Diversifying to China

November 2022

Executive Summary

China's stock market offers US investors attractive diversification opportunities. Diversifying to the China A-share market allows US investors to reduce volatility more than does reallocating to other foreign markets. The diversification power of China A shares is further enhanced by fundamentally weighting the stocks. Finally, rather than sacrificing average return, diversifying to China A shares actually produces a higher average return and Sharpe ratio.

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Highlights:

- As compared to investing fully in the S&P 500, allocating just 9% to China A shares reduces volatility more than combining the S&P with any allocation to an all-country index, emerging-market index, or all-China index.
- Weighting China A-share stocks fundamentally, by revenue, further enhances the diversification power of the A-Share market for U.S. investors and increases the optimal A-share allocation to 12%.
- Diversifying to China A shares also produces the highest historical average return and Sharpe ratio when compared to the US alone or to a minimum-volatility combination of the US and another foreign market.

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1. Introduction

Managing risk via diversification is a foundational pillar of modern investment management. The general principle is well understood: By allocating across different investment opportunities, an investor can potentially achieve a less volatile return than when allocating to just one opportunity. Consider a US equity investor, for example. Allocating to both a US portfolio and a foreign market, as opposed to investing solely in the US, can potentially produce a less volatile return. We explore here the extent to which China offers such diversification potential to US investors.

Why focus on China? There are two main reasons. First, China's domestic stock market is large and liquid, offering substantial capacity for US investors. The total market capitalization of China's domestic stock market is about 30% of the US market, but the average dollar volume in China is about 70% of the US market.[1] The second reason is that China's economic and political environments differ from those in the US and other Western countries in fundamental respects. Those differences potentially make the US market's return less correlated with China's market than with other major foreign markets. As is well known, diversification has more power to reduce volatility when the investments being combined are less correlated with each other.

An argument sometimes heard from US investors is that diversifying to foreign markets is unnecessary because the US market includes large multinational companies whose global activities already provide significant diversification. While the basic idea underlying this argument is sound, less clear is whether this corporate diversification fully exploits the power of diversification available to US investors who can allocate directly part of their equity investment to China. In this study, we explore this empirical question and find China's domestic equity market indeed offers substantial additional diversification power to US investors.

We first find that, among various international equity markets, China offers US investors the most diversification power. We then find that this diversification power is further enhanced when the stocks within China's market are weighted by fundamentals rather than (the usual) market capitalization. We also show that the lower volatility achieved by diversifying to China has not come at the cost of lower average return. Finally, we discuss why China's diversification potential for US investors could be even greater in the future than what our historical analysis demonstrates.

1 As of September 2021, total capitalization of China's A-share market is $12.2 trillion, compared to $40.7 trillion for the US; China's average daily volume is $214 billion, versus $300 billion in the US.

2. Diversification Power of China A Shares

Consider a U.S. investor with a portfolio fully allocated to the S&P 500. To what extent can this investor lower their overall return volatility by re-allocating some of their portfolio to a non-US market? We first empirically analyze diversification into one of four different foreign portfolios, each represented by an MSCI index:

1. MSCI All Country World Index
2. MSCI Emerging Markets
3. MSCI China
4. MSCI China A Onshore

The MSCI China A Onshore index was launched in May 2005. We take that month as the beginning of our sample period, which extends through May 2022.

The MSCI China index includes not only A shares, China's domestic market, but China's B and H shares and its ADRs. The China-A index represents just the domestic stock market. The two indexes differ in various other ways. For example, MSCI China is more concentrated than MSCI China-A Onshore: The top ten constituent firms in MSCI China account for 39.87% of the index's market capitalization, whereas the top ten constituents of MSCI China A Onshore account for only 17.16%. MSCI China also concentrates more heavily in certain sectors: The largest sector in MSCI China accounts for 30.77% of market capitalization, while the largest sector in MSCI China A Onshore accounts for 16.72%. The sector allocations differ as well: The top three sectors in MSCI China are Consumer Discretionary, Communication Services, and Financials, whereas the top three sectors in MSCI China-A are Industrials, Financials, and Information Technology.

For each of the four foreign indexes, we consider the extent to which a US investor can lower volatility by re-allocating some amount to the foreign market. Table 1 reports the necessary inputs to answer this question. That is, when combining the US market with a foreign market, the degree of potential diversification depends on two characteristics of the foreign market: the volatility of the foreign market's return and the correlation of the foreign market's return with the US return. The lower is each of these inputs, the greater is the potential reduction in volatility for a US investor.

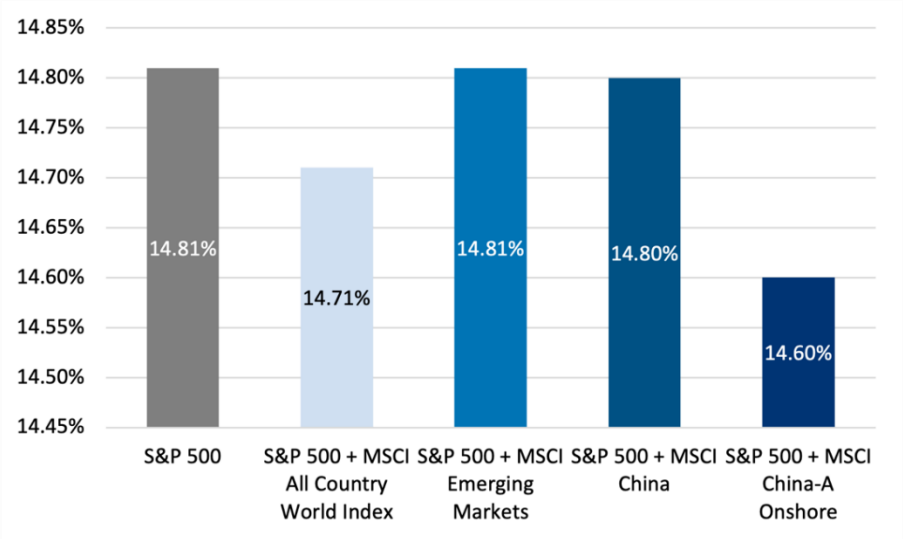
Table 1
Correlations with the S&P 500 and Standard Deviations

	Correlation with S&P 500	Annual Standard Deviation (%)
S&P 500	1.00	14.81
MSCI All Country World Index	0.94	15.10
MSCI Emerging Markets	0.74	20.11
MSCI China	0.58	24.60
MSCI China A Onshore	0.36	28.46

Among the four foreign markets, we see that the correlation with the S&P 500 is lowest for China-A, at just 0.36. At the same time, the China-A return is the most volatile of the four foreign indexes, with an annual standard deviation over 28%. With its low correlation but high volatility, how much diversification potential does the China A-share market offer relative to the other foreign markets?

We see the answer in Figure 1, which displays the minimized standard deviation when combining the S&P 500 with each of the foreign markets. Diversifying to MSCI China-A Onshore lowers the S&P 500 investor's annual standard deviation by 21 basis points (bps), whereas diversifying to the All Country World Index lowers standard deviation by only about half as much, just 10 bps. Diversifying to MSCI Emerging Markets or to MSCI China offers the S&P 500 investor essentially no diversification power.[2]

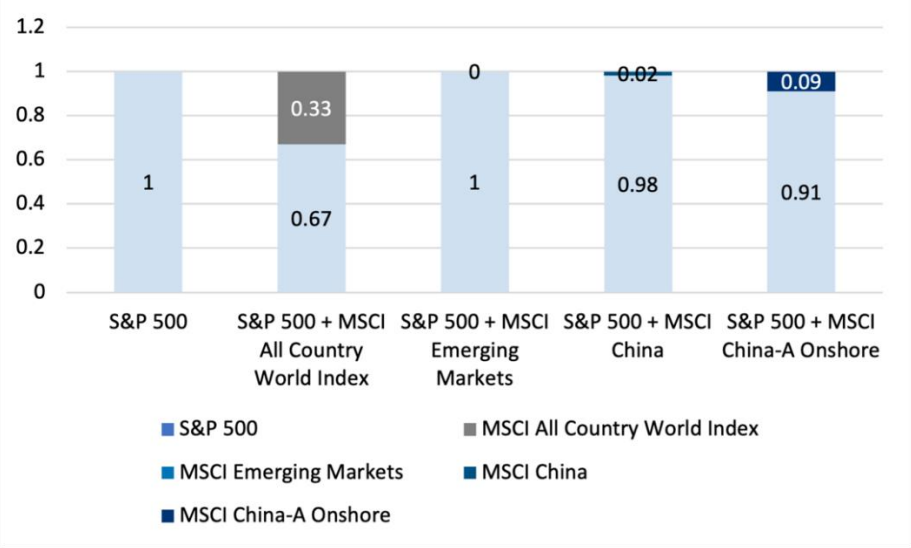
Figure 1
Minimized Standard Deviations



2 The volatility-minimizing allocation to MSCI Emerging Markets is actually negative, implying a short position, but we rule out shorting and thus simply set the allocation to zero in this case.

Figure 2 displays the allocations that produce the minimized standard deviations in Figure 1. To exploit the diversification power of MSCI China-A, the US investor in the S&P 500 would re-allocate 9% of their portfolio to China-A. While such a re-allocation is substantial, it is considerably less than the 33% re-allocation to the MSCI All Country World Index required to achieve a volatility reduction that is only half of the reduction offered by China-A. The formulas underlying the calculations in Figures 1 and 2 are presented in the Appendix.

Figure 2
Allocations Minimizing Standard Deviations



3. Fundamental Weighting: China's Further Diversification Power

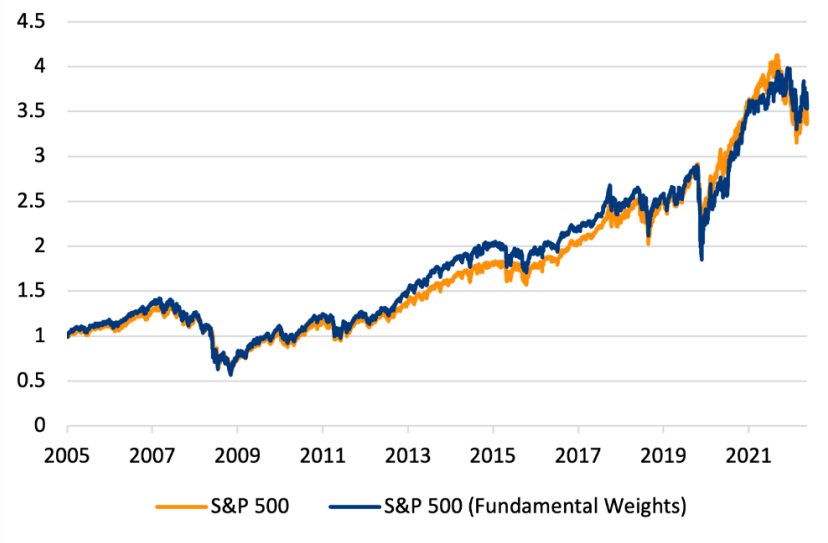
A long-familiar concept to US investors is fundamental weighting.[3] Rather than weight stocks by their market capitalizations, as is common in index construction, fundamental weighting instead weights stocks by a "fundamental" (non-price) quantity such as revenue, profit, or dividends. The usual justification is that, if mispricing exists, then the usual market-cap weighting sacrifices performance because it tends to overweight (underweight) stocks whose current prices are too high (low). Perhaps less appreciated is that fundamental weighting has potential diversification advantages as well. For example, it can dampen sources of positive correlation (detrimental to diversification power) that arise from sentiment-driven waves of mispricing affecting multiple stocks or markets.

3 For a history of fundamentally weighted indexation, see for example, Jeremy Siegel's best-selling Stocks for the Long Run, McGraw Hill, 2014.

We next investigate the ability of fundamental weighting to enhance the diversification power of China's A-share market. Specifically, using revenue as the fundamental, we construct the fundamentally weighted version of the MSCI China-A Onshore index. Figure 3 plots the performance of this fundamentally weighted index as well as the original market-cap-weighted version. Figure 4 displays the corresponding plot for the S&P 500, for which MSCI has constructed a fundamentally weighted version (weighting by revenue) since December 2005. (We construct the performance for the preceding seven months in order to keep our sample period beginning in May 2005.) Clearly, in recent years, fundamental weighting has produced more of a performance advantage in China than in the US. We investigate whether fundamental weighting in China also enhances diversification.

Figure 3
Performance of Fundamental Weighting in China

Figure 4
Performance of Fundamental Weighting in the U.S.



Figures 5 and 6 repeat the same analyses reported earlier in Figures 1 and 2 but focused on just the two A-share indexes. Figure 5 reveals that fundamental weighting unlocks further diversification power of China A shares, reducing the annual standard deviation of a 100% investment in the S&P 500 by 38 bps, which is nearly twice the 21 bps reduction offered by the market-cap-weighted A-share index. Figure 6 shows that the allocation to A shares producing the minimized volatility is also higher, with the allocation increasing to 12%, versus 9% with market-cap weighting.

Figure 5
Minimized Standard Deviations with Fundamental Weights

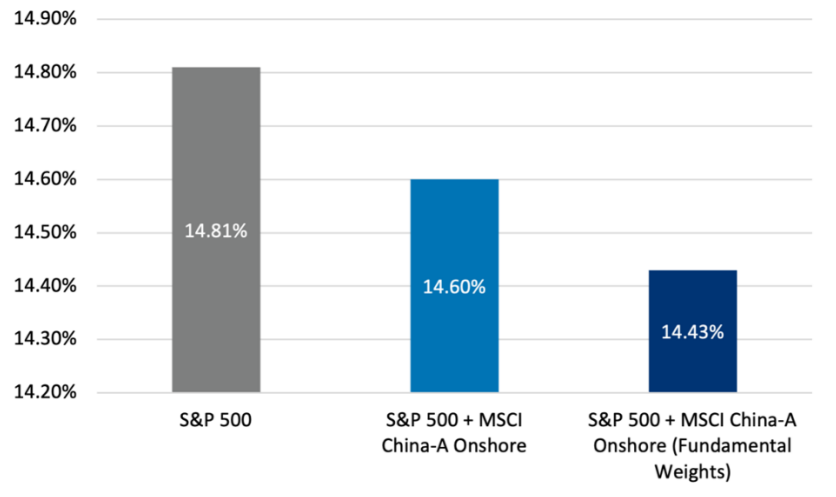


Figure 6
Allocations Minimizing Standard Deviations with Fundamental Weights

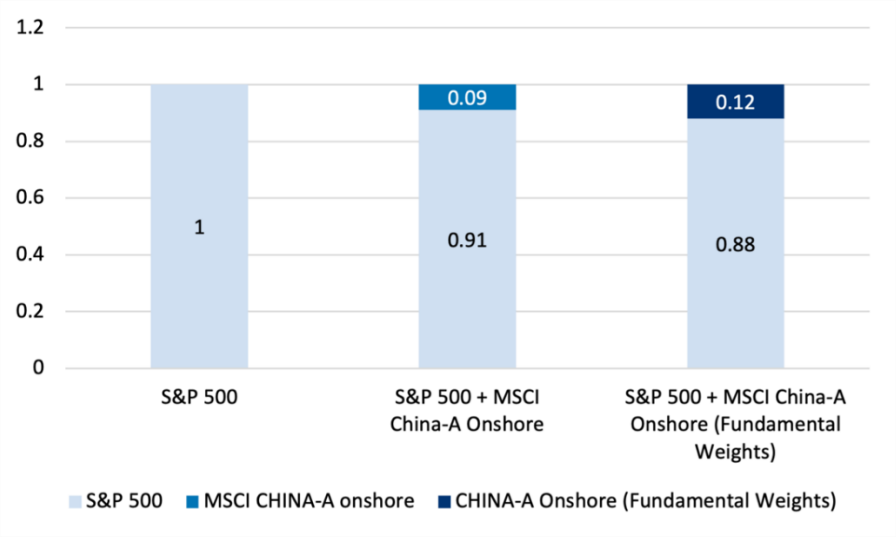


Table 2 reveals the source of the increased diversification power of fundamentally weighting China A shares. Specifically, fundamentally weighting the China-A index gives it lower correlation with the S&P 500, dropping the correlation to 0.30, versus 0.36 with market-cap weighting. The volatility of the China-A index is virtually unchanged by fundamental weighting (increasing just slightly).

Table 2
Correlations with S&P 500 and Standard Deviations

	Correlation with S&P 500	Annual Standard Deviation (%)
S&P 500	1.00	14.81
MSCI China A Onshore	0.36	28.46
MSCI China A with Fundamental Weights	0.30	28.69

4. Diversifying to China Does Not Sacrifice Average Return

A natural question is whether diversifying to China sacrifices expected return. While historical average returns are inherently imprecise predictors of future performance, the historical averages do not suffer when diversifying to China.

In fact, they actually improve. The source of that improvement is evident in Table 3, which reports average annualized returns and Sharpe ratios for various foreign markets analyzed above. Over our 2005-2022 sample period, the China-A index, especially its fundamentally weighted version, exhibits the strongest performance.

Table 3
Average Returns and Sharpe Ratios

	Average Annualized Return (%)	Sharpe Ratio
S&P 500	8.58	0.38
MSCI All Country World Index	5.00	0.13
MSCI Emerging Markets	4.94	0.10
MSCI China A Onshore	12.32	0.33
MSCI China A with Fundamental Weights	16.66	0.48

That strong performance translates to the results displayed in Figure 7, which reports the average return for the variance-minimizing portfolios shown in Figures 2 or 6. In particular, the average return on the portfolio that allocates just 12% to the fundamentally weighted A-share index adds 95 bps of average annual return to a 100% allocation to the S&P 500. The higher average return on that combination, coupled with its lower standard deviation (recall Figure 5), produces an annual Sharpe ratio of 0.45, as compared to 0.38 for the S&P 500. The Sharpe ratios are displayed in Figure 8. Clearly the historical evidence does not indicate that diversifying to China's A-share market sacrifices either average return or Sharpe ratio.

Figure 7
Average Return on Minimum-Variance Portfolio

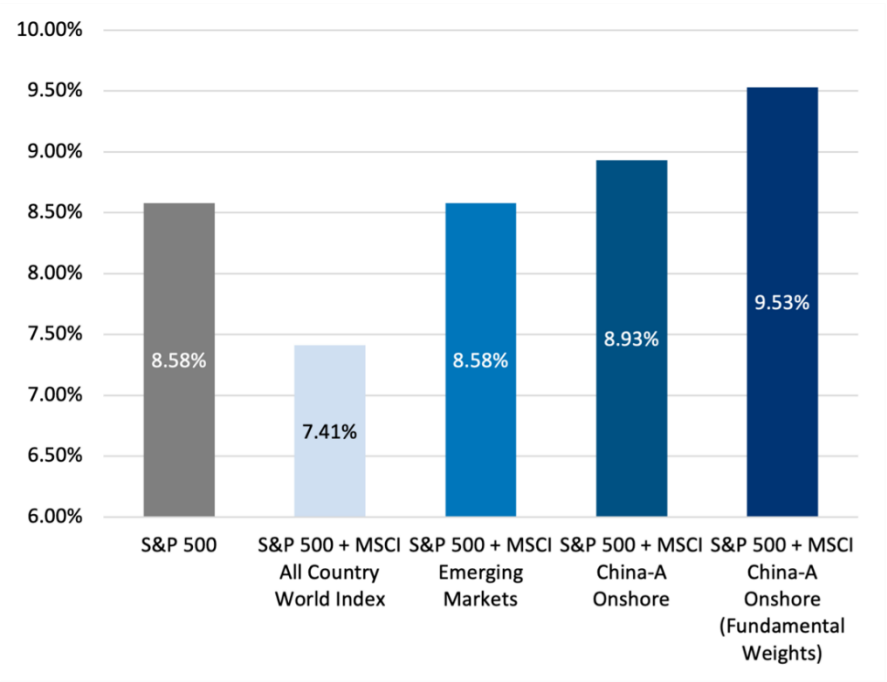
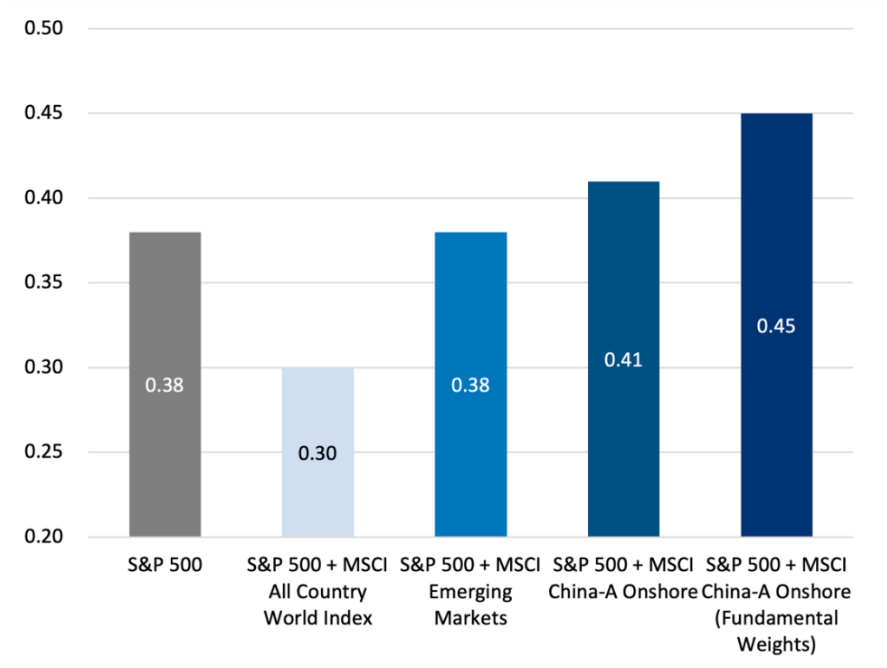


Figure 8
Sharpe Ratio on Minimum-Variance Portfolio

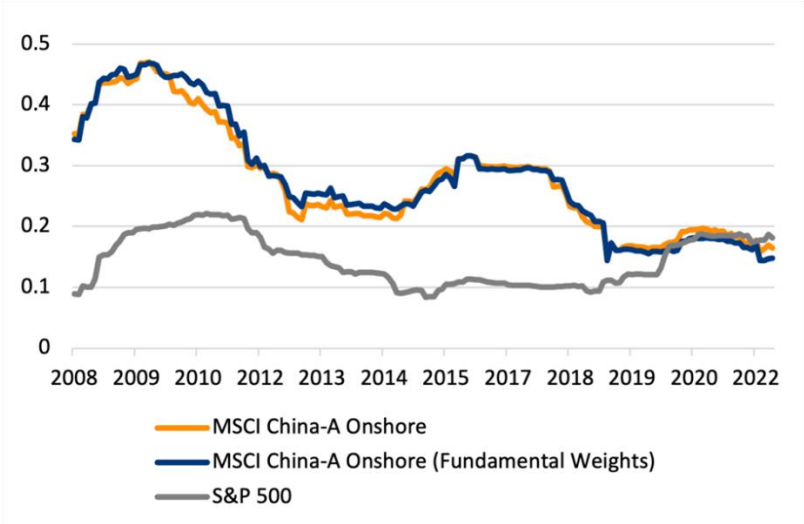


5. Outlook for China's Diversification Power

The evidence presented thus far measures China's diversification power during our 17-year sample period, which is a relatively long history in the context of China's evolving economy and financial markets. A natural question, though, is whether this historical evidence fully captures China's future diversification potential. We suggest two reasons why China's diversification power for US investors could be greater going forward.

First, recall from Table 1 that when standard deviations are computed over the entire sample period, China's domestic stock market is nearly twice as volatile as the US market. As Figure 9 shows, however, this gap has narrowed over time and has essentially disappeared during the last few years. One implication of this recent closing of the volatility gap is a greater variance-minimizing allocation to China. Figure 10 displays the time-series of that allocation when the inputs (standard deviations and correlation) are based on three-year moving windows of monthly returns. Results are plotted for both market-cap and fundamentally weighted indexes. For much of the period, not surprisingly, the optimal allocations to China do not deviate much from the values displayed in Figure 6. During the most recent three years, however, we see that the allocation to China rises sharply, exceeding half of the minimum-variance combination of the US and China. Therefore, more recent levels of volatility suggest China offers substantially greater diversification power to US investors than the longer history would indicate.

Figure 9
Annualized Standard Deviations of MSCI China A Onshore Index and S&P 500 Index over 3-Year Rolling Windows



The recent increases in the variance-minimizing allocation to China, observed in Figure 10, are due entirely to the closing of the volatility gap seen in Figure 9, as opposed to a decrease of the correlation of China's market with the US. In fact, that correlation has been slightly higher than average during the last few years, as in Figure 11.

Figure 10
Variance-Minimizing Allocation to MSCI China A Onshore Index over 3-Year Rolling Windows

Figure 11
Correlation between MSCI China A Onshore Index with S&P 500 over 3-Year Rolling Windows

We expect, however, that this correlation will drop going forward, providing the second reason for China's diversification power to increase. Specifically, we envision heightened competition between the US and China tending to decouple their economies and foster more winner-loser scenarios. Effective diversification then increasingly dictates betting on both competitors, as the heightened competition lowers the correlation of China's market with the US. We have already seen the correlation trend down from its peak in 2018, and we expect this recent trend to continue.

Appendix: Diversifying to a Foreign Market

Consider a U.S. investor with a portfolio fully allocated to the S&P 500. To what extent can this investor lower their overall return volatility by re-allocating some of their portfolio to a non-US market? What is the allocation that minimizes volatility? We summarize here the solutions to the above questions in a general setting.

Let σ_{US}^2 denote the variance of the return on the US market, let σ_{FM}^2 denote the variance of the (currency-hedged) return on the foreign market, and let ρ denote the correlation between the returns on the two markets. Define the "excess" variances of each market as:

$$\tilde{\sigma}_{US}^2 = \sigma_{US}^2 - c$$

$$\tilde{\sigma}_{FM}^2 = \sigma_{FM}^2 - c,$$

where $c = \rho\sigma_{US}\sigma_{FM}$, which is the covariance between the returns on the two markets. The variance-minimizing weights on the US and foreign markets are then, $\omega_{US} = \frac{\tilde{\sigma}_{FM}^2}{\tilde{\sigma}_{US}^2+\tilde{\sigma}_{FM}^2}$ and $\omega_{FM} = \frac{\tilde{\sigma}_{US}^2}{\tilde{\sigma}_{US}^2+\tilde{\sigma}_{FM}^2}$, and the minimized variance is

$\sigma_{MIN}^2 = \sigma_{US}^2 - \omega_{FM}\tilde{\sigma}_{US}^2$, or equivalently, $\sigma_{MIN}^2 = \sigma_{FM}^2 - \omega_{US}\tilde{\sigma}_{FM}^2$.

It can be the case that either ω_{US} or $\omega_{FM}$is negative, corresponding to a short position in the corresponding market. (The denominator, $\tilde{\sigma}_{US}^2 + \tilde{\sigma}_{FM}^2$, is always positive given $\rho < 1$.)

A short position arises in the high-variance market when ρ is large enough to make c greater than the other market's variance. As noted in our empirical analysis, we rule out short positions, so if either ω_{US} or ω_{FM} is negative, we set that weight to 0 and the other weight to 1.

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