS

FOUNDATIONS IN FACTORS: EMERGING MARKETS

JIM JOHNSON, CFA
Senior Quantitative Strategist

MATT CONNELLY
Quantitative Strategist, Analyst

SEPTEMBER 2022

Most institutional investors have allocated a portion of their portfolio to Emerging Markets, seeking additional return and diversification, and with good reason. Emerging Markets (EM) have provided a diversified source of returns for decades. (see **Exhibits 1A and 1B**). In seeking the best outcomes in the space, many investors have gravitated towards either passive options or towards more concentrated fundamental portfolios. However, one powerful source of potential returns in the space that is often overlooked is investing in compensated sources of risk, such as Value, Quality and Momentum factors.[1]

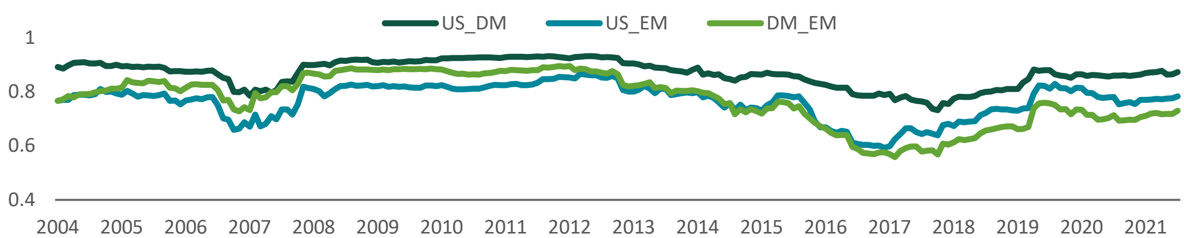
In this paper, we explore factor returns in Emerging Markets and show that implementing them in EM has provided a powerful source of alpha with low correlation to U.S. and Developed Markets (DM). These features make factors in EM worthy of investor consideration, helping them further diversify their portfolio in a challenging risk environment and possibly improving risk-adjusted returns. The goal of this paper is to provide investors with a solid foundation of knowledge in the emerging markets space, with a specific focus on implementing factor investing therein.

[1] For a broader discussion on factors, see Northern Trust's *Foundations in Factors* (Hunstad and Lehnherr [2019]).

EXHIBIT 1A: U.S., WORLD EX-US AND EM RETURNS (LOCAL RETURNS)

12/31/1999 - 6/30/2022	*US*	*Dev*	*EM*
Return (local)	6.49%	3.74%	8.10%
Risk	15.46%	13.82%	16.80%
Sharpe	0.32	0.16	0.39

EXHIBIT 1B: U.S., WORLD EX-US AND EM ROLLING 60-MONTH CORRELATIONS



Source: Northern Trust Asset Management, Bloomberg. Data from 1/1/2000 to 6/30/2022. Past performance is no guarantee of future results. Index performance returns do not reflect any management fees, transaction costs or expenses. It is not possible to invest directly in any index. Note: Russell 1000 Index: 12/31/1999 to 6/30/2022. MSCI World ex-US Index: 12/31/1999 to 6/30/2022. MSCI Emerging Markets Index: 12/31/1999 to 6/30/2022.

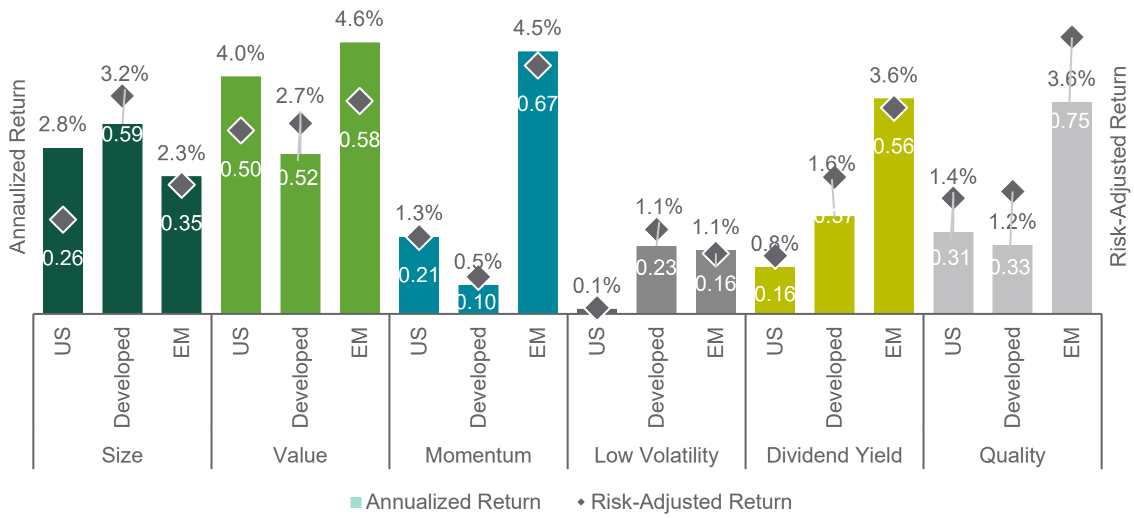
FACTORS IN EMERGING MARKETS

While Emerging Markets (EM) represent only 12 percent of the market cap of the MSCI All Country World Index, it accounts for roughly 40 percent of the World's GDP, making it hard to ignore. Style factors have been a consistent source of excess returns in EM, and generally provided higher factor returns in the U.S. and World ex-U.S. for over two decades[2]. As shown in **Exhibit 2**, the returns to Size, Value, Momentum, Low Volatility, Dividend Yield and Quality have produced strong positive returns on a relative and risk-adjusted basis in these markets. The returns shown are the cap-weighted average returns of the top quintile ranked stocks in each universe relative to the respective index, using our proprietary Northern Trust factor definitions, which control for region and sector biases.[3] In order to remove the effects of currency, all returns are viewed from a local market perspective.

[2] All of the analysis for this paper utilizes Russell 1000 for U.S. equities, MSCI World ex-U.S. for World Ex-U.S or Developed Markets., and MSCI Emerging Markets for Emerging Markets. Gross total return indexes were used.

[3] See *Factor Profiles* for more details on our approach to defining factors

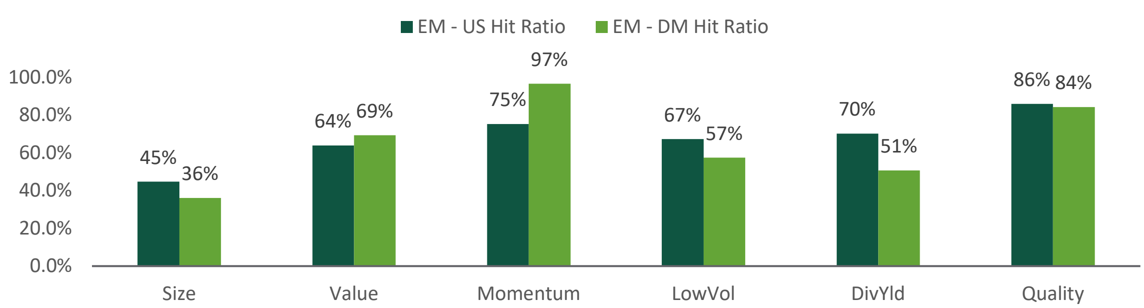
EXHIBIT 2: FACTOR RETURNS AND RISK-ADJUSTED RETURNS (LOCAL CURRENCY)



Source: Northern Trust Asset Management, Bloomberg. Data from 12/31/1999 to 6/30/2022. Past performance is no guarantee of future results. Index performance returns do not reflect any management fees, transaction costs or expenses. It is not possible to invest directly in any index. Note: Russell 1000 Index: 12/31/1999 to 6/30/2022. MSCI World ex-US Index: 12/31/1999 to 6/30/2022. MSCI Emerging Markets Index: 12/31/1999 to 6/30/2022.

The incremental returns from EM vs DM have been consistent over time as well. In **Exhibit 3**, we look at the factor returns in EM versus U.S. (Russell 1000) and EM versus Developed Markets (MSCI World ex-US) over a rolling 36-month hit ratio basis (percentage of periods where EM outperforms). With hit ratios far exceeding 50 percent in most cases, we can confirm that factor returns in EM have historically been consistently better than in the U.S. and DM.

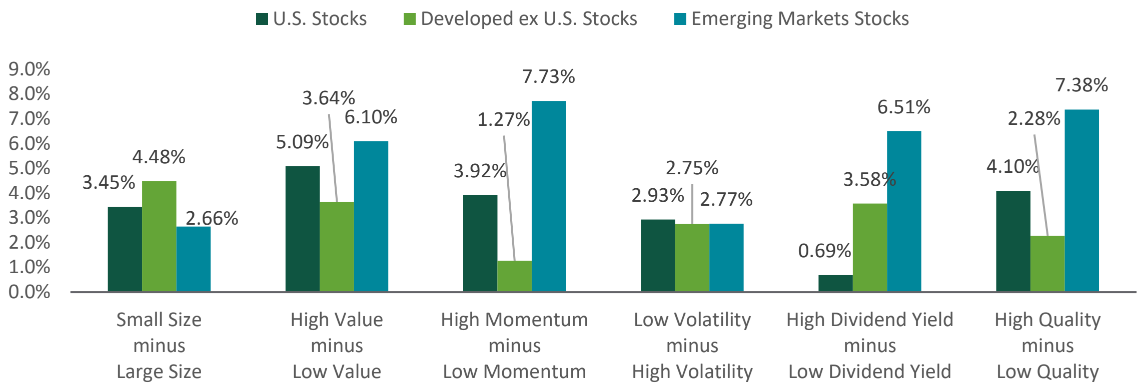
EXHIBIT 3: ROLLING 36-MONTH ANNUALIZED FACTOR COMPARISON EXCESS RETURN DIFFERENCE: HIT RATIOS



Source: Northern Trust Asset Management. Data as of 6/30/2022. This graph does not show actual performance results. For illustrative purposes only. Past performance is no guarantee of future results. Index performance returns do not reflect any management fees, transaction costs or expenses. Hit ratio is the number of positive-returning positions in the portfolio divided by the total number of positions. It is not possible to invest directly in any index. Note: Russell 1000 Index: 12/31/1999to 6/30/2022. MSCI World ex-US Index: 12/31/1999 to 6/30/2022. MSCI Emerging Markets Index: 12/31/1999to 6/30/2022.

Not only have the top ranked stocks been an attractive source of excess returns in EM, but the spread between top and bottom ranked stocks on a quintile basis have also been a superior source of excess returns (**Exhibit 4**), suggesting investors can benefit from both outer tails of the factor ranks across the entire investable universe.

EXHIBIT 4: Q1-Q5 FACTOR RETURNS

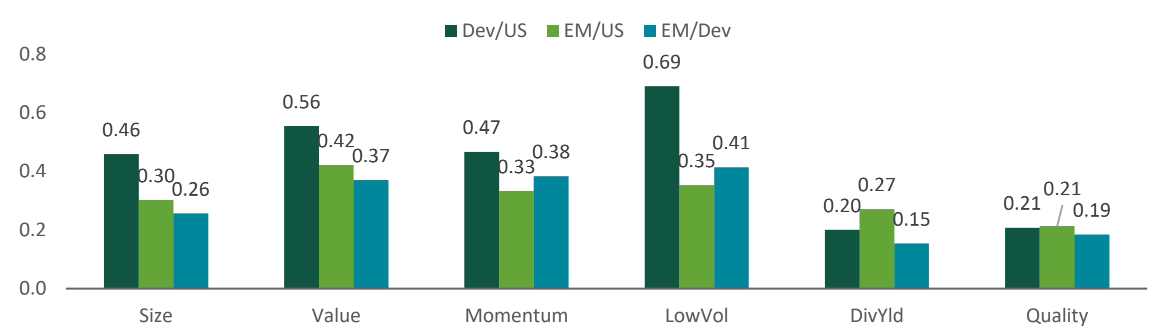


Source: Northern Trust Asset Management, Bloomberg. Data from 12/31/1999 to 6/30/2022. This graph does not show actual performance results. For illustrative purposes only. Past performance is no guarantee of future results. Index performance returns do not reflect any management fees, transaction costs or expenses. It is not possible to invest directly in any index. Note: Russell 1000 Index: 12/31/1999 to 6/30/2022. MSCI World ex-US Index: 12/31/1999 to 6/30/2022. MSCI Emerging Markets Index: 12/31/1999 to 6/30/2022.

CYCLICALITY DIFFERENCES CAN SMOOTH RETURNS AND REDUCE RISK

In addition to the potential for increased excess returns through factors in Emerging markets, gaining factor exposure can also provide improved diversification to overall equity holdings. Like markets generally, factor performance is cyclical, which means that factors can outperform or underperform for a sustained period of time. Interestingly, we find that while factors have been consistent sources of return across regions, they have not necessarily delivered their benefits at the same time. This is an additional layer of diversification from which investors can greatly benefit. We see this when we look at both factor correlations, and the tracking error, or degree of variability, of factor returns across regions. The correlation between factor returns, a key ingredient to better diversification, has been substantially lower for EM with either of the other markets, as illustrated in **Exhibit 5**. This highlights that while similarly defined factor returns by regions and market do move together in general, there have been meaningful ebbs and flows, again providing a powerful source of alpha diversification.

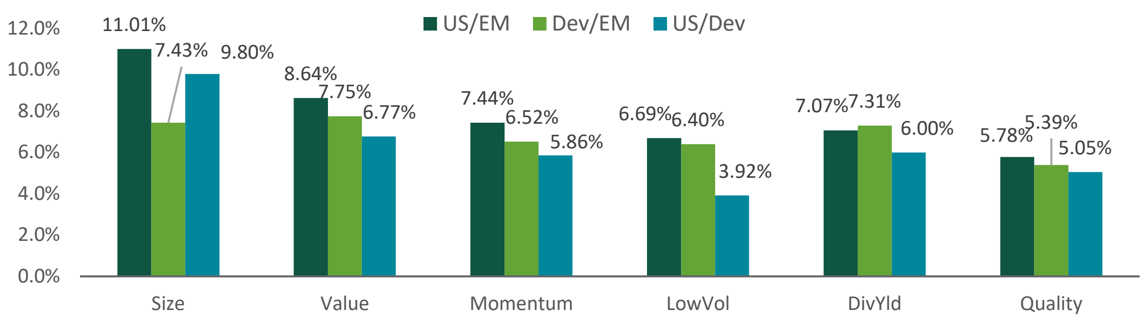
EXHIBIT 5: US, WORLD EX-US AND EMERGING MARKETS FACTOR RETURN CORRELATIONS



Source: Northern Trust Asset Management, Bloomberg. Data from 12/31/1999 to 6/30/2022. This graph does not show actual performance results. For illustrative purposes only. Past performance is no guarantee of future results. Index performance returns do not reflect any management fees, transaction costs or expenses. It is not possible to invest directly in any index. Note: Russell 1000 Index: 12/31/1999 to 6/30/2022. MSCI World ex-US Index: 12/31/1999 to 6/30/2022. MSCI Emerging Markets Index: 12/31/1999 to 6/30/2022.

We can also see the diversification benefits of factors in EM by looking at the tracking error between factor returns. **Exhibit 6** shows the higher tracking error between factor returns across markets, indicating again a different sort of cyclicality and movement in factor returns in EM.

EXHIBIT 6: TRACKING ERROR OF Q1 EXCESS RETURNS ACROSS MARKETS



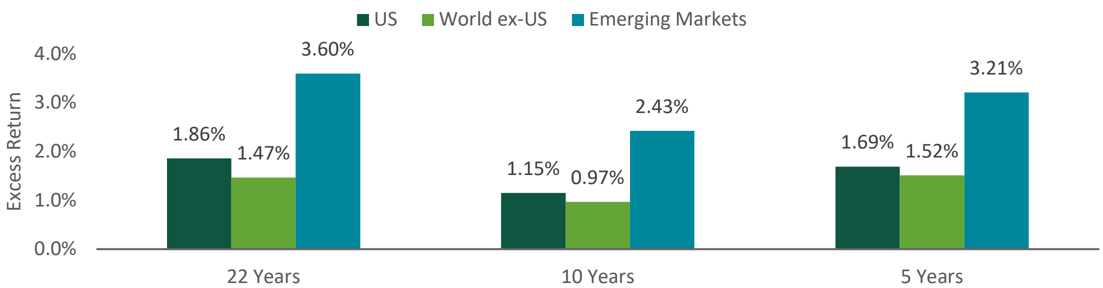
Source: Northern Trust Asset Management, Bloomberg. Data from 12/31/1999 to 6/30/2022. This graph does not show actual performance results. For illustrative purposes only. Past performance is no guarantee of future results. Index performance returns do not reflect any management fees, transaction costs or expenses. It is not possible to invest directly in any index. Note: Russell 1000 Index: 12/31/1999 to 6/30/2022. MSCI World ex-US Index: 12/31/1999 to 6/30/2022. MSCI Emerging Markets Index: 12/31/1999 to 6/30/2022.

MULTI-FACTOR SOLUTIONS

While the individual factor benefits have been meaningful, the benefits of combining factors into a multi-factor solution have historically further improved outcomes. Although the cross-sectional factor correlations we see in this segment of the market are very similar to the levels seen in the U.S. and DM, the stronger returns overall, along with the effective interaction effects, demonstrate a powerful multi-factor result. Focusing on four of the factors that we see most widely used in our strategies, Value, Momentum, Quality and Low Volatility, the average cross-sectional correlation from monthly factor returns is 0.01.[4], a nearly ideal level for combining single factor portfolios. For illustration purposes, we created a simplistic four-factor portfolio, combining the top quintile factor portfolios in an equal-weighted manner. While a more optimal combination may exist, from this naïve approach, we see that returns (**Exhibit 7A**) and risk-adjusted returns (**Exhibit 7B**) have been significantly better in EM vs U.S. and DM.

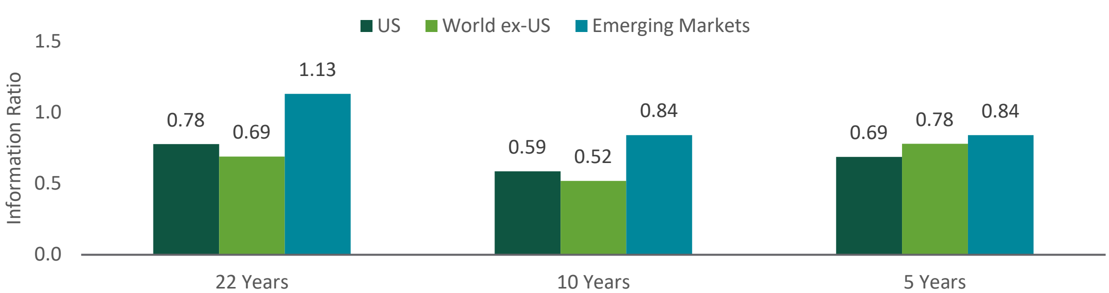
[4] This is the average of all cross-sectional correlations of factor return between the four factors

EXHIBIT 7A: VALUE, QUALITY, MOMENTUM AND LOW VOLATILITY EQUAL WEIGHTED BLEND U.S., WORLD EX-US AND EMERGING MARKETS ANNUAL EXCESS RETURNS



Source: Northern Trust Asset Management, Bloomberg. Data from 12/31/1999 to 6/30/2022. This graph does not show actual performance results. For illustrative purposes only. Past performance is no guarantee of future results. Index performance returns do not reflect any management fees, transaction costs or expenses. It is not possible to invest directly in any index. Note: Russell 1000 Index: 12/31/1999 to 6/30/2022. MSCI World ex-US Index: 12/31/1999 to 6/30/2022. MSCI Emerging Markets Index: 12/31/1999 to 6/30/2022

EXHIBIT 7B: VALUE, QUALITY, MOMENTUM AND LOW VOLATILITY EQUAL WEIGHTED BLEND U.S., WORLD EX-US AND EMERGING MARKETS RISK-ADJUSTED RETURNS



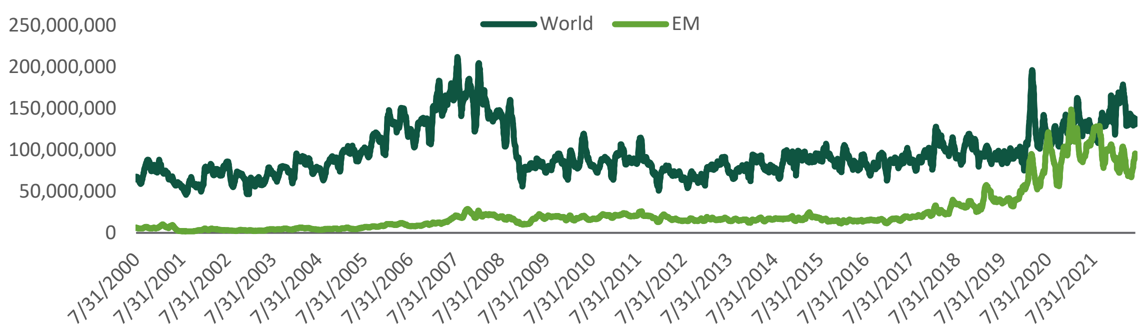
Source: Northern Trust Asset Management, Bloomberg. Data from 12/31/1999 to 6/30/2022. This graph does not show actual performance results. For illustrative purposes only. Past performance is no guarantee of future results. Index performance returns do not reflect any management fees, transaction costs or expenses. It is not possible to invest directly in any index. Note: Russell 1000 Index: 12/31/1999 to 6/30/2022. MSCI World ex-US Index: 12/31/1999 to 6/30/2022. MSCI Emerging Markets Index: 12/31/1999 to 6/30/2022.

DON'T FORGET ABOUT LIQUIDITY

While the analysis above makes a compelling case for the benefits of EM factor investing in theory, as practitioners and investors, we must also scrutinize sources of alpha from a practical implementation perspective. Specifically, we need to understand if and how much of the factor premia is potentially masked in a liquidity bias. In other words, if transaction costs are taken into account, does the factor premia go away? While a specific number is very difficult to ascertain, we can reasonably estimate, based on our over 20 years of experience, the cost of trading and liquidity related metrics across the three markets.

Over the past 20 years, the value of shares traded in EM stocks was about 20 percent of the level of Developed Markets, though that level has been steadily increasing. From this, we can assume that the cost of trading in EM is generally going to be higher than DM on a dollar per dollar basis (**Exhibit 8A**).

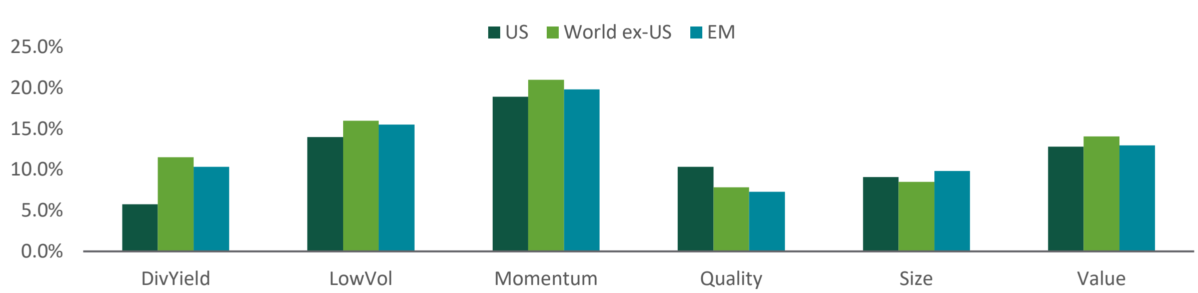
EXHIBIT 8A: INDEX AVERAGE DAILY TRADED VALUE 22-DAY ROLLING AVG



Source: Northern Trust Asset Management, Bloomberg. Data from 6/30/2000 to 6/30/2022. Past performance is no guarantee of future results. Index performance returns do not reflect any management fees, transaction costs or expenses. It is not possible to invest directly in any index. Note: Russell 1000 Index: 6/30/2000 to 6/30/2022. MSCI World ex-US Index: 6/30/2000 to 6/30/2022. MSCI Emerging Markets Index: 6/30/2000 to 6/30/2022.

However, we also know from our vast experience managing factor-based strategies in less liquid Emerging and U.S. Small Cap Markets, that a lower cost of trading can be achieved with specific trading strategies. The key to reducing this cost is understanding the relative life and turnover of the factors targeted. In other words, the effective alpha of a factor is also a function of time, as stocks factor scores are continually changing. One way to look at this is the turnover of alpha signals. Comparing the monthly turnover of the top quintile of each alpha in their respective markets, we see that EM is very consistent with DM and U.S. levels (**Exhibit 8B**). We can infer from this data that an EM factor strategy will have turnover levels in-line with U.S. and DM strategies, all else equal. We can again infer that a well-designed trading approach to less liquid markets should translate well to the EM factor space.

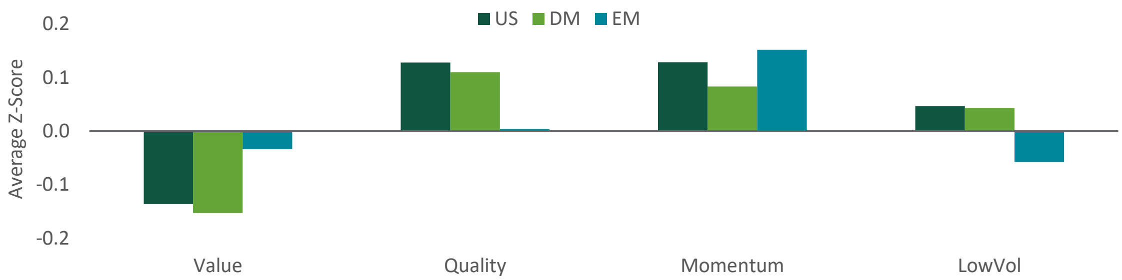
EXHIBIT 8: FACTOR TURNOVER – MONTHLY Q1 AVERAGE



Source: Northern Trust Asset Management, Bloomberg. Data from 12/31/1999 to 6/30/2022. This graph does not show actual performance results. For illustrative purposes only. Past performance is no guarantee of future results. Index performance returns do not reflect any management fees, transaction costs or expenses. It is not possible to invest directly in any index. Note: Russell 1000 Index: 12/31/1999 to 6/30/2022. MSCI World ex-US Index: 12/31/1999 to 6/30/2022. MSCI Emerging Markets Index: 12/31/1999 to 6/30/2022.

We can also look to the relative liquidity biases in the factor scores themselves to gain more insight into the liquidity profile of EM factors. Given that most of the trading and active exposures in any factor-based portfolio will occur in the outer tails of the signal, predominately quintile 1, we looked at the average value traded in these quintiles of each stock monthly over the full sample period relative to the benchmark average. We find that the value traded in quintile 1 has not been materially different from the universe mean for EM compared to U.S. and DM (**Exhibit 9**), from which we can gain further confidence that an active implementation of the factors will not be met with any unexpected liquidity issues beyond the general market liquidity characteristics.

EXHIBIT 9: FACTOR AVERAGE LIQUIDITY PROFILES Q1 RELATIVE VALUE TRADED

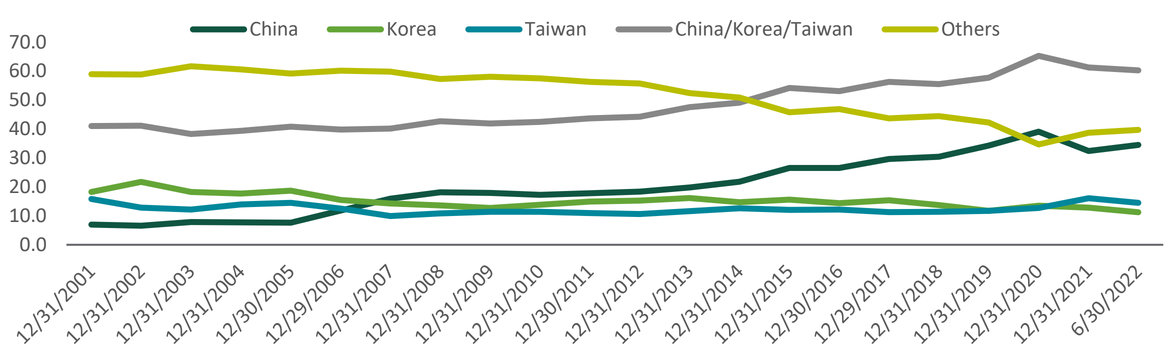


Source: Northern Trust Asset Management, Bloomberg. Data from 12/31/1999 to 6/30/2022. This graph does not show actual performance results. For illustrative purposes only. Past performance is no guarantee of future results. Index performance returns do not reflect any management fees, transaction costs or expenses. It is not possible to invest directly in any index. Note: Russell 1000 Index: 12/31/1999 to 6/30/2022. MSCI World ex-US Index: 12/31/1999 to 6/30/2022. MSCI Emerging Markets Index: 12/31/1999 to 6/30/2022.

EMERGING MARKET COUNTRY REPRESENTATION

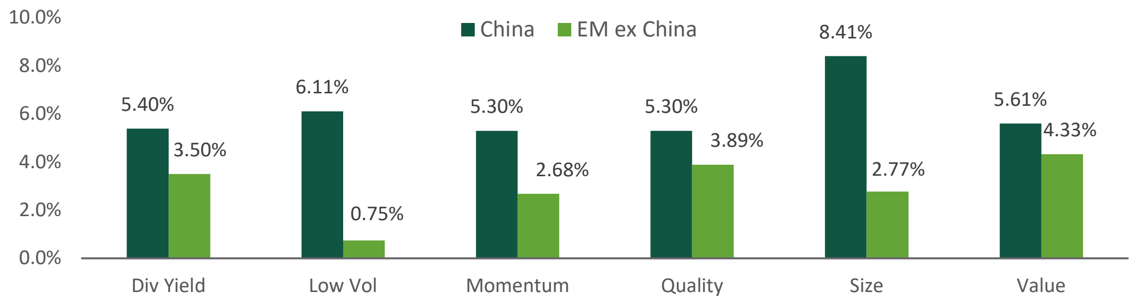
As with monitoring possible liquidity risks, EM investors must also be aware of country biases. One of the more significant changes in Emerging Market investing over the past decade is the inclusion and increasing representation of China in passive benchmarks. The prominence of countries like China in benchmarks can lead to unwanted biases, which can lead to uncompensated risks, thereby disrupting factor exposure goals. How has this impacted the efficacy of factor investing in EM? China has been included in the benchmark since 1996, through B-shares initially, then through Hong Kong and other exchanges. MSCI began including China A shares in 2017, on a limited basis. The proportion of A shares included has continued to grow since then. Its representation in the MSCI Emerging Markets Index has increased from less than 10 percent in 2001, to nearly 40 percent as of the end of 2021 (**Exhibit 10A**). Since calendar year 2000, factor returns in China have consistently exceeded the remainder of the EM Index (**Exhibit 10B**). Since 2012, however, as market breadth and visibility have increased, factor returns in China have performed more in-line with other EM countries.

EXHIBIT 10A: CHINA, KOREA AND TAIWAN VS OTHERS COUNTRY WEIGHTS



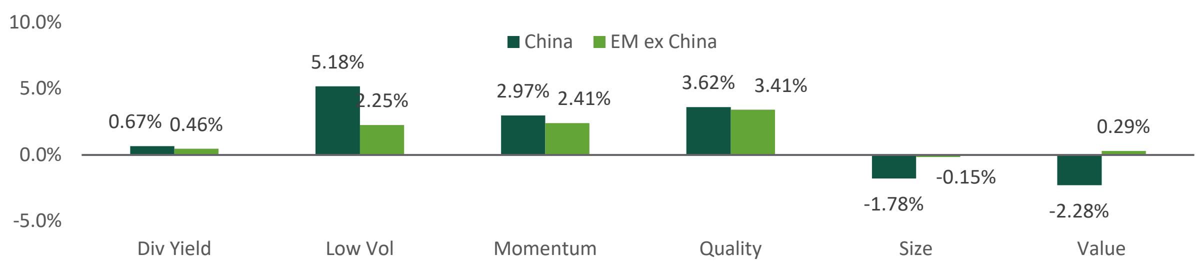
Source: Northern Trust Asset Management, Bloomberg. Data from 12/31/2000 to 6/30/2022. Past performance is no guarantee of future results. Index performance returns do not reflect any management fees, transaction costs or expenses. It is not possible to invest directly in any index. Note:. MSCI Emerging Markets Index: 12/31/2000 to 6/30/2022.

EXHIBIT 10B: CHINA VS EM EX-CHINA FACTOR RETURNS 1/2000 – 6/2022



Source: Northern Trust Asset Management, Bloomberg. Data from 12/31/1999 to 6/30/2022. This graph does not show actual performance results. For illustrative purposes only. Past performance is no guarantee of future results. Index performance returns do not reflect any management fees, transaction costs or expenses. It is not possible to invest directly in any index. Note: MSCI Emerging Markets Index: 12/31/1999 to 6/30/2022.

EXHIBIT 10C: CHINA VS EM EX-CHINA FACTOR RETURNS 10 YEARS ENDING 6/30/2022



Source: Northern Trust Asset Management, Bloomberg. Data from 6/30/2012 to 6/30/2022. This graph does not show actual performance results. For illustrative purposes only. Past performance is no guarantee of future results. Index performance returns do not reflect any management fees, transaction costs or expenses. It is not possible to invest directly in any index. Note: MSCI Emerging Markets Index: 6/30/2012 to 6/30/2022.

CONCLUSION

As investors increasingly look to more innovative solutions to mitigate portfolio volatility and macroeconomic risks, we show that Emerging Markets can be a fruitful source of diversification from both a systematic and style factor perspective. In this paper, we demonstrated that factor returns have generally been stronger in Emerging Markets compared to U.S and Developed Markets, and offer a differing pattern of cyclicality as well. We also showed the benefits of using multiple factors in terms of return and risk-adjusted return relative to only using individual factors on their own. We then addressed an important question regarding the liquidity and country level effects within EM. These are both areas that need to be carefully considered when building an efficient and implementable portfolio. Constructing factors in a thoughtful way that reduces turnover and mitigates country effects is one important step to help address these areas and help to reduce any noise. Therefore, for investors looking to get more out of their Emerging Markets portfolios, we suggest looking at a disciplined factor-based approach as a powerful potential solution.

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F-101323-3164268-111224