White Paper
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Chinese Bonds: The Case for an Increased Allocation

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Executive Summary

The improvement in access to China's large bond market has started a conversation among global investors about the merits of allocating to Chinese bonds. Many institutional investors are considering whether to make an allocation and, if they do, what level of investment that should be. As of June 2021, Chinese bonds accounted for 7% of Global Aggregate Bond Indices and our analysis shows that an allocation beyond that level can offer significant diversification benefits to a global bond portfolio. We believe those diversification benefits will likely remain in place over the foreseeable future.

However, investors considering investment also need to take qualitative factors such as credit risk, the level of market development, access and operational differences into account. Furthermore, they should consider the potential differences in liquidity versus more developed markets when deliberating on their allocation to Chinese bonds. On this basis, we recommend that foreign investors intending to build onshore China bond exposures should do so gradually.

Key Points

Low Correlation Chinese bonds are lowly correlated with global bonds and provide diversification benefits for global bond investors.

Comparative Appeal Chinese bonds look attractive when compared across global bond markets as they tend to be lower in volatility and provide a yield pick-up. Average duration is also shorter, particularly relative to Euro, Japanese and Sterling aggregate bond indices.

Lower Liquidity and Less Mature Investors need to be aware of the lower potential liquidity and the developing nature of China's bond market.

Portfolio Benefits

Diversification Benefits Our analysis shows that based on historical data, there were consistent diversification benefits in adding Chinese bonds to a Global Aggregate bond portfolio.

Portfolio Volatility Impact We assessed the impact on fixed income portfolios on a forward-looking basis assuming China bonds become more correlated and volatile. Even under a conservative forward-looking scenario, an asset mix of 40% Chinese bonds/60% Global Aggregate bonds provided the lowest theoretical portfolio volatility — this shows that Chinese bonds provide meaningful diversification benefits for a Global Aggregate bond portfolio.

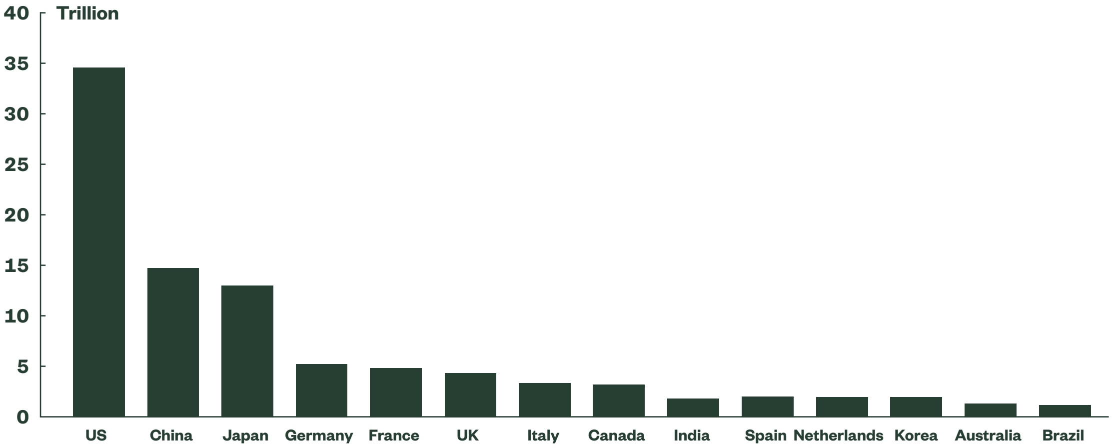
Incorporating USD Hedge Investors who want to hedge back to USD can still enjoy positive diversification benefits, which will help to reduce risk in their portfolios. Our forward-looking analysis on a hedged basis shows an asset mix of 40% Chinese bonds/60% Global Aggregate bonds provided the lowest theoretical portfolio volatility in a conservative scenario.

China Opens to Foreign Investors

- **China's bond market has grown to become the world's second largest.**
- **The difficulties foreign investors can face in accessing China's onshore bond market are easing with their inclusion in global indices.**

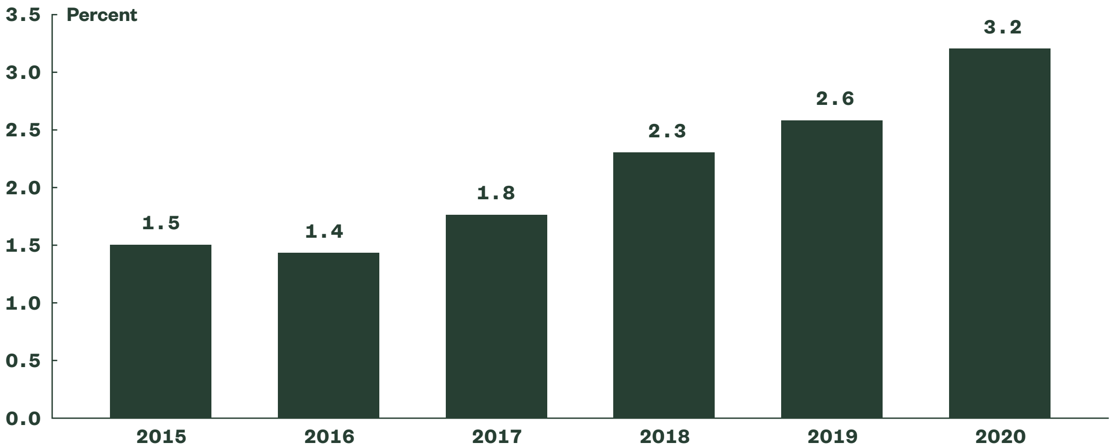
China's bond market has grown significantly and become the second-largest bond market globally (see Figure 1). Until recently, the onshore China bond market has been difficult for foreign investors to access due to investment restrictions and quotas, resulting in them accounting for only 3.2% of the total onshore China bond market at the end of 2020 (see Figure 2). However, foreign ownership of government bonds is higher at around 10%.

Figure 1
China Bond Market Now Second Largest (in USD)



Source: State Street Global Advisors, Bloomberg Finance L.P., as of July 26, 2021.

Figure 2
Foreign Investors Increase Chinese Bond Holdings from Low Base



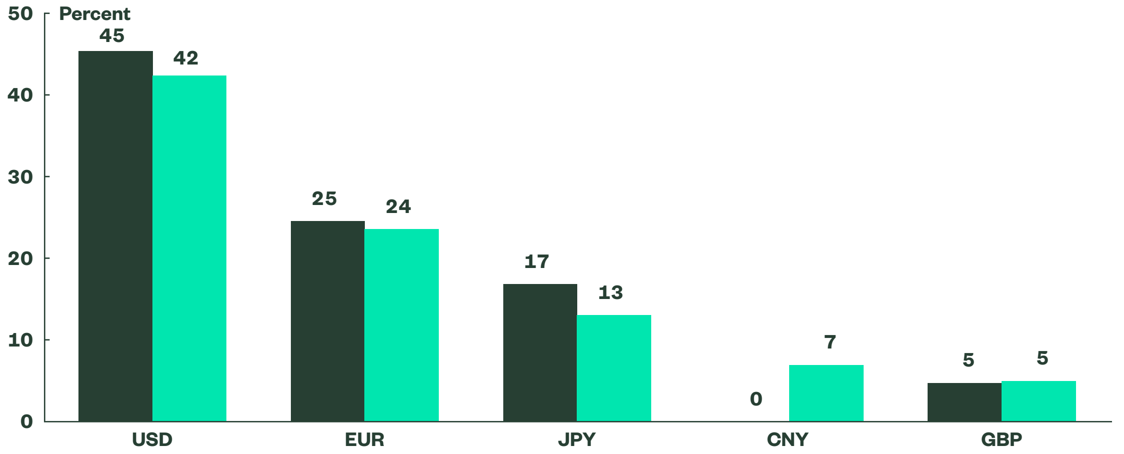
Source: State Street Global Advisors, China Central Depository & Clearing, Shanghai Clearing, as of December 31, 2020.

Since 2016, Chinese policymakers have made a series of policy changes to open up the China's onshore bond market,[1] leading to the milestone inclusion of Chinese bonds in the Bloomberg Barclays bond indices; these indices are widely tracked by global investors. Since April 2019, Bloomberg has officially started to include Chinese yuan-denominated government and policy bank securities in the Bloomberg Barclays Global Aggregate, Global Treasury and EM Local Currency Government indices, with weights to be phased in over a 20-month period.

Prior to the inclusion of CNY-denominated bonds, USD-, EUR-, JPY- and GBP-denominated bonds were the biggest constituents of the Bloomberg Barclays Global Aggregate index; these accounted for over 90% of the index at the end of 2018. After the phase-in period, CNY-denominated bonds are the fourth-largest constituent of the index, accounting for around 7% of the index weight, as of June 2021 (see Figure 3). Over the longer term, China could account for a greater proportion given its higher expected growth relative to developed markets.

Figure 3
Impact of Chinese Bond Inclusion in Bloomberg Barclays Global Aggregate Index

Before CNY Bond Inclusion
After CNY Bond Inclusion



Source: State Street Global Advisors, Point. The weights before CNY bond inclusion represent the index currency allocation as of December 31, 2018. The weights after CNY bond inclusion are based on the index currency allocations as of June 30, 2021.

The other major bond indices, the JPMorgan Government Bond Index-Emerging Market (GBI-EM) and the FTSE World Government Bond Index (WGBI) also decided to include onshore Chinese bonds from February 2020 and October 2021, respectively.

Given the size of China's bond market, its now-improved accessibility to foreign players and its inclusion in global bond indices, some institutional investors are starting to think about how much of a Chinese bond allocation they should make to their global fixed income portfolios. In the next section, we explore some of the key characteristics of Chinese bonds and their potential impact on global bond portfolios.

Key Characteristics of Chinese Bonds

- **Onshore Chinese bonds offer some unique characteristics for global bond investors compared to other major regional bonds.**

- **Low correlations provide diversification benefits, while investment grade Chinese bonds also offer the potential for yield enhancement.**

We believe that onshore Chinese bonds offer unique characteristics for global bond investors compared to other major regional bonds. Investors considering onshore Chinese bonds should be aware of the potential implications of such investments.

Low Correlation Provides Strong Diversification Benefits in Fixed Income Portfolios

Over the past 17 years, the correlation between China Treasury and Policy Bank bonds relative to Global Aggregate bonds has been low at 0.23 (see Figure 4). Correlations with the four major regional developed bond markets (US, Europe, Japan and the UK) have also been low over this time-frame, ranging from 0.10 to 0.21. Even in comparison with the emerging markets, we found that correlations with China were still low at 0.25. These historically-low correlations to other major bond markets suggest that onshore Chinese bonds can offer strong diversification benefits in fixed income portfolios.

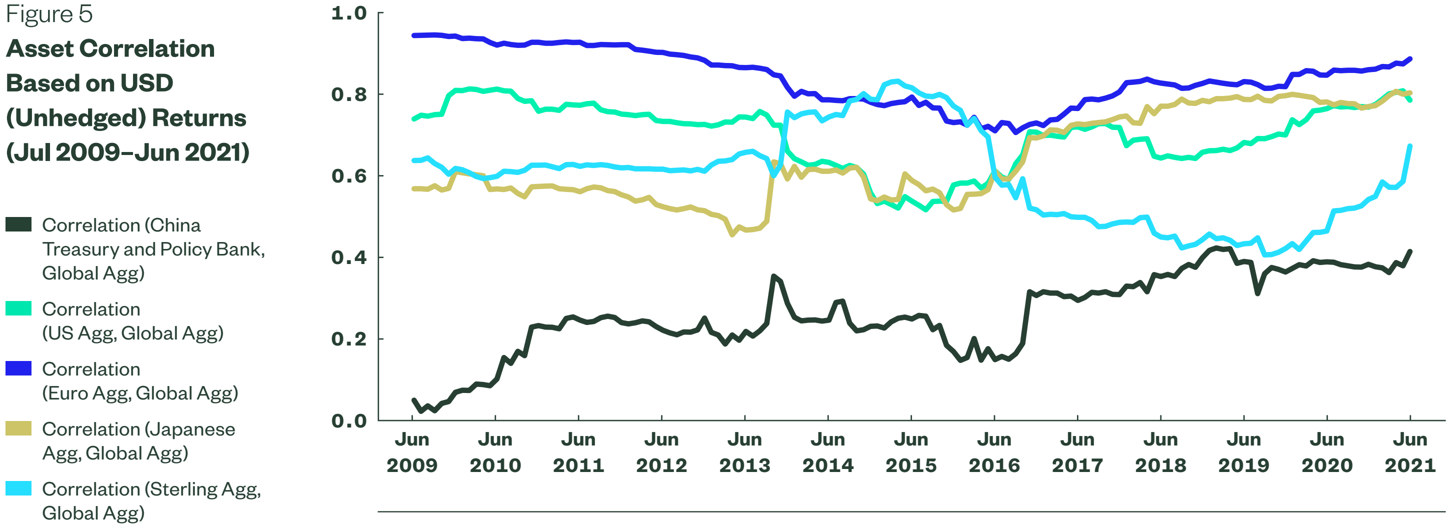
Figure 4
Asset Correlation Based on USD (Unhedged) Returns (Jul 2004–Jun 2021)

	China Treasury and Policy Banks	Global Aggregate	US Aggregate	Euro Aggregate	Japanese Aggregate	Sterling Aggregate	Local Currency EM Debt
China Treasury and Policy Bank	1.00	0.23	0.10	0.21	0.17	0.14	0.25
Global Aggregate	**0.23**	1.00	0.70	0.87	0.65	0.64	0.68
US Aggregate	**0.10**	0.70	1.00	0.39	0.48	0.37	0.35
Euro Aggregate	**0.21**	0.87	0.39	1.00	0.29	0.62	0.72
Japanese Aggregate	**0.17**	0.65	0.48	0.29	1.00	0.16	0.16
Sterling Aggregate	**0.14**	0.64	0.37	0.62	0.16	1.00	0.54
Local Currency EMD	**0.25**	0.68	0.35	0.72	0.16	0.54	1.00

Source: State Street Global Advisors, Bloomberg, JPMorgan, as of June 30, 2021. China Treasury and Policy Bank = Bloomberg Barclays China Treasury and Policy Bank USD unhedged index; Global Aggregate = Bloomberg Barclays Global Aggregate USD unhedged index; US Aggregate = Bloomberg Barclays US Aggregate index in USD; Euro Aggregate = Bloomberg Barclays Euro Aggregate USD unhedged index; Japanese Aggregate = Bloomberg Barclays Japanese Aggregate USD unhedged index; Sterling Aggregate = Bloomberg Barclays Sterling Aggregate USD unhedged index; Emerging Market Local Currency Debt = JPMorgan GBI-EM Global Diversified USD unhedged index.

We also took a look at the correlation between onshore China Treasury and Policy Bank bonds and Global Aggregate bonds on a five-year rolling basis (Figure 5). Compared to correlations between the other major markets and the Global Aggregate, China's correlations still appear relatively low. However, we do note that these have been generally rising over the last few years.

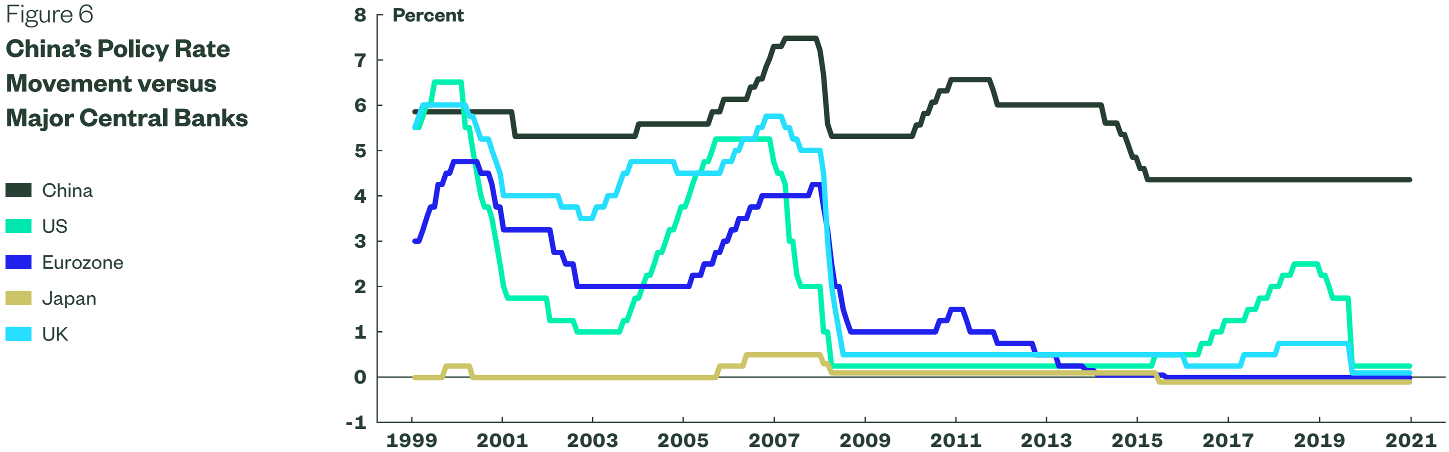
Figure 5
Asset Correlation Based on USD (Unhedged) Returns (Jul 2009–Jun 2021)



Source: State Street Global Advisors, Bloomberg, JPMorgan, as of June 30, 2021. China Treasury and Policy Bank = Bloomberg Barclays China Treasury and Policy Bank USD unhedged index; Global Aggregate = Bloomberg Barclays Global Aggregate USD unhedged index; US Aggregate = Bloomberg Barclays US Aggregate index in USD; Euro Aggregate = Bloomberg Barclays Euro Aggregate USD unhedged index; Japanese Aggregate = Bloomberg Barclays Japanese Aggregate USD unhedged index; Sterling Aggregate = Bloomberg Barclays Sterling Aggregate USD unhedged index.

In our view, the main reason for the low return correlations of Chinese bonds with global bonds is that China's interest rate movements are predominantly determined by domestic factors, and its monetary cycle is independent from the other major economies (see Figure 6).

Figure 6
China's Policy Rate Movement versus Major Central Banks



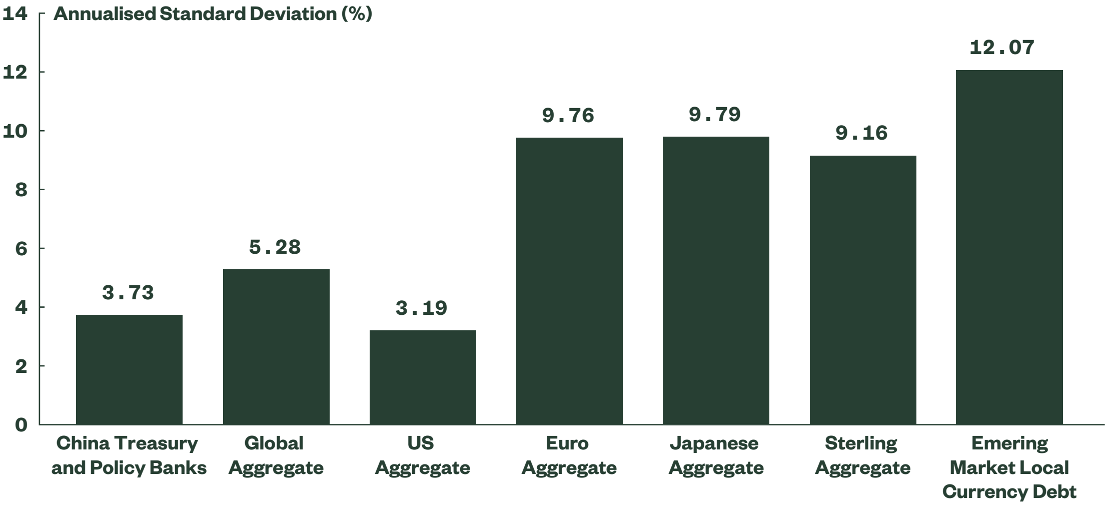
Source: State Street Global Advisors, Bloomberg Finance L.P., as of June 30, 2021.

As China integrates more with the global capital markets and gets included in global bond indices, the correlations between Chinese bonds and global bonds should increase. However, given China's domestically-driven economy and the relatively early stage of its global market integration, we expect Chinese bonds to continue to provide strong diversification benefits for the foreseeable future.

A Managed (Relatively Stable) Currency has Kept China Bond Volatility Low

Over a long period, China Treasury and Policy Bank bonds proved less volatile than Global Aggregate bonds, most regional aggregate bonds and emerging market local currency debt (Figure 7); this was primarily due to its relatively stable currency exchange rate with the US dollar.

Figure 7
Volatility of Major Bond Indices, Based on USD Unhedged Returns (Jul 2004–Jun 2021)

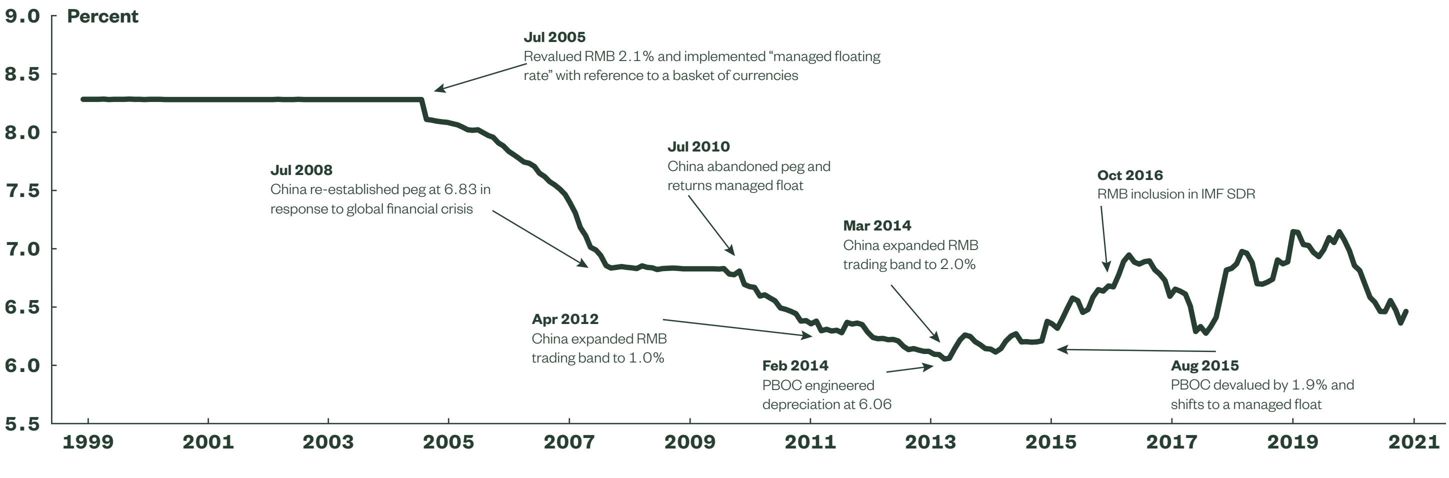


Source: State Street Global Advisors, Bloomberg, JPMorgan, as of June 30, 2021. China Treasury and Policy Bank = Bloomberg Barclays China Treasury and Policy Bank USD unhedged index; Global Aggregate = Bloomberg Barclays Global Aggregate USD unhedged index; US Aggregate = Bloomberg Barclays US Aggregate index in USD; Euro Aggregate = Bloomberg Barclays Euro Aggregate USD unhedged index; Japanese Aggregate = Bloomberg Barclays Japanese Aggregate USD unhedged index; Sterling Aggregate = Bloomberg Barclays Sterling Aggregate USD unhedged index; Emerging Market Local Currency Debt = JPMorgan GBI-EM Global Diversified USD unhedged index.

China does not have a floating exchange rate that is determined by market forces, as is the case with most advanced economies. China pegged its currency, the renminbi (RMB), to the US dollar for over a decade from 1994. Since 2005, China has gradually moved towards a "managed float" system against a basket of currencies, although it re-pegged the RMB to the dollar for several years during the Global Financial Crisis.

Between 2000 and 2014, the RMB was mostly stable or appreciating against the US dollar. However, as China continued to widen the RMB trading band, and with the inclusion of the RMB into the International Monetary Fund's Special Drawing Rights (SDR), there has been more of a two-way currency movement, along with higher currency volatility, in recent years (Figure 8).

Figure 8
USD/RMB Currency Movement from 2000

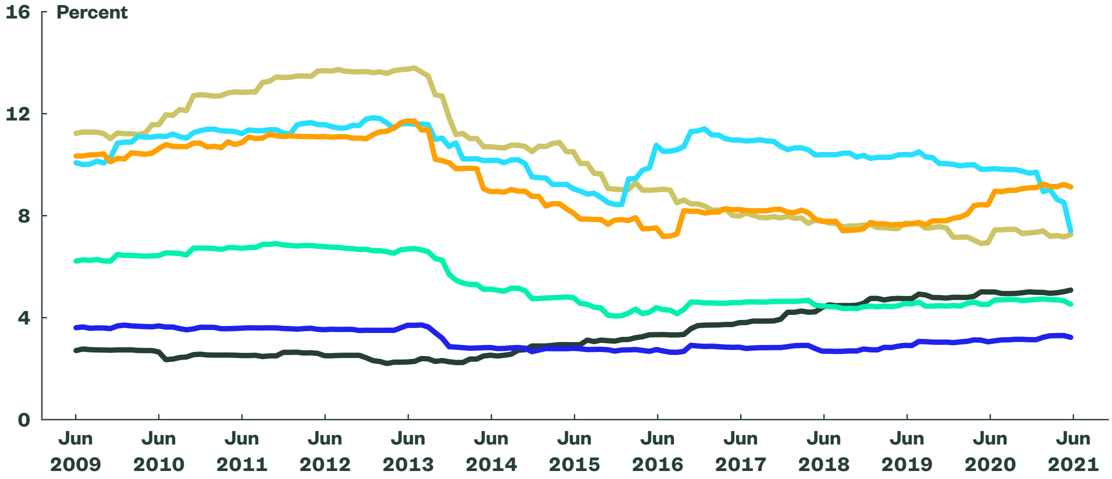


Source: State Street Global Advisors, Bloomberg Finance L.P., CFA Institute as of June 30, 2021.

Alongside the higher recent USD/RMB currency volatility, the volatility of onshore Chinese bonds has also increased of late (Figure 9). Over the last five years, the volatility of China Treasury and Policy Bank bonds was similar to that of Global Aggregate bonds, but still much lower than those of most regional aggregate bonds and emerging market local currency bonds.

Figure 9
5-Year Rolling Volatility of Major Bond Indices, Based on USD Unhedged Returns (Jul 2009–Jun 2021)

- China Treasury and Policy Bank
- Global Aggregate
- US Aggregate
- Euro Aggregate
- Japanese Aggregate
- Sterling Aggregate



Source: State Street Global Advisors, Bloomberg Finance L.P., JPMorgan, as of June 30, 2021. China Treasury and Policy Bank = Bloomberg Barclays China Treasury and Policy Bank USD unhedged index; Global Aggregate = Bloomberg Barclays Global Aggregate USD unhedged index; US Aggregate = Bloomberg Barclays US Aggregate index in USD; Euro Aggregate = Bloomberg Barclays Euro Aggregate USD unhedged index; Japanese Aggregate = Bloomberg Barclays Japanese Aggregate USD unhedged index; Sterling Aggregate = Bloomberg Barclays Sterling Aggregate USD unhedged index; Emerging Market Local Currency Debt = JPMorgan GBI-EM Global Diversified USD unhedged index .

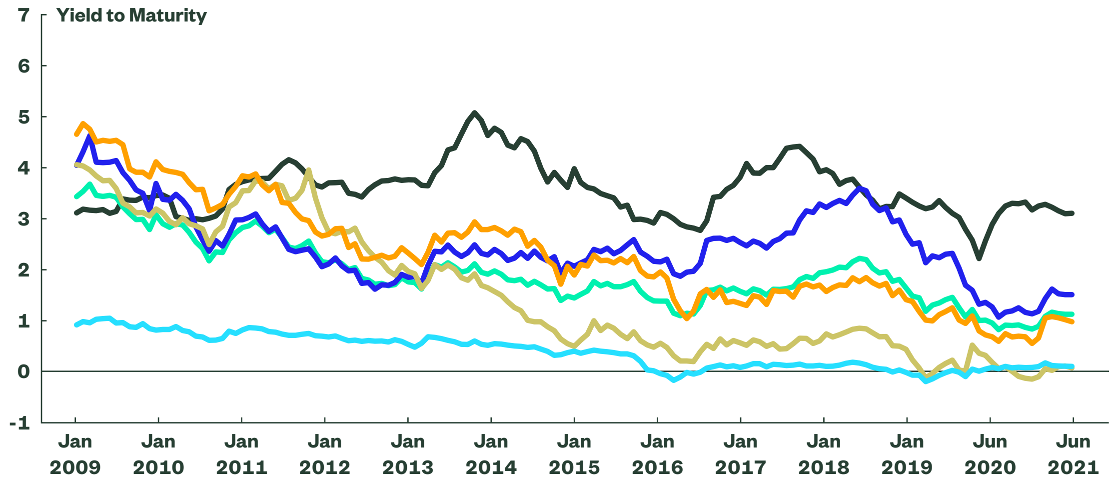
Investment Grade Bonds: Chinese Bonds Offer Yield Enhancement

As illustrated in Figure 10, the yields of Global Aggregate bonds and the four major regional aggregate bonds have generally trended downwards over the past decade, driven largely by the accommodative monetary policies of major developed market central banks during this time.

Yields of US Aggregate bonds rose significantly from 2016 to 2018, reflecting the series of rate hikes implemented by the US Federal Reserve as it normalised interest rate levels. However, US bond yields trended downwards again since 2019 as the Fed reversed course and cut interest rates to stimulate the US economy. In the UK, yields on Sterling Aggregate bonds stabilised briefly in late 2017 and 2018 as the Bank of England tentatively began the interest rate normalisation process at the end of 2017. UK bond yields dropped again since 2019 as the UK first paused the rate normalisation process and then cut rates significantly in early 2020. Elsewhere, yields on the Euro and Japanese Aggregate bonds have remained at very low levels as the respective central banks have maintained easy monetary policy.

Figure 10
Yield to Maturity of Major Bond Indices (Jan 2009–Jun 2021)

- China Treasury and Policy Bank
- Global Aggregate
- US Aggregate
- Euro Aggregate
- Japanese Aggregate
- Sterling Aggregate



Source: State Street Global Advisors, Bloomberg, as of June 30, 2021.

Contrasting with the developed market experience, the yield of the China Treasury and Policy Bank bonds rose during the first half of this period and then trended downwards from 2014 to 2016 as the People's Bank of China (PBoC) cut interest rates to boost the slowing domestic economy. In line with the brighter outlook in 2017, yields then rose once again. Yields have since fallen generally as earlier non-monetary tightening measures have weighed on growth although we do note that over the last few months yields have moved back up as growth has returned after the economic closure due to Covid-19.

As of June 2021, the yield to maturity of China Treasury and Policy Bank bonds was significantly higher than those of Global Aggregate bonds and major regional aggregate bonds. Its credit rating was similar to that of Japan and the Euro Aggregate and slightly lower than the US Aggregate, Global Aggregate and Sterling Aggregate, but with a shorter duration. When compared to Global Aggregate Corporate bonds, China Treasury and Policy Bank bonds still offer higher yields with a shorter duration, and a better credit rating. Therefore, we believe that China's higher relative yields and lower duration should be a relatively attractive combination for many investment grade investors. Looking at the yield over duration ratio, China bonds also offer a relatively better cushion against potential rising rates. (The yield/duration calculates the breakeven point at which falling bond prices will overwhelm the interest income, thereby resulting in a capital loss.)

Figure 11
Bloomberg Barclays Bond Index Characteristics, as of June 30, 2021

	Yield to Maturity (%)	Index Rating	Modified Duration	Yield/Duration (%)
China Treasury and Policy Bank	3.1	A1	5.6	0.5
Global Aggregate	1.1	AA3/A1	7.5	0.2
US Aggregate	1.5	AA1/AA2	6.6	0.2
Euro Aggregate	0.1	AA3/A1	7.7	0.0
Japanese Aggregate	0.1	A1/A2	9.7	0.0
Sterling Aggregate	1.0	AA3/A1	11.4	0.1
Global Aggregate — Corporate	1.5	A3/BAA1	7.5	0.2

Source: State Street Global Advisors, Bloomberg, as of June 30, 2021. * Bloomberg Barclays use the middle rating of Moody's, S&P and Fitch.

China's sovereign credit rating outlook is currently stable, although it was cut by a notch in September 2017 by S&P, which cited increased risks after a prolonged period of strong credit growth. According to Moody's, Chinese authorities face challenges in implementing policies that limit or reduce leverage and improve the allocation of capital in the economy, while preserving robust GDP growth, and economic and financial stability. We believe that policymakers have the necessary flexibility to manage the deleveraging process in a controlled and gradual way — this makes China's debt situation manageable, rather than a serious cause for concern.

Liquidity Gap Between China Bonds and Developed Market Bonds is Improving

While the onshore China bond market may not be as liquid as developed market peers, its liquidity has improved over time. There is still a liquidity gap between newly-issued bonds and older bonds. Newly-issued bonds remain relatively liquid for at least a year after issue, and in some cases for up to two years. Thereafter, market flow and secondary demand begins to taper off as Chinese domestic investors generally have more of a buy-and-hold mindset. Recently, the government has reopened existing bonds to build up larger outstanding issue size and reduce the number of new issues per year, thereby increasing the time these bonds can be actively traded in the secondary market. This has helped improve the liquidity of existing bonds.

Recent Bloomberg and JPM index inclusion events have proven that investors have been able to successfully gain exposures without a large liquidity challenge. The upcoming FTSE index inclusion is expected to further attract more foreign inflows into Chinese bonds.

Growing Market: The Chinese Bond Market is Less Mature Than Developed Markets

China is still a developing country and the bond market has been open to foreign investors for a relatively short period of time. As a consequence, the market is not yet as mature as its developed market peers and operational differences exist in areas such as trading requirements and settlement. Nevertheless, investors are encouraged by efforts from the Chinese authorities to engage market participants to improve on its market practices to be more aligned with global standards and practices. Electronic trading has been successfully introduced into China bond trading over recent years, further reducing some of the operational challenges that investors mayface.

There are two main access routes for new entrants to the market: Bond Connect and the China Interbank Bond Market direct access programme. Government bond futures are currently unavailable to foreign investors as a hedging tool. Over time, we expect these operational issues will be addressed, but in the near term this creates potential challenges for investors.

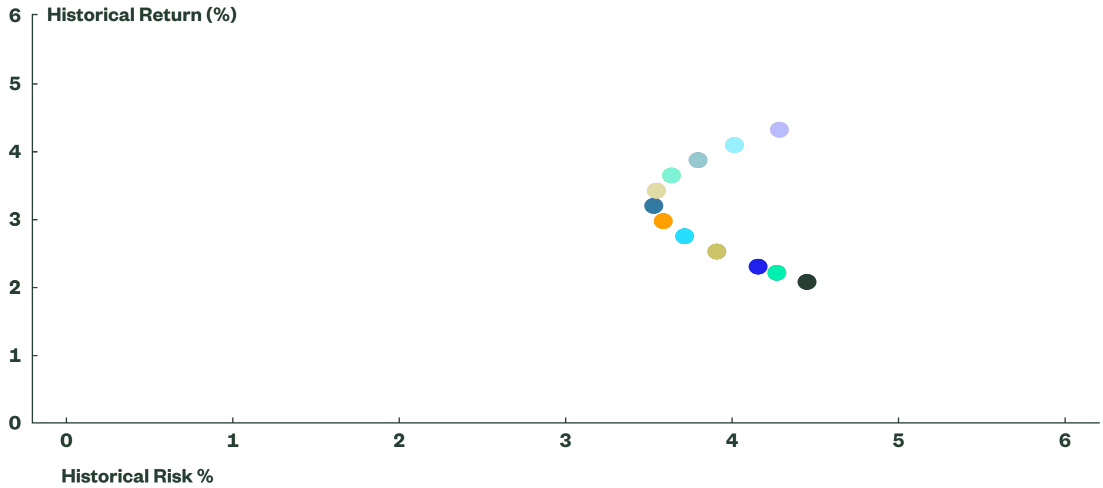
Including Chinese Bonds in Fixed Income Portfolios: The Impact

- **Adding Chinese bonds to a global bond portfolio can bring considerable diversification benefits.**

- **Our analysis shows that investors should consider making a meaningful allocation to Chinese bonds.**

Using historical 10-year return and risk metrics, we ran an optimisation to look at different combinations of Chinese bonds and Global Aggregate bonds in a portfolio. Adding Chinese bonds to a Global Aggregate bond portfolio led to a reduction in portfolio risk and an increase in portfolio return up to a 50/50 split between the two indices (see Figure 12). This outcome is purely based on historical returns and risk metrics. We recognise that investors are not going to replace 50% of their Global Aggregate bond exposure with onshore Chinese bonds; however, this analysis shows the diversification benefits of adding Chinese bonds in a global bond portfolio. The diversification benefits have also been consistent over different historical time horizons.

Figure 12
Historical Hypothetical Portfolio Return & Risk with Different Combinations of Chinese Bonds and Global Aggregate Bonds, Based on USD Unhedged Returns (Jul 2011–Jun 2021)



	0% CNY Bond/ 100% Glb Agg	7% CNY Bond /93% Glb Agg	10% CNY Bond/ 90% Glb Agg	20% CNY Bond/ 80% Glb Agg	30% CNY Bond/ 70% Glb Agg	40% CNY Bond/ 60% Glb Agg	50% CNY Bond/ 50% Glb Agg	60% CNY Bond/ 40% Glb Agg	70% CNY Bond/ 30% Glb Agg	80% CNY Bond/ 20% Glb Agg	90% CNY Bond/ 10% Glb Agg	100% CNY Bond/ 0% Glb Agg
Return (%)	2.05	2.19	2.28	2.50	2.73	2.95	3.18	3.40	3.62	3.85	4.07	4.30
Risk (%)	4.46	4.27	4.16	3.91	3.72	3.59	3.53	3.55	3.64	3.80	4.02	4.29
Return/Risk	0.46	0.51	0.55	0.64	0.73	0.82	0.90	0.96	1.00	1.01	1.01	1.00

Source: State Street Global Advisors, Bloomberg, Morningstar Direct as of June 30, 2021. Chinese bonds (CNY Bond) = Bloomberg Barclays China Treasury and Policy Bank USD unhedged index; Global Aggregate (Glb Agg) = Bloomberg Barclays Global Aggregate USD unhedged index.
For Illustrative Purposes Only. Past performance is not a reliable indicator of future performance. Returns were achieved by mathematically combining the actual performance data of the Bloomberg Barclays China Treasury and Policy Bank USD unhedged index and the Bloomberg Barclays Global Aggregate USD unhedged index. The performance assumes no transaction and rebalancing costs, so actual results will differ.

How a Rise in China Bond Correlation and Volatility Impacts the Mix in Fixed Income Portfolios

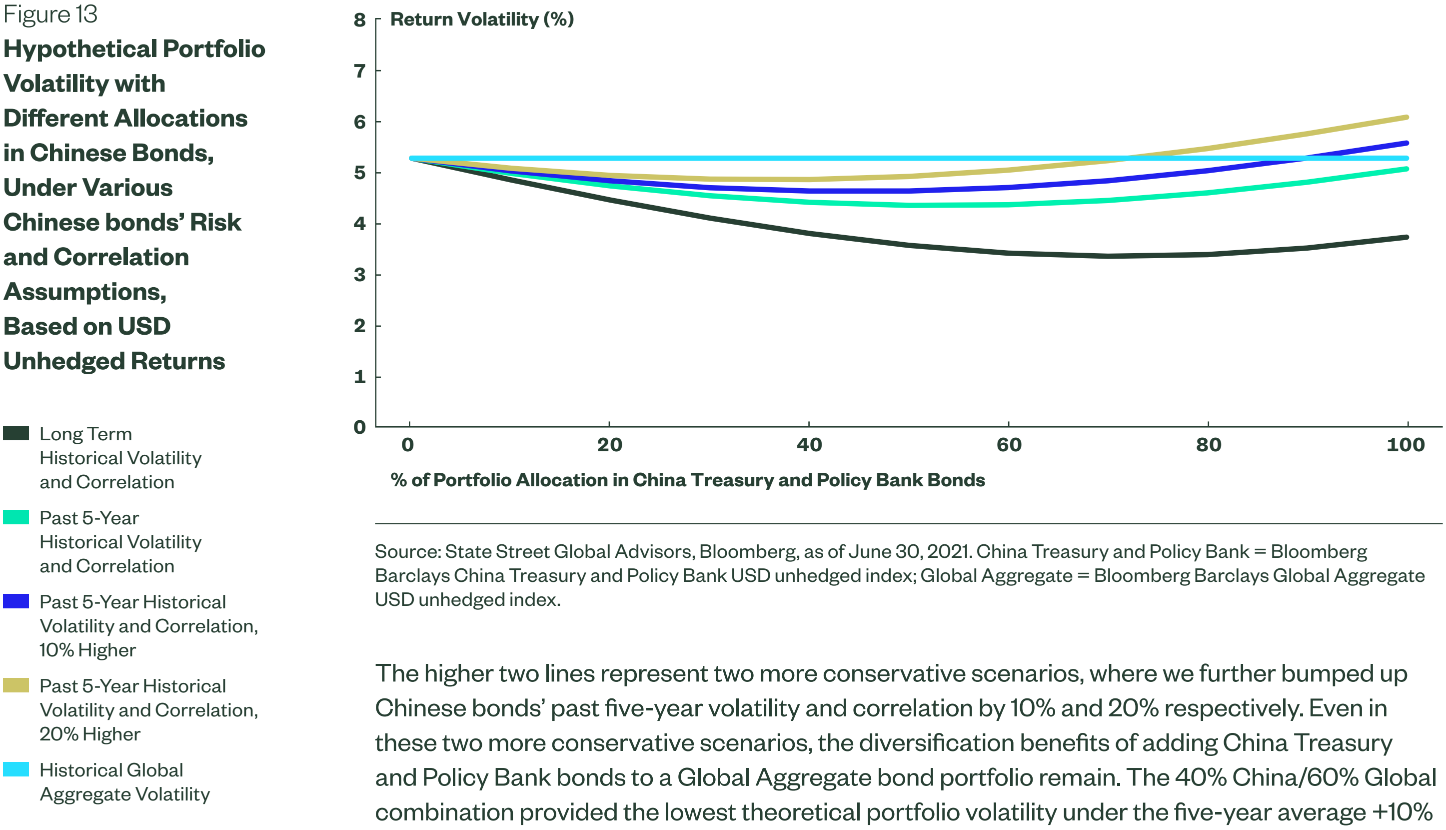
China bond correlation and volatility have historically been low relative to Global Aggregate bonds on a long-run basis, something that is key to its diversification benefits. However, this has risen over the last five years and we assessed the impact this could have on the China bond diversification benefits in a portfolio if this trend continues.

Figure 13 illustrates the total volatility of a hypothetical portfolio with different asset mixes of China Treasury and Policy Bank bonds and Global Aggregate bonds, under various Chinese bonds' risk and correlation assumptions.

The straight horizontal line shows the long-term historical volatility of Global Aggregate bonds as 5.28%. As represented by the lowest line, adding China Treasury and Policy Bank bonds has historically helped to reduce the overall volatility of a Global Aggregate bond portfolio over the long term. The mix of 70% China Treasury and Policy Bank/30% Global Aggregate had the lowest portfolio volatility.

However, given the recent rise in China bond volatility and correlation between China Treasury and Policy Bank bonds and Global Aggregate bonds, the second-lowest line (based on five-year data to June 2021) is more realistic of investors' recent experience. Allocating to China Treasury and Policy Bank bonds would still provide diversification benefits, with the mix of 50% China Treasury and Policy Bank/50% Global Aggregate having the lowest theoretical portfolio volatility.

Figure 13
Hypothetical Portfolio Volatility with Different Allocations in Chinese Bonds, Under Various Chinese bonds' Risk and Correlation Assumptions, Based on USD Unhedged Returns



Source: State Street Global Advisors, Bloomberg, as of June 30, 2021. China Treasury and Policy Bank = Bloomberg Barclays China Treasury and Policy Bank USD unhedged index; Global Aggregate = Bloomberg Barclays Global Aggregate USD unhedged index.

The higher two lines represent two more conservative scenarios, where we further bumped up Chinese bonds' past five-year volatility and correlation by 10% and 20% respectively. Even in these two more conservative scenarios, the diversification benefits of adding China Treasury and Policy Bank bonds to a Global Aggregate bond portfolio remain. The 40% China/60% Global combination provided the lowest theoretical portfolio volatility under the five-year average +10% volatility/correlation and the five-year average +20% volatility/correlation scenarios.

Bond returns are difficult to predict, but taking current yields as proxies for bond return forecasts it would be reasonable to assume that the medium- to long-term return forecast of China Treasury and Policy Bank bonds would be higher than that of the Global Aggregate bonds. Considering the strong diversification benefits that onshore Chinese bonds could provide to a Global Aggregate bond portfolio (even with similar return forecasts), this analysis purely based on bond risk assumptions suggests that investors should consider making a meaningful allocation to Chinese bonds.

While this analysis shows that Chinese bonds can provide very strong benefits to a global bond portfolio, a 40% allocation is going to be too high for most investors. Aside from the quantitative factors, investors will need to consider qualitative factors such as credit risk, the level of market development, access and operational differences, as well as potential differences in liquidity compared to more developed markets. On this basis, we suggest that foreign investors build onshore China bond exposures gradually. However, as China further develops and opens up its bond market, we believe that investors could consider an allocation over and above the current 7% index inclusion level in order to take advantage of the strong diversification benefits that we believe would remain in the foreseeable future.

To Hedge or Not to Hedge

- **Investing in Chinese bonds also presents diversification benefits on a USD-hedged basis.**
- **As a developing market, China is still subject to fluctuating investor sentiment and short-term volatility, despite efforts of the Chinese authorities to achieve a "managed float" exchange rate regime.**

On a USD-hedged basis, China Treasury and Policy Bank bonds would continue to provide diversification benefits to global bond portfolios given their relatively low correlation with global aggregate bonds and major regional aggregate bonds (Figure 14).

Figure 14
Asset Correlation Based on USD Hedged Returns (Jul 2004–Jun 2021)

	China Treasury and Policy Banks	Global Aggregate	US Aggregate	Euro Aggregate	Japanese Aggregate	Sterling Aggregate
China Treasury and Policy Bank	1.00	0.18	0.15	0.10	0.22	0.17
Global Aggregate	**0.18**	1.00	0.93	0.85	0.63	0.80
US Aggregate	**0.15**	0.93	1.00	0.64	0.51	0.71
Euro Aggregate	**0.10**	0.85	0.64	1.00	0.46	0.63
Japanese Aggregate	**0.22**	0.63	0.51	0.46	1.00	0.45
Sterling Aggregate	**0.17**	0.80	0.71	0.63	0.45	1.00

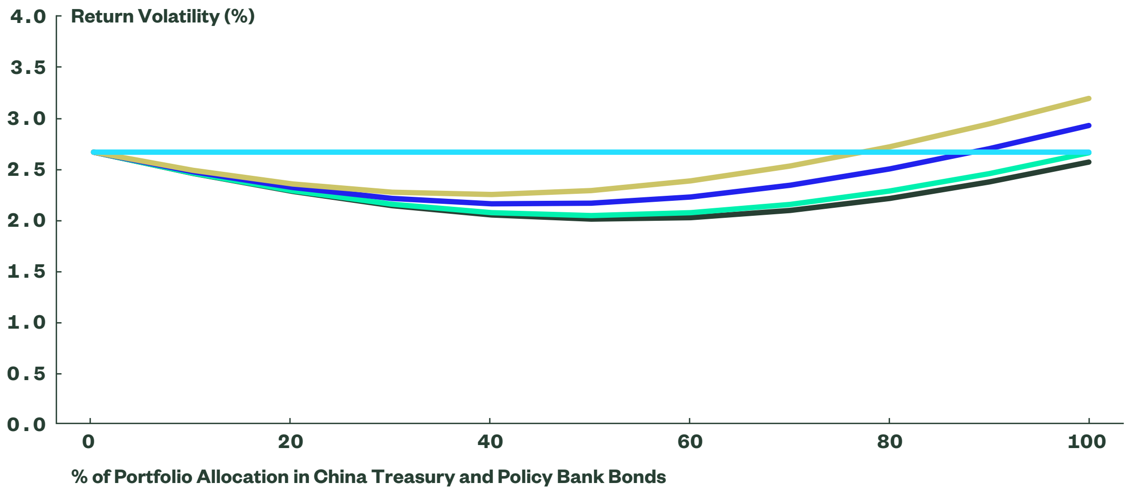
Source: State Street Global Advisors, Bloomberg, as of June 30, 2021. China Treasury and Policy Bank = Bloomberg Barclays China Treasury and Policy Bank USD hedged index; Global Aggregate = Bloomberg Barclays Global Aggregate USD hedged index; US Aggregate = Bloomberg Barclays US Aggregate index in USD; Euro Aggregate = Bloomberg Barclays Euro Aggregate USD hedged index; Japanese Aggregate = Bloomberg Barclays Japanese Aggregate USD hedged index; Sterling Aggregate = Bloomberg Barclays Sterling Aggregate USD hedged index.

Figure 15 illustrates a similar analysis on correlation and volatility scenarios to the one referenced earlier, based on USD-hedged returns. We observe that even in the most conservative scenario (as represented by the orange line where we bumped up the USD-hedged Chinese bonds' past five-year volatility and correlation by 20% as Chinese bonds' risk and correlation assumptions), allocating to China Treasury and Policy Bank bonds has provided diversification benefits. The mix of 40% China Treasury and Policy Bank bonds / 60% Global Aggregate bonds has the lowest theoretical portfolio volatility.

Figure 15

Hypothetical Portfolio Volatility with Different Allocation In Chinese Bonds, Under Various Chinese Bonds' Risk And Correlation Assumptions, Based on USD Hedged Returns

- Long Term Historical Volatility and Correlation
- Past 5-Year Historical Volatility and Correlation
- Past 5-Year Historical Volatility and Correlation, 10% Higher
- Past 5-Year Historical Volatility and Correlation, 20% Higher
- Historical Global Aggregate Volatility



Source: State Street Global Advisors, Bloomberg, as of June 30, 2021. China Treasury and Policy Bank = Bloomberg Barclays China Treasury and Policy Bank USD hedged index; Global Aggregate = Bloomberg Barclays Global Aggregate USD hedged index.

Currency Hedging and the Outlook for the Chinese Yuan

The mechanics of hedging Chinese currency exposures are different to developed market currencies. Historically, positions have been hedged in the CNY market[2] using non-deliverable forward contracts ("NDFs").[3] USD/CNY contracts have reasonable liquidity out to a 12-month tenor and the offshore daily NDF (CNY) average volume is USD1bn according to HSBC estimates.[4]

More recently, we have seen more investors start to hedge using the CNH market[5] rather than the CNY market. CNH is a fully deliverable currency and the mechanics of hedging are the same as traditional developed market currencies. The CNH market has reasonable liquidity for contracts out to a 12-month tenor. The daily average forward volume of CNH (USD25-30bn), according to HSBC estimates, is already comparable to or more than NOK, SEK or NZD.

Trying to actively position for medium-term currency movements in China is difficult. As a developing market, China is still subject to fluctuating investor sentiment and short-term volatility. Chinese authorities have long targeted a "managed float" exchange rate regime, seeking to control volatility rather than manage to an absolute level. More active investors may choose to hedge if they are more concerned about near-term headwinds such as China's slower growth, the PBoC's easing stance, the tensions with the US and risks in the country's credit sector. However, it is important for potential hedgers to be mindful of the high costs of hedging as they have to pay the near 3% short-term CNY interest rate as part of the hedge.

In the long term, we are still constructive on CNY due to China's relatively resilient growth versus major DM/EM markets, and the continued opening up of Chinese financial markets (i.e. the IMF SDR inclusion and the global bond index inclusion). In our view, the onshore Chinese bond market provides a relatively conservative way of accessing these longer-term currency tailwinds.

Conclusion

Market access to Chinese bonds has improved and with their inclusion in global fixed income indices, investors should now consider what allocation, if any, they might make to onshore Chinese bonds with their global fixed income portfolio.

Our analysis shows that Chinese bonds have historically been lowly correlated with global bonds and could provide meaningful diversification benefits for global bond investors. Furthermore, Chinese bonds are relatively less volatile and offer higher yields compared with most regional aggregate bonds (such as Euro, Japanese and Sterling aggregate bonds).

In our view, investors who need to hedge their CNY back to USD can still take advantage of the diversification benefits provided by Chinese bonds in their fixed income portfolios. However, the Chinese bond market is not as mature and liquid as more developed markets. Therefore, we suggest that investors should gradually increase their allocation to Chinese bonds in a global bond portfolio. As China further develops and opens up its bond market, we believe investors could consider an allocation over and above the current 7% index inclusion level to take advantage of the diversification benefits, which we believe should remain in the foreseeable future.

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Endnotes

1 Please refer to State Street Global Advisors' "Opening of China's Bond Market" (June 2018) for more details of the key China policy developments of the country's bond and FX markets.

2 Chinese currency exchange rate offshore.

3 NDFs are contracts for the difference between an agreed exchange rate and the actual spot rate at maturity, settled with a single payment for one counterparty's profit.

4 Source: Emerging markets currency guide 2021, HSBC, as of January 2021.

5 Chinese currency exchange rate offshore.

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* Pensions & Investments Research Center, as of December 31, 2020.
† This figure is presented as of June 30, 2021 and includes approximately $63.59 billion of assets with respect to SPDR products for which State Street Global Advisors Funds Distributors, LLC (SSGA FD) acts solely as the marketing agent. SSGA FD and State Street Global Advisors are affiliated.

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