June 2023

Research Report

Swap Connect — A Convenient Access Channel to Mainland China's Derivatives Market for Onshore Bond Investment

CONTENTS

Page

Chief China Economist's Office
Hong Kong Exchanges and Clearing Limited

2 June 2023

SUMMARY

China's onshore bond market currently stands as the second largest in the world, on the back of China's rise in the global economy. There is yet the potential for further growth, given the authorities' favourable policies, the relatively small size of the market relative to China's gross domestic product, and the increasing demand for, and use of, RMB-denominated assets globally.

In parallel, foreign investors' participation in the onshore bond market has also risen steadily over the years, thanks to the continuous opening-up of the Mainland capital markets. At the end of 2022, foreign institutions held RMB 3.39 trillion of outstanding onshore bonds in the China Interbank Bond Market, representing 2.7% of the total market. However, the proportion of foreign holdings is still low by international standards and far lower than China's weight in the global economy.

Bonds are subject to interest rate risks, and so interest rate derivatives such as futures, options, swaps and forward rate agreements are often used as effective tools to help investors manage the risk profile of their bond holdings. This in turn facilitates the further development of the bond market. World experience shows that interest rate swaps (IRSs) are the most popular type of interest rate derivatives in the over-the-counter (OTC) market, having a world market share of 86% in April 2022.

In Mainland China, following the market-based interest rate liberalisation reform started in 1996, the onshore OTC interest rate derivatives market has grown rapidly as a result of risk management activities for hedging against the resultant increased interest rate volatility. In 2022, interest rate derivatives transactions on China's interbank market amounted to RMB 21.3 trillion, showing a remarkable growth of over 6 times from RMB 2.8 trillion in 2011. RMB IRSs are the dominant product type in the Mainland OTC interest rate derivatives market, with a market share of 98.6% by trading value in 2022.

Onshore interest rate derivatives play an important role for investors in the management of their onshore bond portfolios. However, challenges exist for the market's further development and opening-up. These include inadequate diversity in market participants, and relatively low liquidity and market transparency.

The introduction of Swap Connect is a milestone step of the further opening-up of the Mainland derivatives market, which will help alleviate the challenges. Swap Connect is a new mutual access arrangement which will enable investors to participate in the financial derivatives markets in the Mainland and Hong Kong through a connection between financial infrastructure institutions in both places for trading, clearing and settlement. Northbound trading of IRSs under Swap Connect is implemented first at the initial stage, allowing international investors to trade and clear onshore RMB IRSs without changing their existing trading and settlement practices. This will give international investors a convenient channel to access the onshore IRS market to better manage their onshore bond investments, thereby encouraging more foreign participation in the onshore bond market. More foreign participation will lead to more participant diversity and higher liquidity, helping further develop both the financial derivatives and bond markets onshore.

With a well-developed financial regulatory framework, market infrastructure and strong global connectivity, Hong Kong is home to a vibrant OTC interest rate derivatives market that is on par with international standards and has active international participation. Founded on this, Swap Connect is believed to effectively support the functional role of Bond Connect to promote the further development and high-level opening-up of China's onshore bond market and also to strengthen Hong Kong's status as the premier offshore RMB hub.

1. INTRODUCTION

The bond market in Mainland China started to open up to international investors through the Qualified Foreign Institutional Investor (QFII) scheme in 2002 and the Renminbi QFII (RQFII) scheme in 2011. Wider access to the China Interbank Bond Market (CIBM) has been enabled by the launch of CIBM Direct[1] in 2016 and Bond Connect[2] in 2017, giving foreign investors easier access to China's onshore bond market. These access channels are able to well serve international investors' growing demand for onshore bond investments, facilitating higher capital flows into the onshore bond market. This, in turn, has led to an increase in demand for interest rate-related risk management tools for onshore bond investments, which has not been fully met yet.

On 4 July 2022, the People's Bank of China (PBOC), the Hong Kong Securities and Futures Commission (SFC) and the Hong Kong Monetary Authority (HKMA) made a joint announcement on the collaboration between Hong Kong Exchanges and Clearing Limited (HKEX), China Foreign Exchange Trade System (CFETS) and Shanghai Clearing House (SHCH) to develop Swap Connect. Swap Connect is a new mutual access arrangement which will enable investors to participate in the financial derivatives markets in the Mainland and Hong Kong through a connection between the market infrastructures in both places, covering trading, clearing and settlement.

Northbound Trading of interest rate swaps (IRSs) commenced at the initial stage, allowing investors from Hong Kong and other parts of the world to participate in this key product type in the Mainland interbank financial derivatives market. Through connecting the market infrastructures in Hong Kong and the Mainland, Swap Connect offers a convenient channel for offshore investors to trade and clear onshore RMB IRSs without changing their existing trading and settlement practices[3]. This marks yet another milestone in the ongoing opening-up of China's financial market.

This report first looks at the increasing significance of China's onshore bond market and the related investment opportunities in the context of global financial markets, and the gradual opening-up of the onshore bond market to foreign investors. It then discusses the importance of interest rate derivatives for bond investments and the related global experiences, as well as the significance of onshore interest rate derivatives as hedging tools for foreign investors with Chinese bond exposure. Lastly, it gives an account of how Swap Connect could facilitate and promote foreign investment in Chinese onshore bonds and provide for Mainland investors' access to offshore interest rate derivatives with Hong Kong's infrastructural support.

2. THE EXPANSION OF CHINA'S ONSHORE BOND MARKET

China's economy and financial markets have grown rapidly in recent years, assuming an increasingly important and influential role in the world economy. Alongside this development, China has continued to open up its capital markets, expanding the breadth and depth of its equity and bond markets.

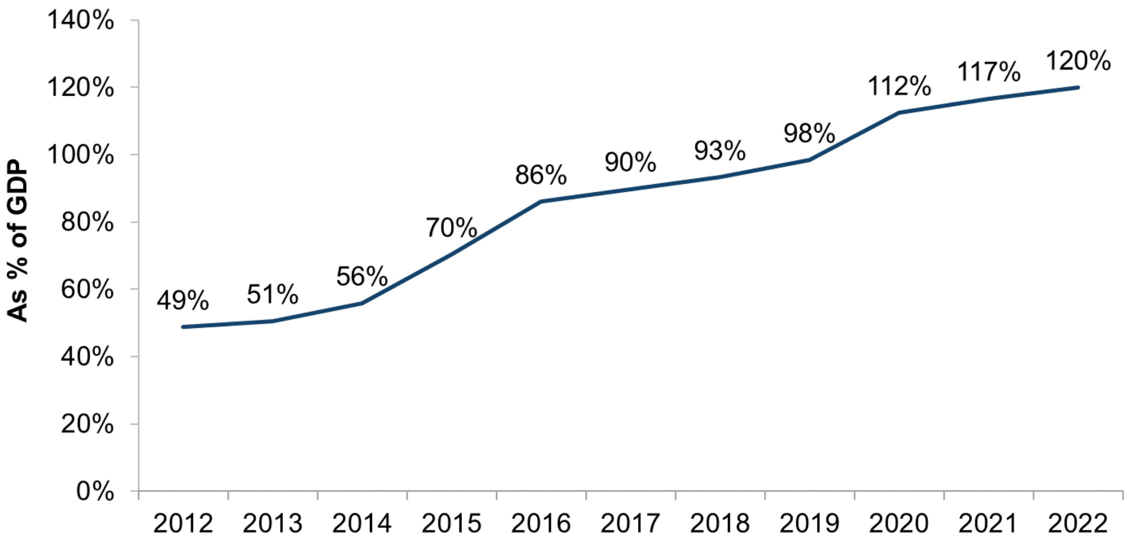
[1] "CIBM Direct" allows all qualified foreign institutional investors to directly access the interbank bond market without any quota limitations as for the QFII and RQFII schemes after policy relaxations announced by the PBOC in February 2016.

[2] Bond Connect is a mutual market access scheme that allows overseas investors to trade bonds on the CIBM (Northbound Trading) and Mainland investors to trade overseas bonds in the Hong Kong market (Southbound Trading) through market infrastructure linkages between the Mainland and Hong Kong. Northbound trading under Bond Connect commenced on 3 July 2017.

[3] See "Swap Connect: a new channel, a new chapter", *HKEX Insight* webpage on HKEX's website, 25 October 2022.

In particular, China's onshore bond market has become the world's second largest since 2019[4]. At the end of 2022, the outstanding amount of onshore bonds was 120% of China's gross domestic product (GDP) (see Figure 1).

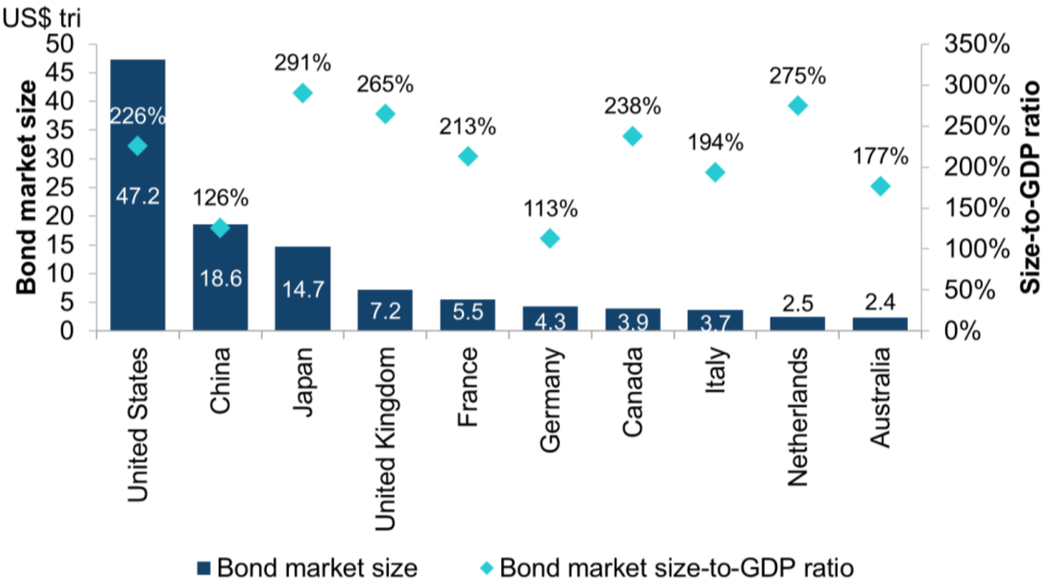
Figure 1. Outstanding amount of onshore bonds as a percentage of China's GDP (2012 – 2022)



Source: Wind.

However, the share of China's onshore bond market as a percentage of its GDP lags behind those of other major economies (which ranged from 177% to 291%), with the exception of Germany (see Figure 2). This means that China's onshore bond market still has a big growth potential.

Figure 2. Bond market size and size-to-GDP ratio of top 10 largest bond market in the world (2020)



Source: Bond market sizes are obtained from debt statistics of Bank for International Settlements (BIS); GDP data is obtained from the World Economic Outlook April 2021 database of the International Monetary Fund (IMF).

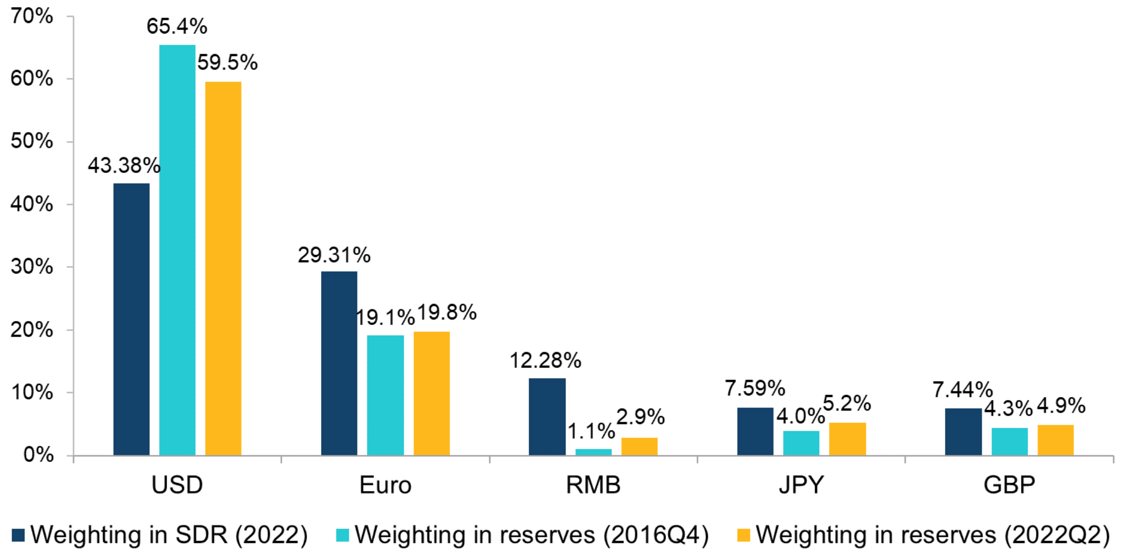
[4] Source: "China's bond market: A playground of untold potential", *Bloomberg*, 12 November 2019.

As outlined in China's 14th Five-Year Plan, vibrant bond markets are essential for efficient capital allocation, and for China's long-term goals of rebalancing the economy and increasing productivity. Accordingly, Chinese authorities will encourage the gradual increase of bonds as a proportion of direct financing in both public and the private sectors[5]. As a result, the supply of Chinese bonds is expected to significantly increase to meet the financing needs of the real economy. Therefore, China's onshore bond market, with its continuous expansion, will grow to become a significant asset pool for global investment.

In addition, the increasing use and acceptance of the Renminbi (RMB) globally — which is the currency denomination of onshore bonds — is also a key supporting factor.

Since 2016, the RMB has been included in the International Monetary Fund (IMF)'s special drawing rights (SDR) currency basket[6]. This has encouraged central banks around the world to increase the proportion of RMB-denominated assets in their foreign reserves. As a result, the share of RMB-denominated assets in global foreign reserves has increased from 1.1% in 2016Q4 to 2.9% in 2022Q2 (see Figure 3). However, the RMB's share in foreign reserves is still relatively small compared to its share in the SDR currency basket (12.28%).

Figure 3. Weighting of each currency in the SDR currency basket and global foreign reserves (2016Q4 and 2022Q2)



Source: IMF's Official Foreign Exchange Reserves (Cofer) database, IMF's website.

Given the increasing importance and use of the RMB in global investments, the upside potential for a higher allocation of global investments into Chinese bonds is huge, subject to the further opening up of the onshore bond market.

For China, the opening up of its onshore capital market could attract a diverse set of global investors, especially professional institutions, which would help strengthen the market's institutional investor base, and in turn increase market sophistication and support the internationalisation of the RMB.

5 See "Yi Hui Man: Increasing the share of direct financing" (〈易會滿：提高直接融資比重〉), published on CSRC's website, 3 December 2020.

6 The special drawing right (SDR) is supplementary reserve asset defined and maintained by the IMF. The SDR is not a currency, but its value is based on a basket of five currencies — the US dollar, the euro, the Chinese renminbi, the Japanese yen, and the British pound sterling. The SDR serves as the unit of account of the IMF and other international organisations and holders of SDRs can exchange for currencies when needed.

For international investors, China's onshore bond market offers them potentially favourable interest rate differentials and diversification benefits, as China's onshore bond market has a relatively different risk-return profile compared to those in major advanced economies and a relatively low correlation with global bond benchmarks[7] due to China's different market structure, interest rate environment and economic cycle.

Given China's large and growing onshore bond market and its appeal to global investors on several fronts, there is a huge potential for increased foreign participation in onshore bonds.

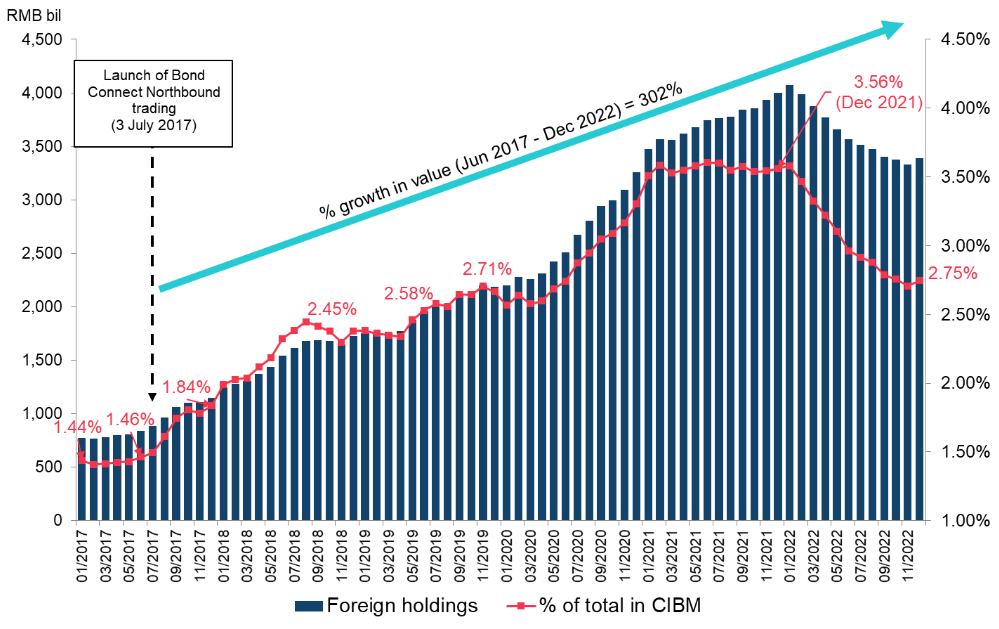
3. FOREIGN PARTICIPATION IN CHINA'S ONSHORE BOND MARKET

3.1 Increasing foreign holdings in China's onshore bond market

Since the launch of Bond Connect in July 2017, total foreign holdings in China's onshore bond market have grown rapidly. At the end of 2022, the amount and proportion of foreign holdings in bonds on the CIBM totalled RMB 3.39 trillion and 2.7% respectively, dropping from their record high of RMB 4 trillion and 3.5% in December 2021 (see Figure 4), as a result of unprecedented changes in world financial markets, such as the sharp rise in US bond interest rates.

Despite the rapid growth of China's onshore bond market over the years, the degree of foreign participation is still low by international standards — in comparison, the share of foreign holdings in bonds in developed markets is over 20%[8].

Figure 4. Foreign holdings in China's onshore bond market (Jan 2017 – Dec 2022)



Source: China Central Depository & Clearing Co., Ltd and SHCH.

---

7 See HKEX research report, "Broadening International Investor Participation in the Mainland Bond Market", published on the HKEX website, 14 Feb 2022.

8 For example, for foreign holdings of US long-term and short-term debt securities was US$13,044 billion as of end-June 2022 (source: U.S. Department of the Treasury, "Preliminary report on foreign holdings of U.S securities at end-June 2022, 28 February 2023), which was over 25% of the total outstanding amount of US debt securities (US$50,740 billion, source: BIS Statistics database). For the UK, about 30% of UK government debt was held by overseas investors in 2021 (source: UK HM Treasury, *Debt Management Report 2022/23*).

The main driving force behind the increase in foreign holdings would probably be the inclusion of China's onshore bonds into three key global bond indices:

(1) Bloomberg Barclays Global Aggregate Index (BBGA) [9]**:** In March 2018, Bloomberg announced that it would add RMB-denominated central government bonds (CGBs) and policy bank bonds to the BBGA. The inclusion started from April 2019 with a 20-month phase-in period and completed in November 2020. Currently, China's weight in BBGA is about 6%.

(2) JP Morgan Government Bond Index-Emerging Markets (GBI-EM) Global Diversified Index[10]**:** In September 2019, JP Morgan stated that the bank would start a phased inclusion of CGBs into its benchmark emerging-market indices. China's weight would be capped at 10% of the GBI-EM global diversified and narrow diversified indices. The inclusion started from 28 February 2020 with a 10-month phase-in period and completed in December 2020.

(3) FTSE World Government Bond Index (WGBI): In March 2021, FTSE Russell confirmed that CGBs would be included into the WGBI[11]. FTSE estimated that China's weight would be around 5.25%, based on the latest available data then. The inclusion has officially started from 29 October 2021, with a 36-month phase-in period[12].

The inclusion into global bond indices is expected to have a significant impact on the allocation of global portfolios if, as expected, passive index-tracking funds and actively managed funds use these indices as benchmarks for their investments.

According to the estimates of FTSE Russell, total potential capital inflows into Chinese bonds would be about US$271 billion to US$299 billion upon the full inclusion of Chinese government bonds into global indices at the given weightings and might further increase by US$207.5 billion if the weightings further increased[13]. Looking forward, international investors may consider making a greater allocation to China's onshore bonds along with the continued index inclusion process, not only in government bonds but also possibly in credit bonds.

3.2 Bond Connect: a major channel to access China's onshore bond market

At present, international investors can access China's onshore bond market through three channels: (1) the QFII and RQFII schemes; (2) the CIBM Direct; and (3) Bond Connect.

Table 1 summarises features of the existing access channels to the onshore bond market.

Table 1. Channels for international investors to enter onshore bond market

	QFII / RQFII	CIBM Direct	Bond Connect
Launch time	Dec 2002 / Dec 2011	Jul 2016	Jul 2017 (Northbound)
Applicable market segments	CIBM, on-exchange market	CIBM	CIBM
Quota limit	No quota limit since May 2020	No quota limit	No quota limit

9 See "Bloomberg to add China to the Bloomberg Barclays Global Aggregate Indices", press announcement on Bloomberg's website, 23 March 2018.

10 See "JPMorgan says China to be included in benchmark bond indexes", *Bloomberg* website, 4 September 2019.

11 See "FTSE fixed income country classification announcement March 2021", published on FTSE Russell's website, 29 March 2021.

12 See "London Stock Exchange Group welcomes the China Bond inclusion to FTSE WGBI", news release on London Stock Exchange's website, 29 October 2021.

13 See "WGBI inclusion confirms China's arrival on global bond stage", published on FTSE Russell's website, May 2021.

Table 1. Channels for international investors to enter onshore bond market

	QFII / RQFII	CIBM Direct	Bond Connect
Currency	Foreign currencies / RMB	Foreign currencies / RMB	RMB
Scope of investment	Cash bonds traded in CIBM and on-exchange market, mutual funds, asset-backed securities, bond forwards, interest rate swaps, forward rate agreements, bond lending and bond repos	Cash bonds traded on CIBM, bond lending, bond forwards, interest rate swaps and forward rate agreements and bond repos	Cash bonds traded on CIBM
Eligible investors	Foreign institutional investors approved by CSRC who meet certain qualifications to invest in equities and bonds in onshore markets	Foreign institutional investors approved by PBOC, including sovereign institutions and private institutional investors	
Transaction tax	Nil	Nil	Nil
Regulators	CSRC, PBOC, SAFE	PBOC, SAFE	PBOC

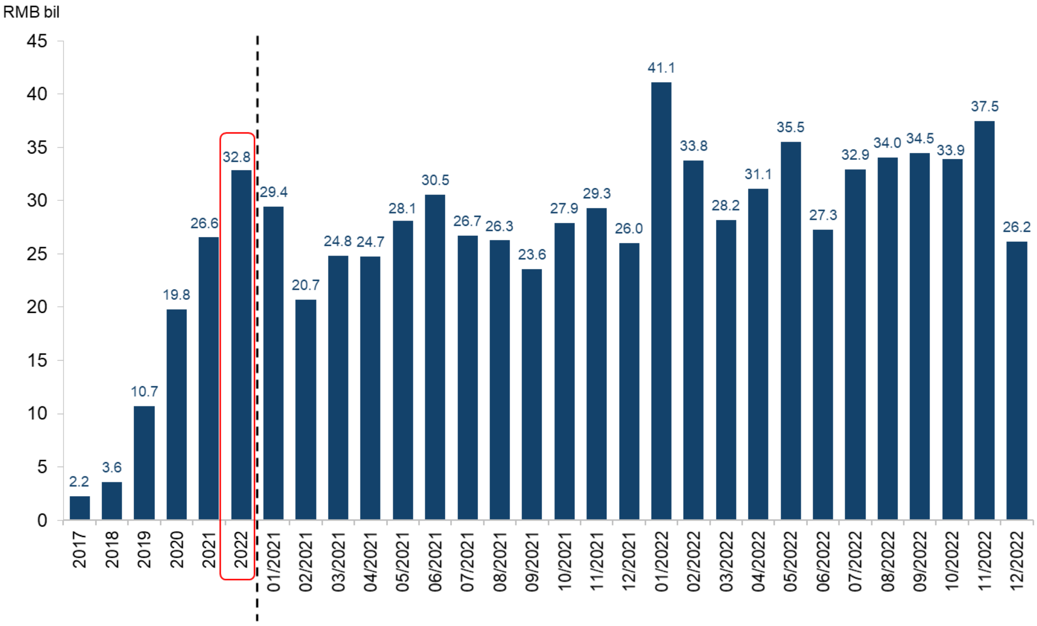
Abbreviations: CFETS — China Foreign Exchange Trade System
CSRC — China Securities Regulatory Commission
PBOC — People's Bank of china
SAFE — State Administration of Foreign Exchange

Source: Publicly disclosed information on the websites of Bond Connect Company Limited (BCCL), CSRC, PBOC and CFETS.

Bond Connect is a scheme that allows international investors to access China's onshore bond market through Hong Kong, and Mainland investors to access the Hong Kong bond market. The access is enabled through the connectivity (or linkages) established between the financial infrastructures in the Mainland and Hong Kong. Bond Connect opens up China's onshore bond market in a controlled manner, thereby providing new impetus to the continued opening-up of the market and the internationalisation of the RMB.

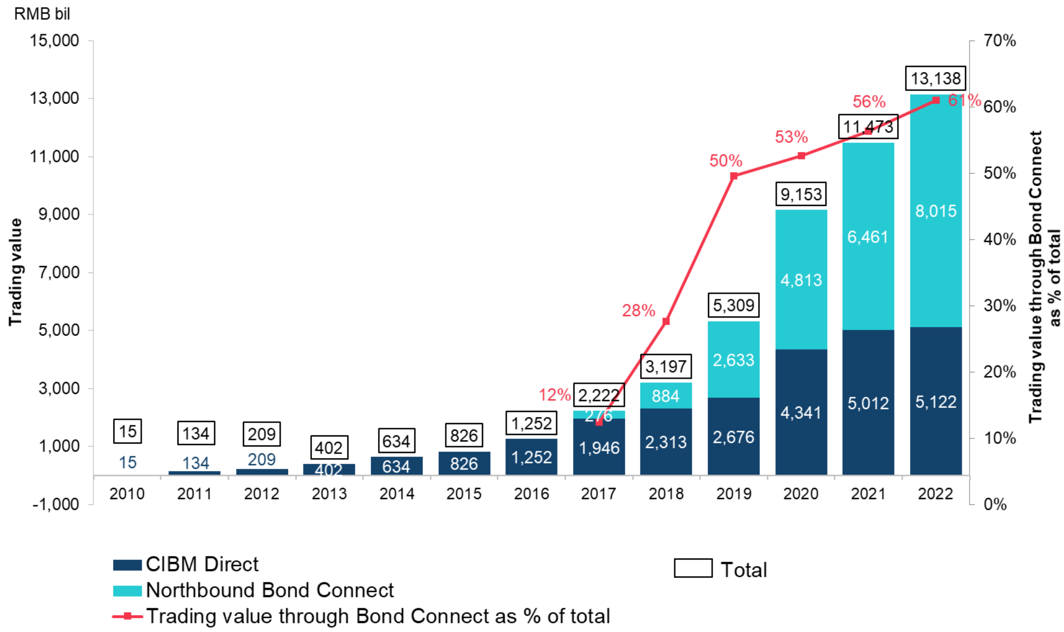
As at the end of December 2022, a total of 784 overseas entities have registered to access the onshore bond market through Bond Connect. In 2022, the average daily turnover value (ADT) rose to RMB 32.8 billion, a 23% increase from 2021 (see Figure 5), and the trading conducted through Bond Connect by overseas investors on CIBM cash bonds constituted a record high of 61% of total cash bond trading value by overseas investors on CIBM (see Figure 6).

Figure 5. ADT through Bond Connect (Jul 2017 – 2022)



Source: BCCL.

Figure 6. Trading value of overseas investors in CIBM cash bonds through CIBM Direct and Bond Connect (2010 – 2022)



Source: CFETS and BCCL.

4. THE IMPORTANCE OF INTEREST RATE DERIVATIVES FOR BOND INVESTMENTS

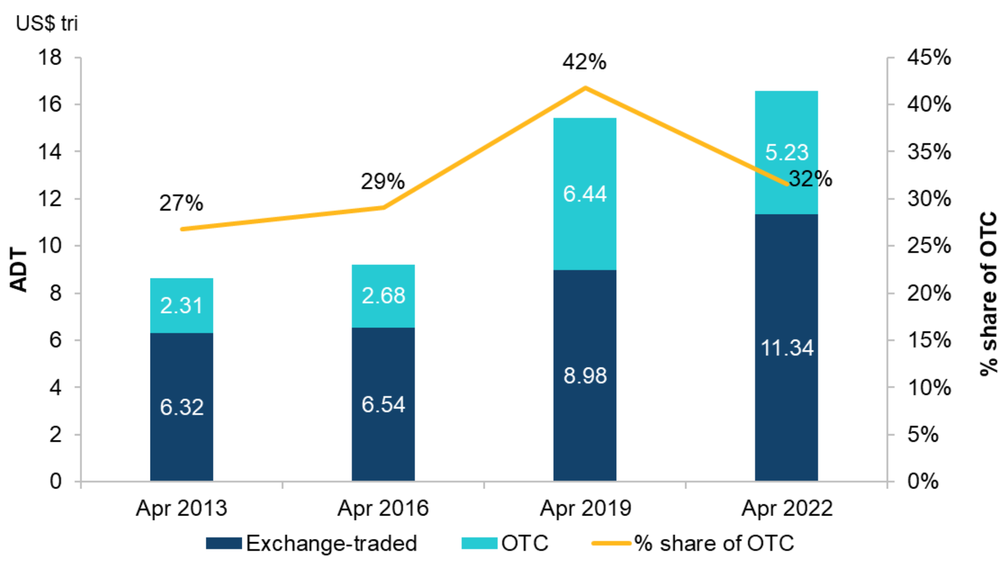
Interest rate derivatives are an important type of financial instrument, the value of which depends on the value of the underlying interest rate. Interest rate derivatives are frequently used to hedge against the volatility of market interest rates. They can also be used to refine the risk profile of the portfolio held, as well as to speculate on interest rate moves.

Since interest rates and bond prices are inversely related[14], bond investors, particularly those who invest in long-term fixed-rate bonds, are directly exposed to interest rate risk and would demand for related risk hedging tools.

Interest rate derivatives in global markets include interest rate futures, options, swaps, and forward rate agreements (FRAs), either in the over-the-counter (OTC) market or the exchange market. Exchange-traded derivatives, which are mostly futures and options, are traded in the centralised exchange market by market participants in standardised contracts set by the exchanges. OTC derivatives are traded one-on-one directly by the two trading parties with each other. Major OTC derivatives include forwards, swaps and options.

According to the statistics maintained by the Bank for International Settlements (BIS), ADT of interest rate derivatives has grown by 92% during the 9-year period from April 2013 to April 2022. The ADT in the exchange market remained higher than in the OTC market during the period, but that in the OTC market grew faster — ADT in the OTC market increased by 126% from US$2.3 trillion in April 2013 to US$5.2 trillion in April 2022 versus 79% for the exchange market. The share of the OTC market in the total turnover of interest rate derivatives (the exchange market and the OTC market combined) increased from 27% in April 2013 to 32% in April 2022. (See Figure 7.)

Figure 7. ADT of interest rate derivatives in global markets (Apr triennial, 2013 – 2022)



Source: Derivatives statistics, available on the BIS Statistics Explorer website, data downloaded on 19 Jan 2023.

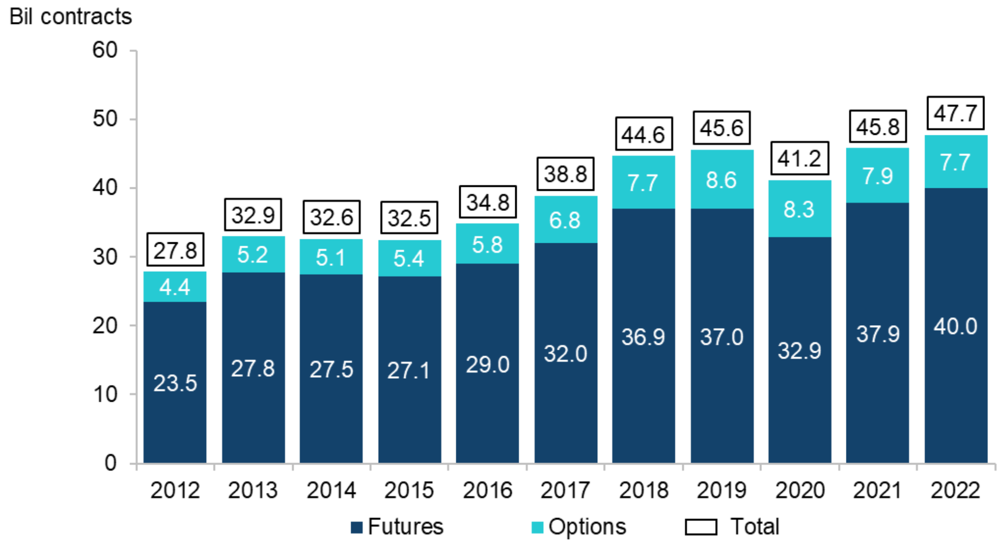
4.1 Interest rate derivatives in the exchange market

Interest rate derivatives traded in the exchange market comprise futures and options contracts. The global trading volume of interest rate derivatives on exchanges in 2022 was

[14] See: "The inverse relationship between interest rates and bond prices", webpage on *Investopedia* (updated 16 May 2022), viewed on 27 February 2023.

about 48 billion contracts, an increase of 4% from 2021. Futures accounted for most of the volume — 84% for futures versus 16% for options in 2022 (see Figure 8).

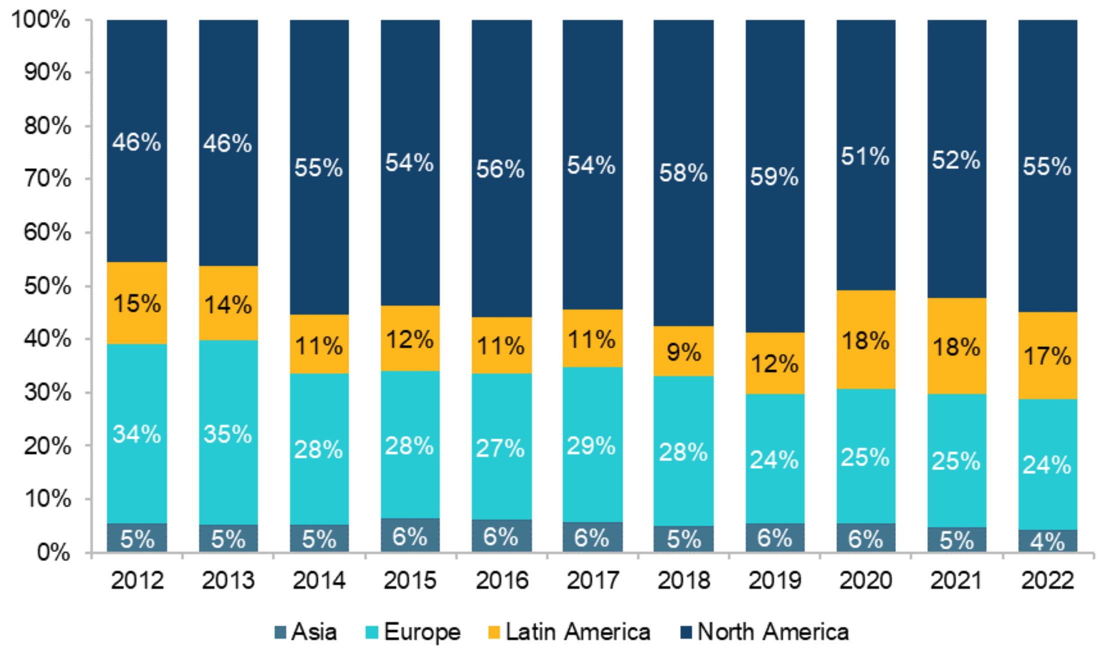
Figure 8. Global trading volume of interest rate derivatives on exchanges (2012-2022)



Source: ETD Tracker webpage on the website of the US Futures Industry Association (FIA), data downloaded on 14 February 2023.

Over the past decade, North America[15] has accounted for the majority of global exchange trading volumes in interest rate derivatives (about 55% in 2022), followed by Europe (about 17% in 2022). Asia's market share remained small (about 4% in 2022) (see Figure 9).

Figure 9. Market share of global interest rate derivatives volume on exchanges by region



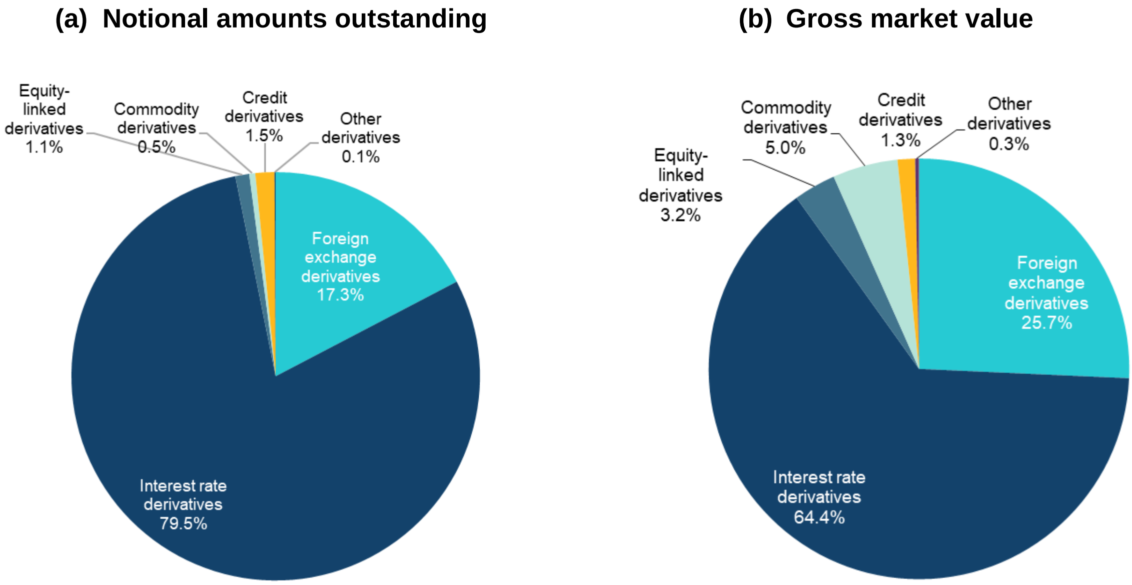
Source: ETD Tracker webpage on the website of the US Futures Industry Association (FIA), data downloaded on 14 February 2023.

15 According to FIA statistics for 2022, the CME Group accounted for about 97.5% of the interest rate derivatives trading volume in North America.

4.2 Interest rate derivatives in the OTC market

In the OTC derivatives market, interest rate contracts dominated in terms of notional amount outstanding and gross market value — at 79.5% and 64.4% respectively, followed by foreign exchange contracts — at 17.3% and 25.7% respectively in the first half of 2022 (2022H1) (see Figure 10).

Figure 10. Composition of global OTC derivatives market by product type (2022H1)



Note: Percentages may not add up to 100% due to rounding.

Source: Derivatives statistics, available on the BIS Statistics Explorer website, data downloaded on 14 February 2023.

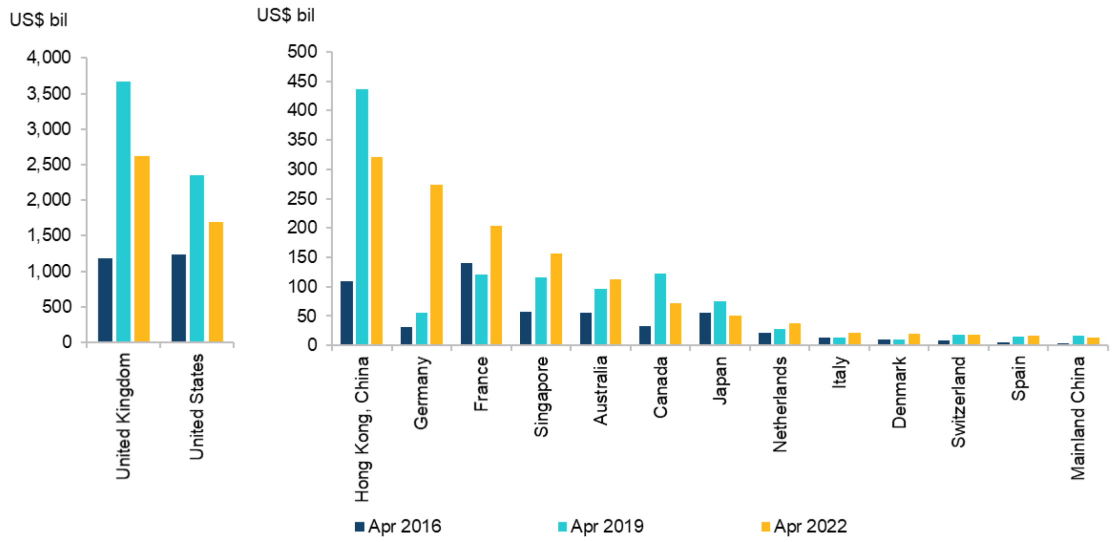
In terms of trading value, interest rate derivatives were almost equally active as foreign exchange derivatives — in April 2022, global OTC interest rate derivatives had an ADT of US$5,226 billion, representing 97% of the ADT of OTC foreign exchange derivatives (US$5,402 billion)[16].

Geographically, the UK and the US together accounted for 75% of global ADT in OTC interest rate derivatives in April 2022, while Hong Kong ranked third (see Figure 11).

In fact, the trading of OTC interest rate derivatives has remained highly concentrated over the past six years — the top six markets (the UK, US, Hong Kong, Germany, France, Singapore) accounted for over 90% of total ADT in April 2022, similar to levels seen in April 2016. However, there have been some shifts, namely four out of the top six markets increased their market shares, at the expense of mainly the US. Notably, Mainland China has a negligible global market share despite a significant growth in its OTC interest rate derivatives ADT (by 225% between April 2016 and April 2022). (See Figure 12.)

16 Source: "BIS Triennial Survey of foreign exchange and OTC Derivatives Trading", database webpage on BIS Statistics Explorer website, viewed on 31 January 2023.

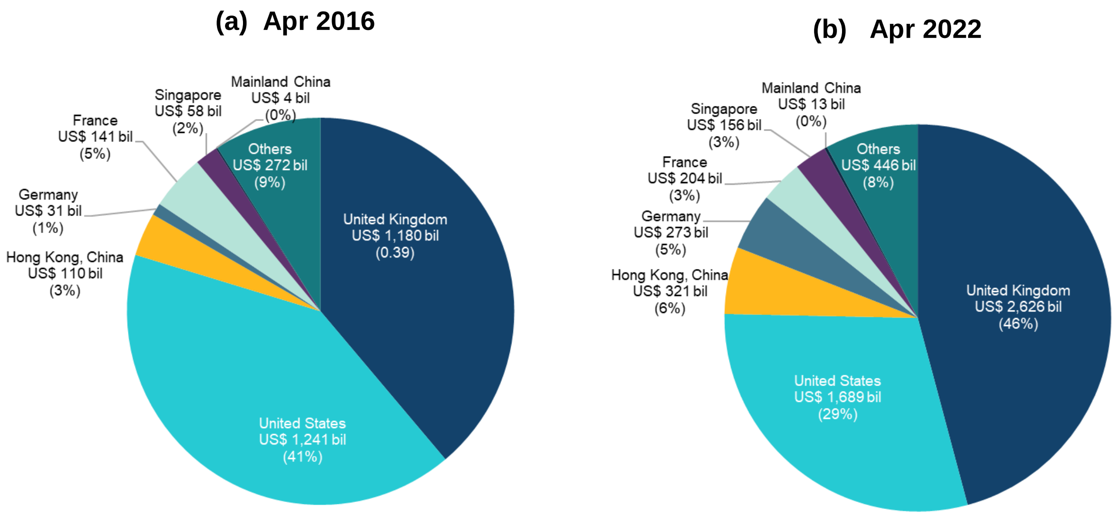
Figure 11. Turnover value of OTC interest rate derivatives by country/market (Apr biennial, 2016 – 2022)



Note: The figure shows the top 15 countries ranked by turnover in April 2022.

Source: Derivatives statistics, available on the BIS Statistics Explorer website, data downloaded on 14 February 2023.

Figure 12. Composition of ADT of OTC interest rate derivatives by country/market (Apr 2016 and Apr 2022)



Note: The charts show the top 6 countries by market share in April 2022 and Mainland China. Market shares are computed relative to the sum of the ADT figures of all countries/markets reported in the *BIS Triennial Central Bank Survey of Foreign Exchange and Derivatives Market Turnover*.

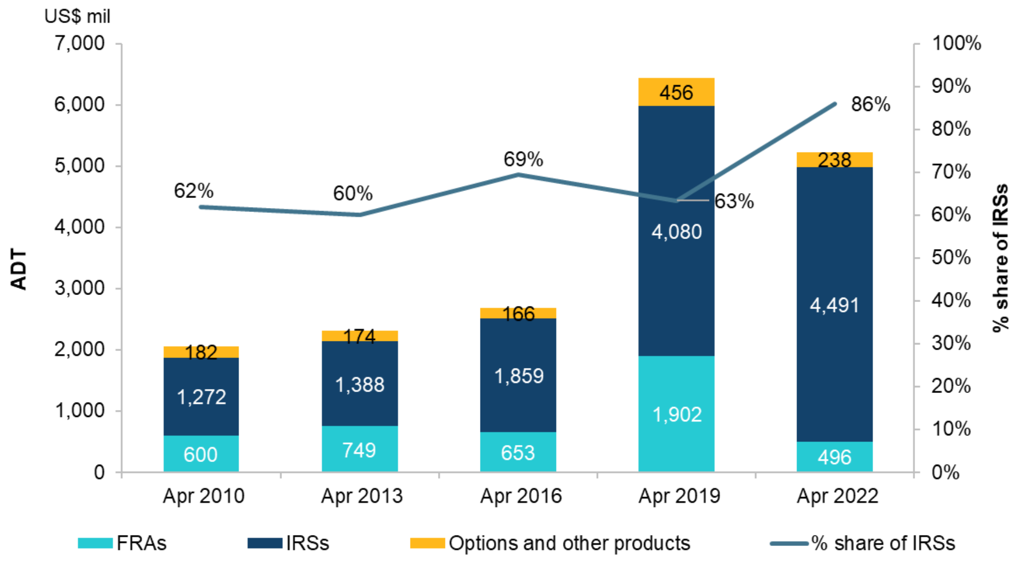
Source: Derivatives statistics, available on the BIS Statistics Explorer website, data downloaded on 14 February 2023.

4.3 Interest rate swaps: the dominant OTC interest rate derivatives in the world

An interest rate swap (IRS) is a special kind of forward contract in which one stream of future interest payments is exchanged for another based on a specified principal amount. IRSs usually involve the exchange of a fixed interest rate for a floating rate, or vice versa, to manage exposure to fluctuations in interest rates.

IRS is the most popular type of OTC interest rate derivatives in the global market by trading value — their market share reached 86% in April 2022, with the ADT amounting to US$4.5 trillion (an increase of 10% from April 2019) (see Figure 13).

Figure 13. ADT of global OTC interest rate derivatives (by instrument)



Source: Derivatives statistics, available on the BIS Statistics Explorer website, data downloaded on 14 February 2023.

IRSs can be used as interest rate locks on bond issuance[17]. When a corporation decides to issue a fixed-rate bond, it may enter into swap contracts to give them time to find buyers while locking in the current interest rate. If interest rates rise in this period, the swap contracts will be worth more, compensating for the additional financing incurred for bond issuance at the higher interest rate.

For investors, IRSs are useful instruments for portfolio management of interest rate exposure through bond investments[18]. In addition, IRS can be used for asset-liability management purposes. For example, a pension fund may have a long-term liability to pay out pensions to retirees. By entering an IRS transaction to lock in a fixed interest rate for a certain period, the fund can better match its assets to its liabilities and reduce the risk of funding shortfalls.

Therefore, IRSs can help enhance the ability of market participants to cope with interest rate volatility, in particular for bond issuers or investors, thereby providing liquidity support for the bond market. For bond issuers, the use of IRS of the appropriate structure can significantly reduce the bond funding cost. For bond investors, IRS can be used to hedge against their interest rate risk or reap potential gains from rising interest rates, and better manage their bond investment portfolios.

5. INTEREST RATE DERIVATIVES IN THE MAINLAND MARKET

The development of the onshore OTC derivatives market has been closely linked to Mainland China's interest rate liberalisation reform. Mainland China formally embarked on interest rate liberalisation reforms in June 1996, at which point the interbank-offered rate became fully

[17] See, for example, "Understanding Interest Rate Swaps", *Investment Education* webpage on PIMCO's website.

[18] In an IRS transaction which involves the exchange of a fixed interest rate for a floating rate, the party who exchanged out a floating rate income will receive a fixed income stream to avoid interest rate fluctuations while the other party will get the exposure to potential profits from a floating rate.

market priced[19]. The deregulation of interest rates has led to higher interest rate levels across the market, increasing interest rate volatility and narrowing interest rate spreads.

As a result of the reforms, the trading value of IRSs in the interbank market increased as they became commonly used by market participants to hedge the increased interest rate volatility risk. In 2022, interbank market interest rate derivatives transactions in the Mainland amounted to RMB 21.3 trillion[20], showing a remarkable growth of over 6 times from RMB 2.8 trillion in 2011[21].

To provide market participants with instruments to manage interest rate risk, bond forwards were introduced in 2005 in the OTC market. RMB IRSs were formally introduced in 2008 as the second type of interest rate risk management tool available in the OTC market after a two-year pilot period, and soon took over bond forwards as the dominant risk management tool by trading value[22]. Following that, more products have been added to the suite of interest rate hedging instruments. Table 2 presents the list of interest rate derivatives currently available in the Mainland market.

Table 2. Interest rate derivatives currently available in Mainland China

Market	Instrument type	Product	Launch year	Regulator
Exchange — China Financial Futures Exchange (CFFEX)	Futures	5-year government bond futures	2013	CSRC
		10-year government bond futures	2015	
		2-year government bond futures	2018	
OTC — Interbank market on CFETS	Forward	Bond forward	2005	PBOC/ China Banking and Insurance Regulatory Commission (CBIRC)
		Forward rate agreement	2007	
		Standardised bond forward	2015	
	Swap	RMB interest rate swap	2006	
		Standardised interest rate swap	2014	
	Option	Interest rate options (IRO)	2020	

5.1 On-exchange interest rate derivatives — government bond futures

Government bond futures are designed to facilitate price discovery, allowing price convergence to the most liquid government bonds at the stated maturity. Based on the experience of developed countries, government bond futures play an important role in improving the pricing function of the underlying bond market, enhancing liquidity in the spot market and enriching the suite of interest rate risk management instruments available to bond investors[23].

19 See "China's interest rate liberalization reform", *Asia Focus*, publication of the Country Analysis Unit of the Federal Reserve Bank of San Francisco, May 2014.

20 Source: *China OTC Financial Derivatives Market Development Report (2021)* (《中國場外金融衍生品市場發展報告 2011 年度》), CFETS, October 2022.

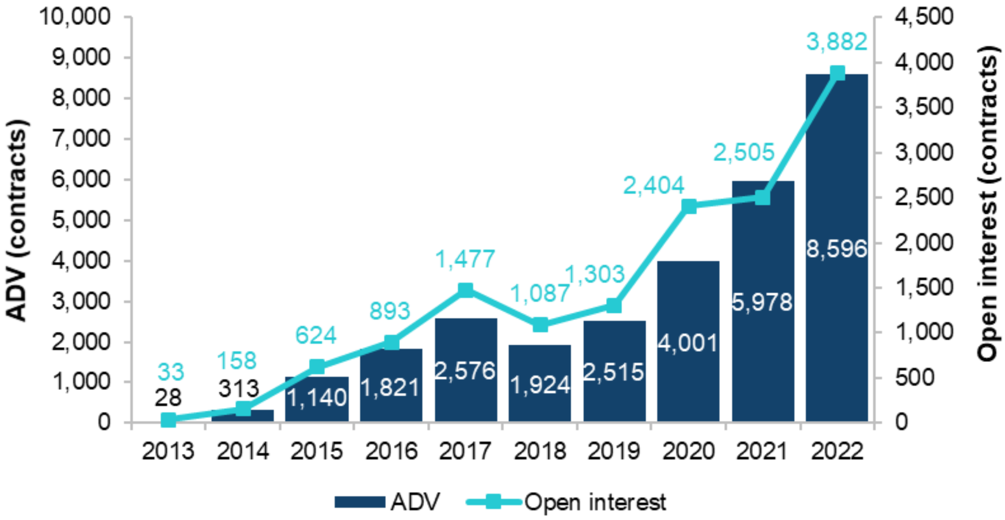
21 Source: "2011 Interbank market infrastructure developments" (《2011 年銀行間市場基礎設施建設不斷完善》), *Sina Finance* website, 4 February 2017.

22 See HKEX research report, "OTC clearing solution for Mainland China's increasing cross-border derivatives trading", published on HKEX's website, November 2017.

23 See HKEX research report, "HKEX's Five-Year China Ministry of Finance Treasury Bond Futures", published on HKEX's website, April 2017.

Since their introduction in September 2013 on the China Financial Futures Exchange (CFFEX)[24], the government bond futures market has undergone rapid growth — its average daily turnover volume (ADV) achieved a compound annual growth rate (CAGR) of 89% during 2013 to 2022; and the open interest of government bond futures grew at a CAGR of 70% over the same period (see Figure 14).

Figure 14. Yearly ADV and year-end open interest of government bond futures on CFFEX



Source: CFFEX's website, data downloaded on 22 February 2023.

5.2 OTC interest rate derivatives — interest rate swap (IRS) and others

The OTC derivatives market in Mainland China runs mainly on the interbank market operated by CFETS, which is under the supervision of the PBOC and the State Administration of Foreign Exchange (SAFE). Clearing and settlement services for OTC derivatives transactions on CFETS are provided by three institutions — CFETS itself, the China Central Depository & Clearing Co., Ltd. (CCDC) and the SHCH[25]. In particular, SHCH was designated by the PBOC in February 2014 to be the central counterparty (CCP) for mandatory central clearing of RMB IRS transactions on CFETS[26].

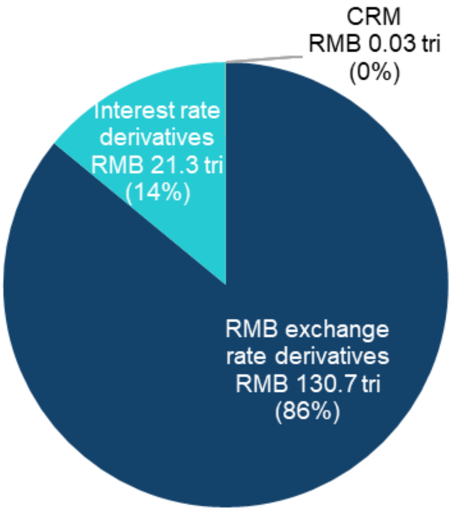
In the interbank derivatives market, RMB interest rate derivatives accounted for only 14% of the total trading value (see Figure 15). This pattern is different from the global OTC derivatives market, in which the trading value of interest rate derivatives is significantly higher than that of foreign exchange derivatives (see Section 3.2 above). This implies that there is a big potential for Mainland China's OTC interest rate derivatives market to develop further.

24 As early as 1992, government bond futures had been launched in the Mainland market for institutional trading shortly after the re-establishment of the stock exchanges. In October 1993, the SSE opened the trading of government bond futures to individual investors. Due to market irregularities as a result of the deficiencies in market conditions, contract design and regulations, the trading of government bond futures was halted by the Mainland authorities in May 1995. See Huatai Securities research report, *"History, experience and concepts of government bond futures"* (〈國債期貨的歷史、經驗和基礎概念〉), 10 May 2013.

25 See HKEX research report, "OTC clearing solution for Mainland China's increasing cross-border derivatives trading", published on HKEX's website, November 2017.

26 Source: *PBOC Notice on Establishing a Centralised Clearing Mechanism for OTC Financial Derivatives and Launching Centralised Clearing of RMB Interest Rate Swaps* (〈中國人民銀行關於建立場外金融衍生產品集中清算機制及開展人民幣利率互換集中清算業務有關事宜的通知〉), 21 February 2014.

Figure 15. Composition of derivatives trading value on the Mainland interbank market by instrument (2022)



Note: CRM refers to credit risk mitigation products. In 2010, China unveiled its onshore credit derivatives market with the launch of two CRM products — Credit Risk Mitigation Agreements (CRMAs) and Credit Risk Mitigation Warrants (CRMWs).

Source: *China Foreign Exchange Market Trading Overview 2022* (《2022 年中國外匯市場交易概況》), published on CFFEX's website, 19 January 2023; *China Financial Market Operations in 2022* (〈中國 2022 年金融市場運行情況〉), released by the PBOC, 20 January 2023.

The key interest rate derivatives currently available in the onshore interbank market include bond forwards, FRAs, IRSs (mainly RMB IRSs) and interest rate options.

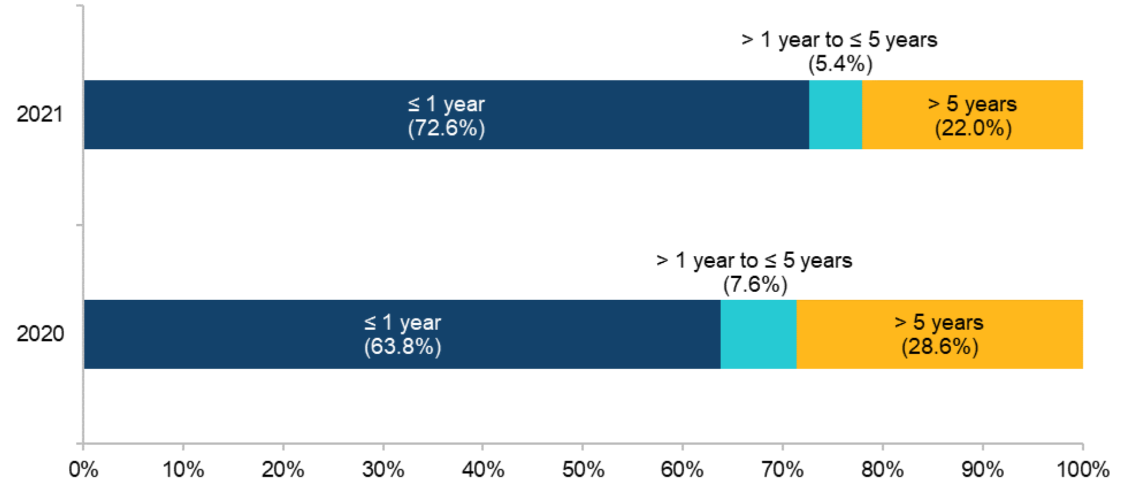
The trading value of IRS reached RMB 21.0 trillion in 2022, representing 98.6% in the OTC interest rate derivatives market[27]. However, this trading level is still low compared with major international markets. For example, in respect of of OTC single-currency interest rate derivatives, the ADT in China was about US$13 billion in April 2022, only 0.8% of that (US$1,689 billion) in the US and 0.5% of that (US$2,626 billion) in the UK[28].

In terms of contract duration, short-term IRSs (with a duration of one year or less) dominated, with a market share of 72.6% in 2021 by trading value (see Figure 16). In terms of reference interest rate, the interbank market 7-day repurchase (repo) fixing rate (FR007) dominated — IRSs at FR007 had a market share of 86.7% by trading value in 2021, followed by IRSs at the Shanghai Interbank Offer Rate (SHIBOR) (see Figure 17).

[27] Source: *China Financial Market Operations in 2022* (《中國 2022 年金融市場運行情況》), released by PBOC, 20 January 2023.

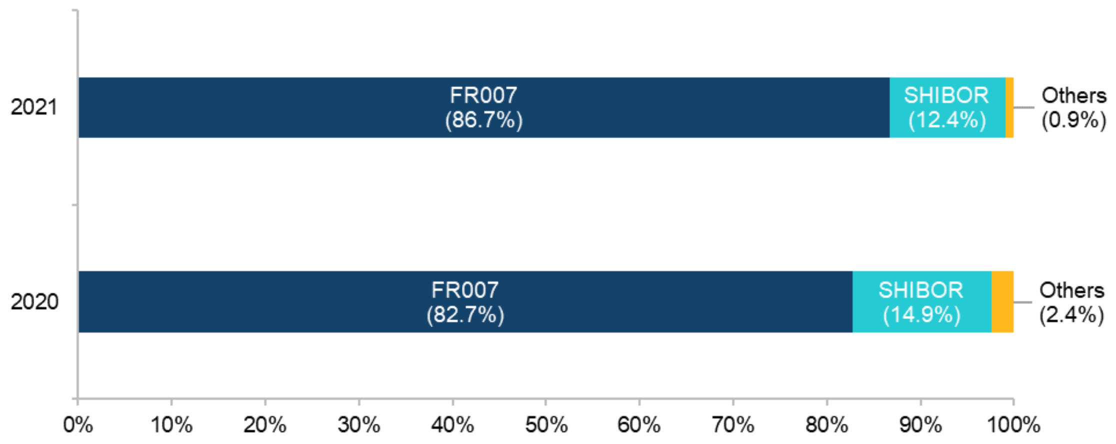
[28] Source: BIS, *Triennial Central Bank Survey of Foreign Exchange and Derivatives Market Turnover,* 2022.

Figure 16. Composition of trading value of IRSs by contract duration (2021 vs 2020)



Source: National Association of Financial Market Institutional Investors (NAFMII), CFETS and SHCH, *China OTC Financial Derivatives Market Development Report 2021* (《中國場外金融衍生品市場發展報告 2021 年度》).

Figure 17. Composition of trading value of IRSs by reference interest rate (2021 vs 2020)



Source: NAFMII, CFETS and SHCH, *China OTC Financial Derivatives Market Development Report 2021* (《中國場外金融衍生品市場發展報告 2021 年度》).

5.3 Pain points for the onshore interest rate derivatives market

Although the interest rate derivatives market in Mainland China has seen significant growth in recent years, there are still challenges to overcome. These include inadequate diversity in market participants and relatively low liquidity and market transparency, as elaborated below.

Inadequate diversity in market participants. This has a negative impact on the balance of supply and demand for products and limits trading liquidity. Increasing the diversity of participants can help expand the derivatives market, bringing in additional trading purposes and trading methods while improving liquidity.

Currently, participants in the Mainland derivatives market are mainly domestic banks and non-bank financial institutions such as securities companies, futures companies, asset managers, insurance companies, and corporates (non-financial institutions). Market participants must be qualified and approved by the Mainland regulatory authorities in order to trade derivatives.

Foreign participants are mainly commercial banks, investment banks and asset management companies.

Although foreign participants now have multiple channels to access China's onshore derivatives market (see Table 1 in Section 2 above and Section 5 below), they face challenges in the efficient use of onshore derivatives products for their portfolio management. These challenges may arise from a lack of familiarity with or adaptability to Mainland China's business practices, as well as from a language barrier.

Relatively low liquidity. This is due to multiple factors, including the relatively small size of the derivatives market, the limited range of products available, and the low participation of international investors. Low liquidity makes it challenging for market participants to open and close positions given high trading costs (due to wide bid-ask spreads) and fair pricing issues.

Nevertheless, the Chinese government has implemented measures to address the liquidity issue. These include introducing new products, reducing restrictions on foreign participation and improving the connectivity with global capital markets.

Complex regulations and low market transparency. Mainland China's derivatives market is relatively new and the regulatory framework is not mature yet, especially when compared with developed markets. Market feedback[29] shows that regulations are not always transparent, consistent and stable under Mainland China's current regulatory framework given the presence of multiple regulators and dynamic conditions[30] for the derivatives market, which make foreign investors difficult to follow.

These pain points disincentivise foreign participation and hinder the further growth of the interest rate derivatives market, thereby undermining the role of the market in supporting the internationalisation and development of the onshore bond market.

6. RISK HEDGING NEEDS OF FOREIGN INVESTORS WITH CHINESE BOND EXPOSURE

The availability and effective use of onshore interest rate derivatives are key considerations for index providers to deliberate whether to increase the weights of Chinese bonds in their global bond indices. These are also key factors for encouraging foreign investors to increase their Chinese bond exposures, as interest rate derivatives are required to serve investors' need for related risk management fools for their bond investments.

Chinese government bonds have gradually been included in major international bond indices since 2019. Global asset management companies tracking these mainstream global bond indices would expand their Chinese bond investments, generating a big demand for related interest rate risk hedging tools.

6.1 Hedging tools available to foreign investors for onshore bond investment

Currently, foreign investors who enter China's onshore bond market are not allowed to access China's onshore government bond futures market on CFFEX. In practice, foreign investors usually use IRSs to manage the interest rate risk of their onshore bond investments. As these investments involve RMB exposure, compared to offshore non-deliverable interest rate swaps (NDIRSs), foreign investors are more inclined to use onshore IRSs as a hedging tool because:

[29] Through HKEX's research exercise.

[30] China's derivatives market is relatively new and the regulatory framework is still being developed. Rules and requirements may have frequent changes in response to new market conditions. This evolving regulatory environment can make it difficult for foreign investors to adapt to the changes.

- Onshore IRSs are traded and settled in RMB directly in China's onshore interbank market without currency mismatch risk. In contrast, NDIRS in the offshore market are usually settled in US dollar, therefore involving foreign exchange risk.
- Due to the non-delivery settlement feature of the offshore market, NDIRSs have a weaker correlation with RMB interest rates than onshore IRSs, such that the RMB interest rate risk will only be partially hedged.

6.2 Policies supporting foreign investors' participation in the onshore IRS market

China's National Association of Financial Market Institutional Investors (NAFMII) published a new cross-border version of the NAFMII Master Agreement in 2022, which is designed to promote the further opening-up of China's derivatives market. This significant development step was taken shortly after the PRC Futures and Derivatives Law (FDL) came into effect on 1 August 2022.

The introduction of the NAFMII Master Agreement reflects China's desire to promote the internationalisation of its derivatives market through standardised derivatives contracts. Specifically, it paves the way for the launch of the Swap Connect scheme (see Section 6 below), as the more flexible, modern and internationalised version of the NAFMII Master Agreement encourages global market participants to access onshore derivatives.

6.3 Current pain points for foreign investors' participation in the onshore IRS market

Currently, foreign investors entering China's onshore bond market through CIBM Direct and QFII/RQFII schemes can participate in the onshore IRS market to manage the interest rate risk of their Chinese bond exposure. However, the participation level of foreign investors in the onshore IRS market remains relatively low due to some pain points (see Sections 4.3 above). Moreover, foreign investors entering the onshore market through Bond Connect are limited to trading onshore cash bonds, and cannot access onshore IRSs under Bond Connect.

Foreign investors who trade onshore bonds through Bond Connect need to open separate settlement accounts in the onshore market through CIBM Direct to access the onshore IRS market. This will incur additional administrative costs and reduce the efficiency offered by Bond Connect for onshore bond investment. This will also require foreign investors to sign settlement agreements separately with onshore clearing banks subject to Chinese domestic laws, leading to additional legal costs and inconvenience for foreign investors, especially for those unfamiliar with China's onshore bond markets.

7. SWAP CONNECT — A NEW CHANNEL FOR ACCESSING THE ONSHORE DERIVATIVES MARKET

Swap Connect is a new mutual access arrangement between Hong Kong's financial derivatives market and Mainland China's interbank financial derivatives market[31]. At the initial stage, Swap Connect connects Hong Kong and international investors with Mainland China's interbank IRS market through a Northbound route.

7.1 A convenient solution for current pain points

Swap Connect offers the solution for the pain points discussed above (in Sections 5.3 and 6.3), thereby could help speeding up the internationalisation of the Mainland derivatives market.

31 See "HKEX to Launch Swap Connect in Partnership with CFETS and SHCH", news release on the HKEX website, 4 July 2022.

Under Northbound Swap Connect, CFETS provides trading services for Hong Kong and international investors to access Mainland China's interbank derivatives market through overseas third-party trading platforms recognised by the PBOC. CFETS will transmit real-time transaction information to OTC Clearing Hong Kong Limited (OTC Clear) and SHCH to ensure the efficient clearing of transactions.

OTC Clear has built a clearing link with SHCH, through which OTC Clear provides central clearing services for Hong Kong and international investors, while SHCH provides central clearing services for investors in Mainland China. The two clearing houses handle daily margin management and settlement payments with each other, and have established a Inter-CCP Margin to manage default risk.

According to the provisional measures[32] issued, IRSs are the eligible product type for trading at the initial stage. Quotation, trading, clearing and settlement will be in RMB. Cross-border payments will be conducted through the Cross-border Interbank Payment System (CIPS) of the PBOC. Northbound Swap Connect is subject to quota management, with the quota to be adjusted depending on market conditions. Foreign investors may use RMB or foreign currencies they own to do Northbound trading and clearing, for which currency conversion will be done at Hong Kong Settlement Banks[33].

With its design, Swap Connect has the following advantages:

(1) Swap Connect (Northbound) allows Hong Kong and international investors to participate in Mainland China's interbank IRS market without changing their existing trading practices, including legal documentation, as well as clearing, settlement and risk management procedures.

(2) Swap Connect offers international investors a convenient way to access Mainland China's derivatives market, similar to the level of convenience offered through Bond Connect for accessing the Mainland bond market.

(3) Given the status of OTC Clear as an internationally recognised "qualifying central counterparty" (QCCP), the onshore IRS business of foreign investors conducted through OTC Clear will benefit from favourable capital ratio calculation per the regulatory requirements in Basel III.

(4) Swap Connect will facilitate cross-border cooperation on regulatory matters for the onshore derivatives market, and therefore help enhance its regulatory framework.

(5) After the 2008 global financial crisis, international regulators raised concerns about the potential risks of bilateral trading and clearing of OTC derivatives, including IRS. Shifting the OTC bilateral clearing model to a centralised clearing model has become a major requirement imposed by international regulators. Swap Connect offers such centralised clearing service to international investors and helping them meet their compliance requirements in onshore IRS trading.

---

32 *Provisional Measures for the Administration of Mainland-Hong Kong Interest Rate Swaps Market Connect Cooperation* (《內地與香港利率互換市場互聯互通合作管理暫行辦法》), issued by the PBOC, 28 April 2023.

33 These are the clearing bank for RMB business in Hong Kong and foreign RMB business participating banks in Hong Kong which are authorised to enter and trade on the onshore interbank foreign exchange market.

(6) Swap Connect will help promote onshore IRS to a wider range of international participants[34], and therefore accelerate the diversification and internationalisation of China's onshore derivatives market.

(7) Swap Connect will further facilitate the cross-border flows of RMB with the currency conversion done in Hong Kong, thereby supporting the internationalisation of the RMB.

7.2 Hong Kong's role in supporting the internationalisation of the Mainland derivatives market

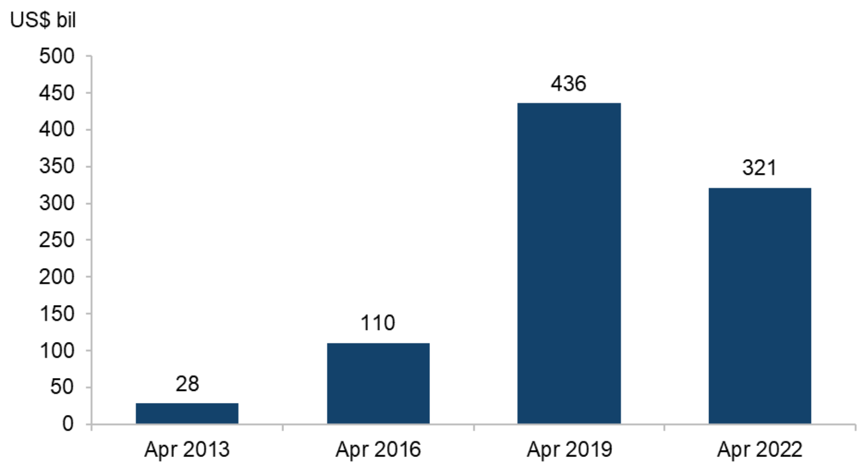
Hong Kong has long been serving as a hub for international investors to access China's financial markets and for Mainland investors to access overseas financial markets. The connectivity is now extended into the OTC derivatives market through Swap Connect.

Northbound trading under Swap Connect allows international investors to participate in the onshore OTC derivatives market, thereby helping to enlarge and diversify the investor base, increase liquidity, and support the development of a robust and efficient OTC derivatives market in the Mainland. Such connectivity can facilitate the cross-border exchange of information, trading flows and risk management activities, thereby enhancing the competitiveness of China's derivatives market.

Hong Kong can perform well in its role under Swap Connect with its well-developed regulatory framework and infrastructure for the financial market, providing a reliable and efficient platform for trading OTC derivatives, in particular interest rate derivatives. Moreover, the Hong Kong market itself has been active in trading interest rate derivatives market.

According to the latest BIS statistics, **Hong Kong ranked third in the trading of OTC interest rate derivatives in the world**[35]. The ADT of OTC interest rate derivatives in Hong Kong was US$321 billion in April 2022 (see Figure 18), representing 5.6% of the world's total[36], with IRSs dominating the market (95% of the total in April 2022) (see Figure 19).

Figure 18. ADT of OTC interest rate derivatives in Hong Kong



Source: BIS, *Triennial Central Bank Survey of Foreign Exchange and Derivatives Market Turnover* of the respective years.

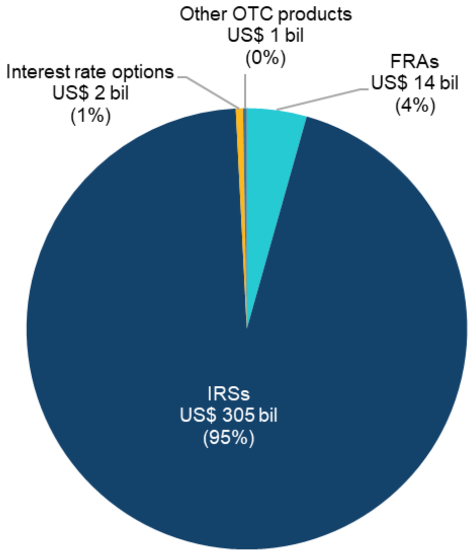
---

34 Under Swap Connect, international investors are served by OTC Clear for clearing their IRS transactions. The clearing members of OTC Clear comprised 25 major banks from Mainland China, Hong Kong, Europe, America and Asia Pacific area who offer international clearing agency services (source: "List of Clearing Members", published on HKEX website, viewed on 21 March 2023).

35 Source: BIS, *Triennial Central Bank Survey of Foreign Exchange and Derivatives Market Turnover*, 2022.

36 Hong Kong ranked behind the United Kingdom (45.5%) and the United States (29.3%) in market share. Source: BIS, *Triennial Central Bank Survey of Foreign Exchange and Derivatives Market Turnover*, 2022.

Figure 19. Composition of the ADT of the Hong Kong OTC interest rate derivatives market by instrument type (Apr 2022)



Source: "The foreign exchange and derivatives markets in Hong Kong", feature article in the *HKMA Quarterly Bulletin*, December 2022.

In fact, Hong Kong has been the world's most active offshore RMB interest rate derivatives market[37]. The ADT of OTC RMB interest rate derivatives in Hong Kong increased by 15.5% to US$14.7 billion in April 2022 from US$12.7 billion in April 2019[38]. This is largely because Hong Kong has the world's largest offshore RMB liquidity pool[39].

On **OTC market infrastructure development**, in line with global efforts, the HKMA and the SFC, jointly with the Hong Kong government and various other stakeholders, have been actively developing a sound regulatory regime for the OTC derivatives market in Hong Kong.

In July 2013, the OTC Derivatives Trade Repository established by HKMA launched its reporting service for OTC derivatives transactions. In November 2013, OTC Clear, a subsidiary established by the HKEX, commenced business.

In compliance with the Principles for Financial Market Infrastructures (PFMI) promoted by International Organization of Securities Commissions (IOSCO), mandatory central clearing of OTC derivatives transactions was introduced in Hong Kong in phases, with the first phase commencing in September 2016 covering certain standardised IRS transactions between major dealers[40]. In the same year, OTC Clear was recognised by the SFC as Recognised Clearing House and designated as a CCP for mandatory clearing for OTC derivatives transactions specified under the Hong Kong OTC derivatives regulatory regime.

For the central clearing of OTC transactions, OTC Clear has been playing an important role. The OTC product types currently served by OTC Clear include IRS, non-deliverable currency forward (NDF), cross currency swap (CCS) and deliverable FX (DFX). Client clearing services

37 Source: "The foreign exchange and derivatives markets in Hong Kong", feature article in the *HKMA Quarterly Bulletin*, December 2022.

38 Source: BIS, *Triennial Survey of Foreign Exchange and Derivatives Market Turnover,* 2022.

39 See paragraph 87 in Hong Kong 2023-24 Budget Speech, available on the Hong Kong Special Administrative Region Government's website, February 2023.

40 See HKEX research report, "OTC clearing solution for Mainland China's increasing cross-border derivatives trading", published on HKEX's website, November 2017.

was launched in March 2017. The OTC Clearing and Settlement System (OCASS) was developed to support its clearing services. OCASS is an integrated system which processes trade registrations and novations, valuations, trade event management and collateral and margin calculations[41].

As part of the financial infrastructure in Hong Kong and levering the city's superconnector role between Mainland China and the world, OTC Clear is well-positioned to provide central clearing services for OTC transactions between Mainland and overseas counterparties in the US dollar, the euro and RMB.

8. CONCLUSION

China's onshore bond market has become the world's second largest, on the back of China's rise in the global economy. There is yet the potential for further growth, given the Chinese authorities' favourable policies, the relatively small size of the market relative to China's GDP, and the increasing demand for, and use of, RMB-denominated assets globally.

Along with the growth of the onshore bond market is the increase in foreign investors' appetite for onshore bonds. This has increased their demand for related risk management tools such as interest rate derivatives.

From international experience, IRSs are the most popular tools for managing interest rate risk by bond market participants. However, while foreign investors have been able to easily access onshore bonds through Bond Connect since 2017, this has not been the case for onshore interest rate derivatives — the access for which has been limited to the QFIIs and CIBM Direct channels, making it costly and inconvenient for Bond Connect investors to access the market. In addition, the inadequate diversity in market participants and the relatively low liquidity and market transparency pose challenges to the onshore financial derivatives market.

Swap Connect would help solve these pain points and facilitate the participation of international investors in the onshore IRS market by using a convenient trading, clearing and settlement model without changing their existing practices. By allowing more foreign participation in the onshore derivatives market, Swap Connect will also help bring more diversity, liquidity and transparency to the market.

It is believed that Swap Connect could effectively support the functional role of Bond Connect to promote the further development and high-level opening-up of China's onshore bond markets and to strengthen Hong Kong's position as a leading offshore RMB hub.

[41] See "Overview of OTC Clear clearing services" (updated 30 Apr 2018), webpage on HKEX.'s website, viewed on 28 February 2023.

Disclaimer

The views expressed in this article do not necessarily represent the position of HKEX. All information and views contained in this article are for information only and not for reliance. Nothing in this article constitutes or should be regarded as investment or professional advice. Past performance is not an indicator of future performance. While care has been taken to ensure the accuracy of information contained in this article, neither HKEX nor any of its subsidiaries, directors or employees shall be responsible for any loss or damage arising from any inaccuracy in or omission of any information from this article.

Hong Kong Exchanges and Clearing Limited

8/F, Two Exchange Square
8 Connaught Place
Central, Hong Kong

hkexgroup.com | hkex.com.hk

info@hkex.com.hk
T +852 2522 1122
F +852 2295 3106