



# China's repo markets

The structure and safeguards of China's largest, most liquid money market instruments

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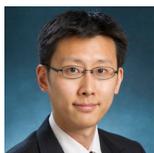
# EXECUTIVE SUMMARY

## EXECUTIVE SUMMARY



AIDAN SHEVLIN

**REPURCHASE AGREEMENTS (REPOS)** are a crucial component of global financial markets, increasing market efficiency and liquidity. In Western markets, long and widespread use of repo, combined with strong legal status under bankruptcy laws and the clarity provided by a master agreement for repo transactions, offers transparency and reassurance to investors and participants.



ANDY CHANG

Chinese repo markets also follow standardized policies and procedures. However, the lack of clarity regarding collateral and counterparty risk, as well as confusion about how repo markets operate, has created uncertainty and concern, especially among Western investors.

There are two types of Chinese repo: interbank and stock exchange. RMB money market funds (MMF) favor stock exchange repo, which provides quasi-sovereign counterparty risk and more timely settlement than interbank repo, albeit with greater volatility. Because it offers uniform counterparty risk, real-time monitoring and genuine market-driven dynamics, stock exchange repo is widely recognized as the most accurate measure of funding costs, liquidity conditions and market stresses in Chinese financial markets.

Repo is an important investment option for RMB money market funds. Their ability to offer higher, market-driven interest returns helped spur the growth of MMF assets in China to a record CNY 2.5 trillion as of April 2015. Essential to this success has been the ability to invest in repo.

Once they understand the organization, mechanics and structure of Chinese repo markets, cash investors will be able to appreciate how repo has helped RMB money market funds provide relatively attractive returns with flexible liquidity.

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## INTRODUCTION

**INTEREST RATE LIBERALIZATION**, a key element in China's financial sector reform, is now under way. As it progresses and the government's market presence recedes, interest rates will become more market-driven. Investors will then be required to develop a heightened awareness of risk as the range of investment options increases.

However, Chinese interest rates have not yet fully liberalized. As a result, there is a limited range of suitable, market-driven investment instruments available to investors. As the largest, most liquid money market instrument in Chinese markets, repo is a major holding for RMB money market funds.

Still, some RMB money market fund investors are concerned about repo market operations, collateral quality and counterparty risk. In the following pages, we explain the market's structure, safeguards and benefits, addressing and allaying those concerns, and making clear how and why repo has become such a critical component of RMB money market funds.

# What is repo: terms and definitions

A repurchase agreement, or repo, is a contract for the sale of a security with a commitment by the seller to buy the same security back from the buyer at a specified price on a designated future date.<sup>1</sup>

A counterparty (the repo seller, often a broker/dealer) is borrowing money and providing collateral for the loan while the second party (the repo buyer, often a money market fund) is lending money and accepting securities as collateral for the loan. The seller gains access to funds at lower funding costs than are typically available elsewhere. The buyer obtains an attractive yield on a short-term, secured, liquid investment.

Repo collateral typically comprises government bonds but can also include money market instruments, agency securities and asset- and mortgage-backed securities. The decision on which collateral to use is negotiable between the repo counterparties and will impact the interest rate offered and the haircuts required.

Repo is effectively a short-term, interest-bearing loan against a pool of collateral, but while repos resemble collateralized loans, their treatment under bankruptcy law is more beneficial to the buyer. That is because a buyer can sell the collateral quickly in the event of a counterparty default.<sup>2</sup>

## Every repo trade consists of six negotiable variables

### EXHIBIT 1: KEY REPO VARIABLES

Repo variables	Details
Transaction size	Based on the cash size of the trade
Collateral	The securities offered by the seller; the characteristics and quality of the collateral impact the size of the haircut
Haircut/margin	Difference between the value of the cash and the value of the collateral (as a percentage)
Maturity date	Repurchase date for the repo
Counterparties	The buyer and seller; the creditworthiness of the seller also impacts the size of the haircut
Interest rate/repo yield	Paid by the seller; affected by market rates, collateral, tenor and counterparty

Source: J.P. Morgan Asset Management; as of May 31, 2015.

<sup>1</sup> Source: Frank J. Fabozzi, *The Global Money Markets* (Wiley Finance, July 2002).

<sup>2</sup> According to market convention, “repo” refers to a transaction in which a dealer acts as a seller—borrowing money and providing securities as collateral. In reverse repo, a dealer acts as a buyer—borrowing securities and lending money.

Across global money markets, repos provide an efficient mechanism for financing bond positions, enabling market makers to take long and short positions, and providing short-term investors with a relatively low-risk investment opportunity. A liquid repo market is a key element of a liquid bond market and is especially important to market participants that rely on wholesale funding or face restrictions on unsecured lines of credit. The terms and definitions we have described apply to both Western and Chinese repo markets, but there are significant differences between the two.

### AN OVERVIEW OF WESTERN REPO MARKETS

In Western markets, two repo structures have evolved: bilateral and tri-party, both of which are traded in over-the-counter markets (EXHIBIT 2). A bilateral repo involves two parties, the buyer and the seller. A tri-party repo involves a tri-party agent (TPA) as well as the two parties. The agent takes on the administrative functions of receiving, reporting, settling and delivering the repo securities—simplifying the operational complexities for both counterparties.

Western repo market participants use the global master repurchase agreement (GMRA).<sup>3</sup> It outlines the terms and conditions of the repo contract, including rules concerning margin maintenance and procedures in the event of default.

While both counterparties are exposed to credit and default risk in a repo transaction, the buyer is usually in the more vulnerable position. Therefore, careful counterparty and collateral selection is important to minimize counterparty default risk, collateral default risk and collateral impairment.

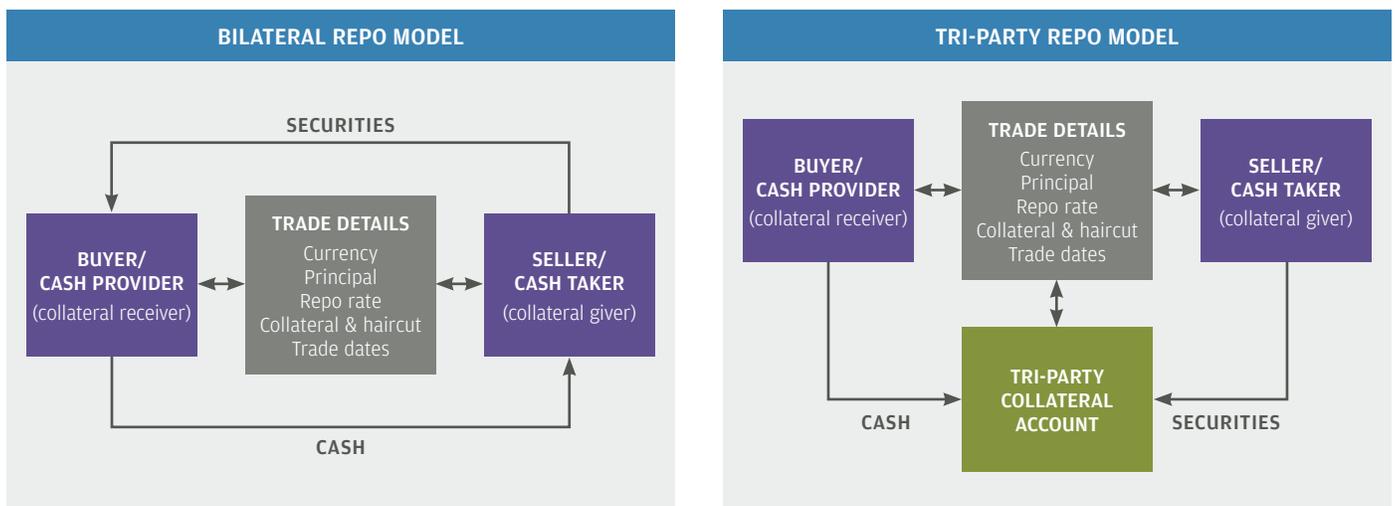
Counterparty default risk can be reduced by using internal credit analysis and nationally recognized statistical rating organization (NSRO) ratings to identify higher quality counterparties. Collateral default and impairment risk are mitigated by ensuring that collateral is high-quality, liquid and uncorrelated with the seller.

Repo transactions are normally over-collateralized. That is, the value of the collateral exceeds the value of the cash exchanged. The excess collateral is known as a “haircut,” or margin. Haircuts are based on historical volatility, market convention and collateral quality.

If the market value of the collateral falls below the repo transaction size (margin deficit), the seller is required to commit additional cash or acceptable securities to cover the difference. In the event of a seller default, the repo buyer can seize and sell the collateral to compensate for the loss of principal and interest.

**Repo is effectively a short-tem, interest-bearing loan against a pool of collateral**

EXHIBIT 2: WESTERN REPO MODELS



Source: J.P. Morgan Asset Management; as of May 31, 2015.

<sup>3</sup> Published by either the Securities Industry and Financial Markets Association or the International Capital Market Association.

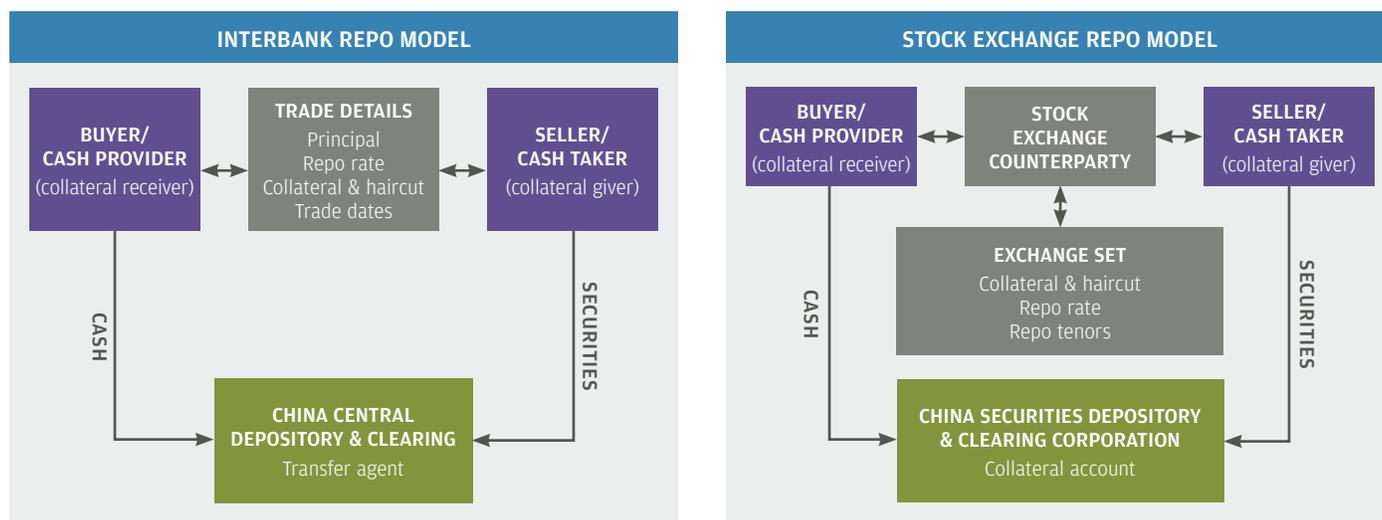
## AN OVERVIEW OF CHINESE REPO MARKETS

As Chinese interest rates are not yet fully liberalized, there is very little relationship between the demand and supply of liquidity on the one hand and benchmark interest rates on the other. In contrast, interest rates for repo transactions are commonly regarded as the most accurate indicator of the true cost of liquidity. Indeed, repos represent the largest, most efficient and most liquid segment of financial markets.

There are two repo markets in China, interbank and stock exchange,<sup>4</sup> each with different structures, characteristics and rules (EXHIBIT 3 and EXHIBIT 4).

### Chinese repo trades on two different platforms

EXHIBIT 3: CHINESE REPO MODELS



Source: J.P. Morgan Asset Management; as of May 31, 2015.

### Repos are an important indicator of the true cost of liquidity

EXHIBIT 4: KEY CHARACTERISTICS OF CHINESE REPO MARKETS

Characteristics	Interbank	Stock exchange
Repo type	Pledged, outright (buy/sell) or X-repo	Pledged or agreement
Participants	Bank and non-bank financial institutions	Non-bank financial institutions, corporates & retail investors
Tenors	o/n, 7d, 14d, 21d, 1m, 3m, 4m, 6m, 9m, 12m	1d, 2d, 3d, 4d, 7d, 14d, 28d, 91d, 182d
Interest rate/yield	Negotiated between counterparties	Market-driven
Eligible collateral	Negotiated between counterparties	Set by exchange
Collateral registration	China Central Depository & Clearing Co., Ltd. (CCDC) Shanghai Clearing House (SCH)	China Securities Depository & Clearing Corporation (CSDDC)
Trading hours	09:00-12:00 and 13:30-16:30	09:30-11:30 and 13:00-15:00
Supervisor	People's Bank of China (PBoC)	China Securities Regulatory Commission (CSRC)
Haircut	Negotiated between counterparties	Set by exchange
Trade size (CNY)	Negotiable (min) / 500mm (average) / unlimited (max)	100k (min) / 100mm (average) / unlimited (max)
Established	1997	1991

Source: J.P. Morgan Asset Management, Wind, Shanghai Stock Exchange, Fitch Ratings; as of May 30, 2015.

<sup>4</sup> The Shanghai and Shenzhen stock exchange repo markets operate with exactly the same rules and regulations, albeit with different collateral pools. However, the volume of Shenzhen repo is very low; therefore, only Shanghai repo trading and volumes are covered in this document.

The interbank market is a wholesale funding market in which all participants are institutional investors. Trading operates on a private, one-to-one, over-the-counter platform<sup>5</sup> where each market maker can make bid and offer prices. The interbank market is the dominant trading platform for fixed income securities and repo, accounting for 94% of all bonds outstanding.<sup>6</sup>

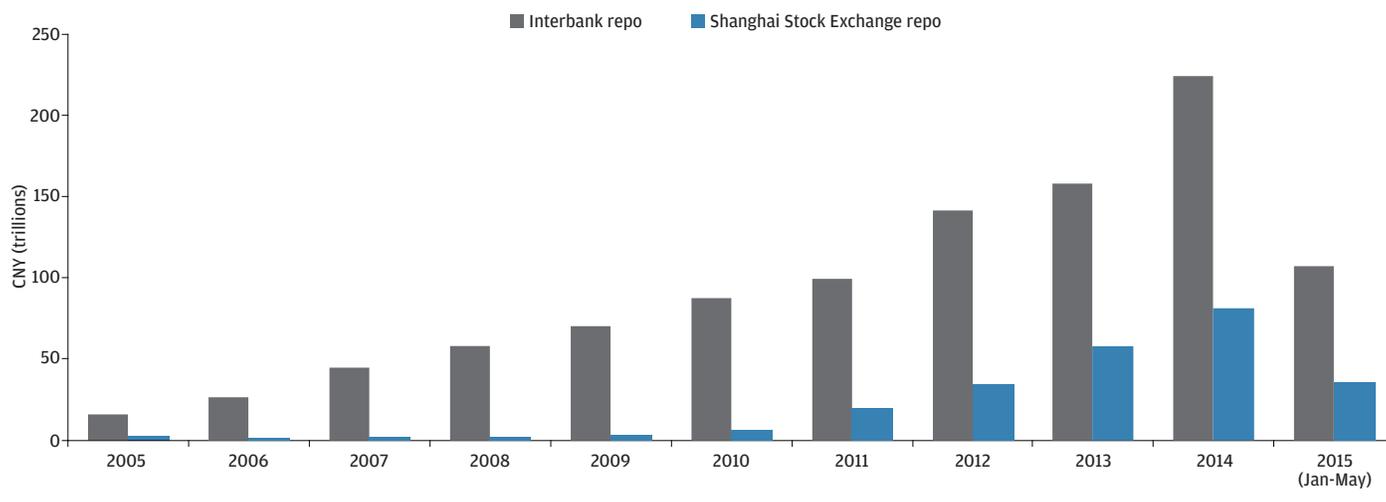
The stock exchanges provide a marketplace and facilities for repo trading in which all repo prices and volumes are observable and continuous bid and offer prices are available for different repo tenors.<sup>7</sup> As the principal bond exchange market, the Shanghai Stock Exchange (SSE) is also the dominant market for stock exchange repo. However, just 6% of all bonds outstanding are exchange-traded.<sup>8</sup> It is worth noting that China's bond market is the third largest in the world, with USD 5.6 trillion outstanding; the majority of these bonds can be used as collateral.<sup>9</sup>

The vast majority of both interbank and stock exchange repo is “pledged style.” That is, the repo buyer has possession of the collateral but not ownership unless default occurs. The pledged collateral is returned to the repo seller when all conditions of the repo are satisfied.

In terms of trading volume, combined interbank and stock exchange repo turnover is eight times larger than interbank bond market turnover.<sup>10</sup> Interbank repo dominates, representing 73% of total market repo volumes. However, while interbank repo volumes have grown by two and a half times in the past four years, stock exchange repo volumes have increased by over thirtyfold in the same period—reflecting the rise of the fund industry and retail investor (EXHIBIT 5).

**Repo volumes are huge; interbank repo trading volumes still dominate**

EXHIBIT 5: ANNUAL REPO TRADING VOLUMES IN INTERBANK AND SHANGHAI STOCK EXCHANGE MARKETS



Source: Wind, Chinabond; as of May 31, 2015.

<sup>5</sup> Using an RMB trading system developed and managed by China Foreign Exchange Trade System (CFETS).

<sup>6</sup> Standard Chartered research report; as of December 31, 2014.

<sup>7</sup> Stock exchange values and volumes are monitored and trades are placed in Hundsun, developed and managed by Hundsun Technologies Inc.

<sup>8</sup> Standard Chartered research report; as of December 31, 2014.

<sup>9</sup> Asian Development Bank; as of June 30, 2015.

<sup>10</sup> Based on 2014 turnover volumes. Wind; as of May 31, 2015.

# Interbank repo: operations, yield and volume

The interbank pledged repo market in China is similar to bilateral repo in Western markets. Terms and conditions, including tenor, size, collateral, haircut and yield, are negotiated between buyer and seller. The interbank market also offers an outright-style repo market where ownership of the collateral is transferred to the seller and the buyer. In addition, the interbank market offers an X-repo<sup>11</sup> contract, where collateral, haircuts and conditions are all standardized. (This paper only addresses the pledged repo market and does not address neither the outright-style repo market nor the X-repo market.)

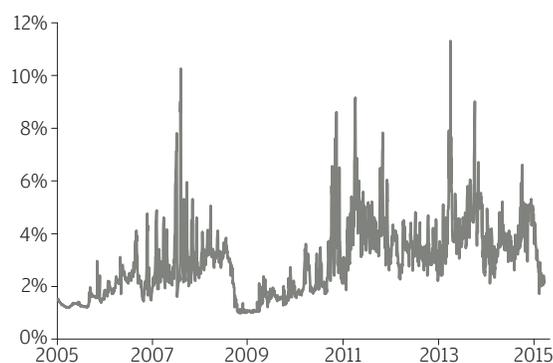
Commercial banks are the dominant interbank repo buyers and sellers: smaller banks seeking funding are collateral providers, and large banks with excess funding are cash providers. Given banks' short-term liquidity requirements, overnight to seven-day repo dominates all other maturities, representing 93% of the total 2014 volume (**EXHIBIT 6**).

The People's Bank of China (PBoC) operates in the interbank market through its open market operations to aid market liquidity and stability. Interbank repo yields reflect the impact of those open market operations as well as general market dynamics. As part of the PBoC's twice-weekly repo operations, the central bank injects or withdraws liquidity based on indicative demand from commercial banks. The PBoC decides on the tenor and yield of its repo trades, giving investors a valuable signal as to the central bank's assessment of market conditions. Because of this central bank intervention, interbank repo yields are typically less volatile than stock exchange repo yields.

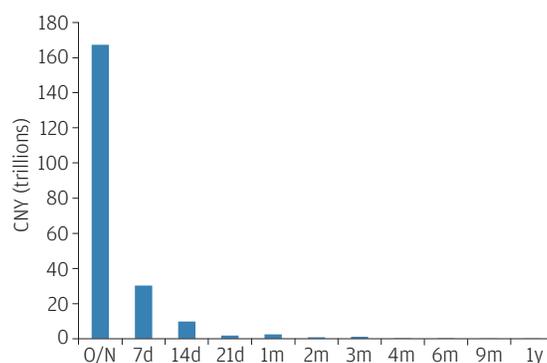
**Interbank repo yields are typically less volatile than stock exchange repo yields; the majority of repo transactions are overnight**

**EXHIBIT 6: HISTORICAL INTERBANK REPO YIELDS, 2014 INTERBANK REPO TRADING VOLUME BY TENOR**

**SEVEN-DAY INTERBANK REPO RATE**



**2014 INTERBANK REPO TRADING VOLUME BY TENOR**



Source: Bloomberg; as of May 31, 2015.

<sup>11</sup> The interbank X-repo market was established in 1Q15 and is currently still in trial phase.

# Interbank repo: collateral and counterparty risk

The key interbank repo risks are default by the repo seller or a fall in the value of collateral. Historically, the quality of collateral has had a greater impact on repo yield than the quality of the counterparty. However, repo buyers still exhibit a clear preference for stronger counterparties, chosen on the basis of internal credit analysis and local agency ratings. To secure funding, smaller or riskier repo sellers typically pay higher yields, offer better collateral or give higher haircuts.

Collateral, which is negotiated between the counterparties, can include any bonds traded on the interbank market except bonds that will mature before the repo maturity date. Collateral is dominated by higher-rated government, policy bank<sup>12</sup> and state-owned enterprise bonds (**EXHIBIT 7**). As the interbank market does not have a margin payment mechanism or collateral mark-to-market, haircuts are generally higher than for equivalent stock exchange repo.

To participate in the interbank market, investors must have an interbank license issued by the PBoC. Interbank repo participants must also sign the bond repurchase master agreement with the National Association of Financial Market Institutional Investors (NAFMII), which details the general terms and conditions that apply to repo counterparties, including their responsibilities and procedures in the event of non-performance or default.

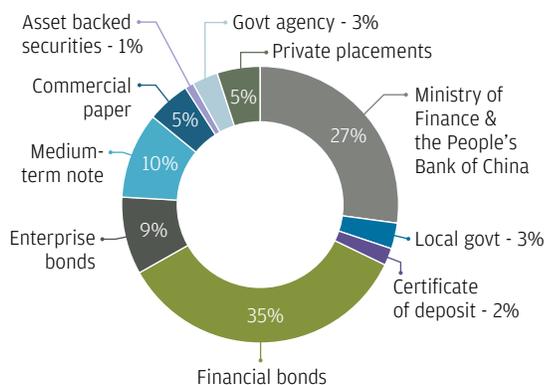
There are no formal or regulator-specified standards for selection of interbank collateral, haircuts or counterparties, although stock exchange repo haircut policies are important references. Therefore, each interbank repo participant must manage its own credit exposures and limits.

In the event of a default by either counterparty, the first option is to negotiate an agreed settlement. If this does not succeed, both counterparties can participate in China Central Depository and Clearing Corporation Limited (CCDC)-directed arbitration. As a final option, the master agreement gives the interbank repo buyer the right to dispose of the collateral to compensate for any losses, including principal, interest, penalties and other related expenses.

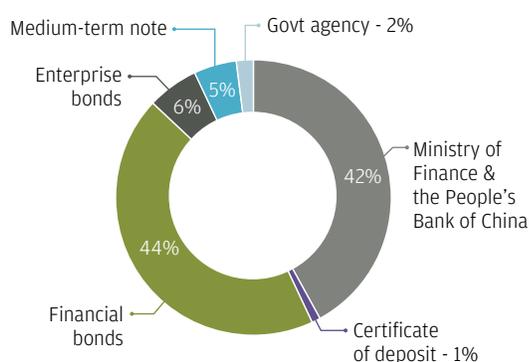
## Interbank collateral is dominated by highly rated government, policy bank and state-owned enterprise bonds

EXHIBIT 7: INTERBANK BONDS OUTSTANDING BY ISSUER, INTERBANK REPO MARKET COLLATERAL BY ISSUER

### INTERBANK BONDS OUTSTANDING BY ISSUER



### INTERBANK COLLATERAL POOL BY ISSUER\*



Source: Chinabond; as of May 31, 2015. \*Interbank collateral pool is based on 2014 trading volumes.

<sup>12</sup> Financial bonds include bank and broker bonds but are predominantly (86%) policy bank bonds.

# Stock exchange repo: operations, yield and volume

While the Shanghai Stock Exchange bond market is significantly smaller than the interbank market, it offers a more diversified investor base,<sup>13</sup> standardized products, lower credit risk and operational ease, all of which make it an attractive platform for executing repo trades.

Investment funds, insurance companies and brokers are the major stock exchange repo buyers and sellers. Equity funds, bond funds and brokers are normally collateral providers, borrowing cash to leverage or meet outflows, while money market funds with large cash balances to invest are typically cash providers. Given funds' short-term liquidity requirements, overnight to seven-day repo dominates all other maturities, representing 98% of the total 2014 volume (**EXHIBIT 8**).

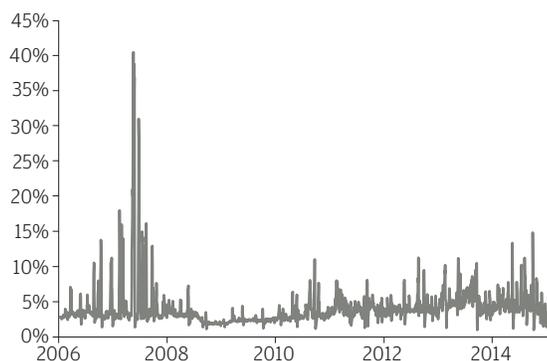
The Chinese stock exchange pledged repo model is unique in that the exchange not only facilitates the transaction but also acts as the counterparty to all repo buyers and sellers. The China Securities Depository & Clearing Corporation (CSDCC) defines the collateral pool and haircuts, and also establishes the rules and procedures for trading and settlement. The Shanghai Stock Exchange also offers an agreement repo<sup>14</sup> in which the exchange acts only as a facilitator and takes no counterparty risk.

Stock exchange repo yields are significantly more volatile<sup>15</sup> than interbank repo (**EXHIBIT 8**). Yields are driven by demand and supply of liquidity, similar to the interbank market, but without the moderating influence of the PBoC's open market operations to dampen demand-and-supply shocks. Margin lending by brokers and retail demand ahead of equity and convertible bond issuance also have a major impact on demand for funds.

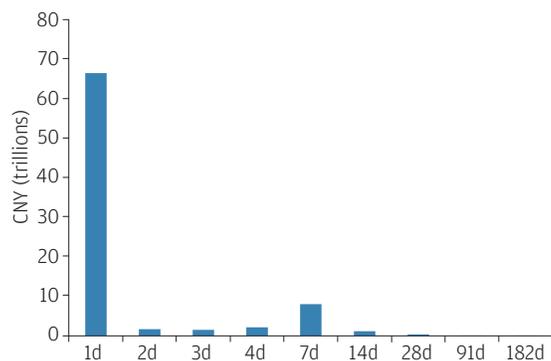
**Stock exchange yields are significantly more volatile than yields for interbank repo; the majority of repo transactions are one-day settlement**

**EXHIBIT 8: STOCK EXCHANGE REPO YIELDS AND TRADING VOLUME**

**SEVEN-DAY STOCK EXCHANGE REPO RATE**



**2014 SHANGHAI STOCK EXCHANGE REPO TRADING VOLUME BY TENOR**



Source: Bloomberg; as of May 31, 2015.

<sup>13</sup> All stock exchange account holders can participate in stock exchange repo transactions, although the market is dominated by institutional investors and funds.

<sup>14</sup> Agreement repo was introduced in February 2015, but it is currently not widely used.

<sup>15</sup> Given the high volatility, the daily volume-weighted average yield is a more accurate indicator of the Shanghai Stock Exchange repo yield than the closing yield level.

# Stock exchange repo: collateral and counterparty risk

As counterparty to all repo buyers and sellers, the stock exchange follows strict policies and procedures to curtail its risks and protect its strategic role. The key stock exchange repo risks are non-payment of funds by repo buyers, default by repo sellers or a fall in the value of collateral.

Both retail and institutional investors can participate in the stock exchange repo market provided they have a stock exchange account. But retail investors, who trade via security brokers, are restricted to reverse repo and a limited subset of bonds. Only larger, more sophisticated qualified investors, which trade directly with the exchange, can buy the full range of listed bonds and act as repo buyers and sellers.

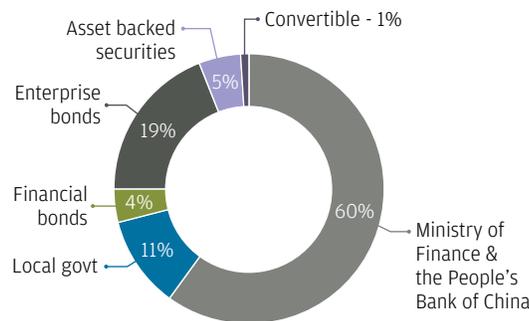
To mitigate the risk of non-payment of funds, repo buyers must maintain a deposit with the stock exchange based on their historical transaction volumes and turnover. In addition, all counterparties pay a small fee on each repo transaction into a securities settlement risk fund, designated to offset stock exchange losses from failed repo trades.

Every trading day, the CSDCC posts a list of acceptable collateral, which must be exchanged-traded bonds<sup>16</sup> with a minimum AA rating. Haircuts, which are large by Western standards, are based on a combination of factors—the bond’s credit quality, market price and price volatility. (EXHIBIT 9 and EXHIBIT 10, next page).

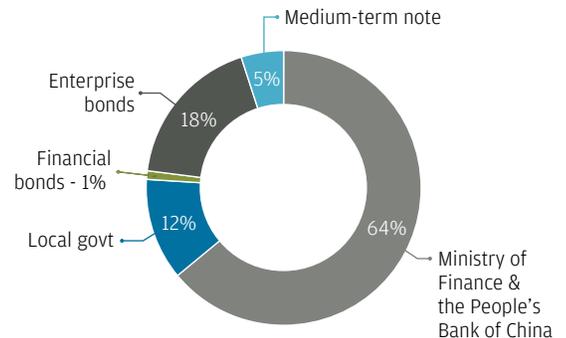
**Stringent collateral and haircut rules are central to stock exchange efforts to minimize the risk of a seller defaulting or a decline in the value of collateral**

EXHIBIT 9: STOCK EXCHANGE BONDS BY ISSUER AND ACCEPTABLE COLLATERAL POOL

STOCK EXCHANGE BONDS OUTSTANDING BY ISSUER



STOCK EXCHANGE ACCEPTABLE COLLATERAL BY ISSUER



Source: Wind; as of May 12, 2015, and Shanghai Stock Exchange; as of December 31, 2014.

<sup>16</sup> Although CSDCC rules allow convertible bonds to be offered as collateral, the haircuts are significantly higher than for equivalent straight bonds.

Typically, the haircut on a bond will increase as its volatility rises or its quality deteriorates

EXHIBIT 10: STOCK EXCHANGE HAIRCUTS IN THE COLLATERAL POOL

Stock exchange haircuts					
Haircut	Repo margin	Issuer example	Typical rating	Amount outstanding (CNY bn)	% Value
<10%	>90%	Government, policy bank	AAA	8,077	85%
10-20%	80-90%	Corporate/enterprise bonds	AA+	206	2%
20-30%	70-80%	Corporate/enterprise bonds	AA	1,072	11%
30-50%	50-70%	Corporate/enterprise bonds	AA	86	1%
>50%	<50%	Corporate/enterprise bonds	AA	55	1%

Source: CSDCC, Shanghai Stock Exchange, Wind, J.P. Morgan Asset Management; as of May 31, 2015.

Repo sellers are free to offer any CSDCC approved bond as collateral; however, the maximum that can be borrowed must be less than the principal of the collateral multiplied by the repo margin.<sup>17</sup>

Stock exchange collateral is marked to market on a daily basis, and this allows for lower initial haircuts relative to the interbank market. Should the value of collateral fall below the amount borrowed (either due to a fall in price or a default of the collateral), the stock exchange will ask the seller to supply additional acceptable collateral within one day to ensure that the collateral exceeds the amount borrowed.

In the event of default by the repo seller, the stock exchange has the right to sell its collateral. If the collateral sale proceeds are not sufficient to cover the entire loss, the CSDCC may seize and liquidate other securities owned by the same counterparty.

Repo buyers have limited information on repo sellers, and vice versa. In addition, the stock exchange does not publish details of the actual collateral pool or indicate which portion is applicable to which counterparty. Therefore, confidence in the ability of the stock exchange to fulfill its commitment as counterparty is paramount. While the Shanghai and Shenzhen stock exchanges are not directly owned by the government, they play a critical role in China's financial development and are widely regarded as systemically important. Their credit profile is seen as similar to other entities with quasi-sovereign ratings, which effectively limits stock exchange counterparty risk.

<sup>17</sup> Repo margin = (1 - haircut).

## WHY ARE CHINESE REPO RATES SO VOLATILE?

### Repo rates

#### SEASONAL FACTORS

- There are three Golden Week holidays in China, when markets typically close for several days and liquidity conditions tighten (Chinese New Year, Labor Day in May and National Day Holiday). Ahead of these holidays, and at quarter-end, yield volatility is higher as banks struggle to estimate their funding needs due to strong retail and institutional demand for cash.

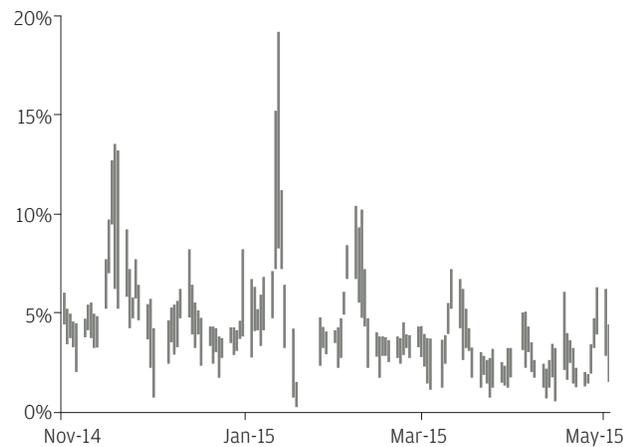
#### CORPORATE FACTORS

- Corporate factors, such as tax and dividend payments, temporarily impact repo yields due to the large quantity of liquidity locked up by these events.
- Stock market initial public offerings for equities and convertible bonds also lock up funds for three to four days, draining liquidity from the market and pushing repo yields higher. When liquidity returns, yields can fall sharply.

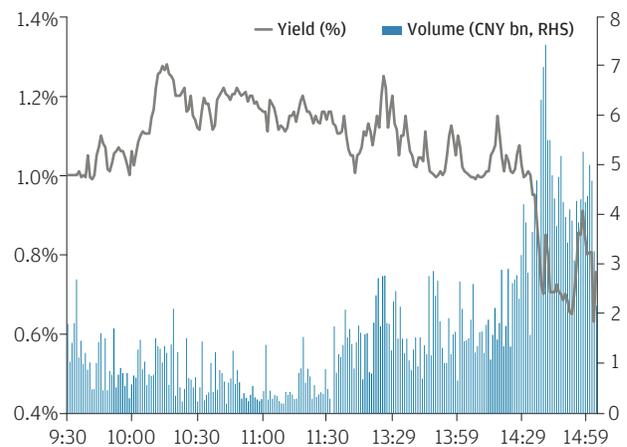
#### INTRA-DAY FACTORS

- Intra-day repo yields and volumes can be volatile, typically peaking during the early-morning session as sellers rush to secure funding while buyers seek to lock in higher yields.
- Repo rates subsequently decline in late-morning and early-afternoon sessions before a final late-day spike in volumes as sellers and buyers lock in funding, unwilling to risk being underfunded overnight.

STOCK EXCHANGE REPO: DAILY HIGH AND LOW YIELDS



STOCK EXCHANGE: INTRA-DAY YIELDS AND VOLUMES



# Repo for money market funds

In the last decade, the RMB money market fund sector has been transformed, growing in size and significance. The ability of MMFs to offer higher, market-driven returns, flexible liquidity and relatively good security helped spur the growth of the industry's assets under management to a record CNY 2.5 trillion as of April 2015.<sup>18</sup> Critical to this success has been the ability of MMFs to invest in repo.

MMFs can invest in both interbank and stock exchange repo, but a combination of regulatory and practical factors has led the industry to generally favor stock exchange repo. The China Securities Regulatory Commission (CSRC), which regulates MMFs, has tighter restrictions on interbank repo than on stock exchange repo. Rating agencies that offer MMF ratings also favor stock exchange repo due to lower counterparty risk while regulations forbid funds from acting as repo sellers (**EXHIBIT 11**).

**Rating agencies that offer MMF ratings favor stock exchange repo due to lower counterparty risk while regulations forbid funds from acting as repo sellers**

**EXHIBIT 11: MMF GUIDELINES FOR REPO TRADING**

Market	Guideline	CSRC	Fitch	CCXI/Moody's
Interbank	Repo (Fund manager is seller)	<ul style="list-style-type: none"> <li>• Max 20% (both Interbank repo &amp; Stock exchange repo)</li> <li>• Max 20% per counterparty</li> </ul>	• Not allowed	• Not allowed
	Reverse repo (Fund manager is buyer)	<ul style="list-style-type: none"> <li>• Unlimited</li> <li>• Max 40% per counterparty</li> </ul>	<ul style="list-style-type: none"> <li>• Max 20%</li> <li>• Max 10% per counterparty</li> <li>• Min A- counterparty</li> </ul>	<ul style="list-style-type: none"> <li>• Max 10% per counterparty</li> <li>• Min A3 counterparty</li> </ul>
Stock exchange	Repo (Fund manager is seller)	<ul style="list-style-type: none"> <li>• Max 20% (both Interbank repo &amp; Stock exchange repo)</li> <li>• Max 20% per transaction</li> </ul>	• Not allowed	• Not allowed
	Reverse repo (Fund manager is buyer)	<ul style="list-style-type: none"> <li>• Unlimited</li> <li>• Unlimited per transaction</li> </ul>	<ul style="list-style-type: none"> <li>• Max 100%</li> <li>• Max 25% per transaction</li> </ul>	<ul style="list-style-type: none"> <li>• Max 100%</li> <li>• Max 25% per transaction</li> </ul>

Source: CSRC, Fitch, CCXI/Moody's; as of May 31, 2015.

<sup>18</sup> Source: CSRC; as of April 30, 2015.

## STOCK EXCHANGE REPO FOR MONEY MARKET FUNDS

- Stock exchange repo typically constitutes 20% to 60% of the holdings of an AAA rated money market fund.<sup>19</sup>
- Repos are used to improve the fund's liquidity profile and boost its yield.
- The decision to buy repo relative to other cash investment options is based on the yield offered and the impact on the fund's weighted average maturity and its allocations.
- Funds generally buy a mixture of one-day and seven-day repo to minimize the stock exchange-required deposit while still maximizing flexibility.
- Funds will typically not buy repo beyond 21 days to maturity given its illiquidity.
- Each individual repo trade typically represents 2% to 5% of the fund's market value.
- Repo maturities are laddered to ensure that several repo trades mature each day. As a result, cash is always available to meet outflows. If cash flow is flat or positive, repos can be reinvested.

Although interbank repo has higher volumes, lower volatility and a wider collateral pool, these benefits do not fully offset the higher counterparty risks and transaction costs that interbank repo entails. In contrast, the lower counterparty risks and operational ease of stock exchange repo are important to money market funds.

A critical consideration for MMFs is liquidity: upon maturity, stock exchange repo cash proceeds are returned to the buyer at the start of day, whereas interbank cash proceeds can be returned at any time prior to market close. This distinction is important for MMFs, whose regulations prohibit intra-day and overnight overdrafts.

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<sup>19</sup> Source: Wind; as of May 30, 2015.

# Conclusion

In China, two distinct repo markets offer different opportunities to investors. In the interbank repo market, the ability to choose counterparties, collateral and haircuts, as well as the clarity provided by the NAFMII master repo agreement, offers transparency and reassurance to investors and market participants. In the stock exchange repo market, the quasi-sovereign nature of the exchange, combined with rigorous counterparty standards and high collateral haircuts, offers excellent risk protections.

The role of repo will evolve as interest rate liberalization gradually takes hold. After three decades of Chinese economic and financial reform, the process has decidedly begun.<sup>20</sup> The changes introduced by the government, central bank and regulators will help interest and deposit rates become more market-driven, introduce a wider range of financial instruments and encourage investors to develop a greater awareness of risk.

Repo will remain a substantial and critical part of Chinese financial markets. As this paper has demonstrated, repo serves as an important indicator of the true cost of liquidity and provides both valuable funding and a relatively secure short-term investment. For RMB money market funds, repo is a low-risk investment option, with good liquidity and timely settlement for short-term cash balances. As liquidity investors are well aware, these factors are important benefits in any market environment.

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<sup>20</sup> Aidan Shevlin and Lan Wu, "China: The Path to Interest Rate Liberalization" (J.P. Morgan Asset Management, June 2015).

## APPENDIX

### Repo regulators, markets and facilitators

	ENTITY	DETAILS	REPO IMPACT
REGULATORS	The People's Bank of China (PBoC)	<ul style="list-style-type: none"> <li>China's central bank, established in 1949 and legally confirmed in 1995</li> <li>Responsibilities include implementing monetary policy, eliminating financial risk and maintaining financial stability</li> </ul>	<ul style="list-style-type: none"> <li>Primary Chinese regulator</li> <li>Operates in IB repo markets via open market operations</li> </ul>
	China Securities Regulatory Commission (CSRC)	<ul style="list-style-type: none"> <li>Main securities market regulator, authorized by the State Council</li> </ul>	<ul style="list-style-type: none"> <li>Supervises and regulates Chinese stock exchanges, brokers and fund managers</li> </ul>
	China Banking Regulatory Commission (CBRC)	<ul style="list-style-type: none"> <li>Main banking regulator, authorized by the State Council to monitor and regulate all banking institutions</li> </ul>	<ul style="list-style-type: none"> <li>Supervises and regulates the banking sector</li> </ul>
	National Association of Financial Market Institutional Investors (NAFMII)	<ul style="list-style-type: none"> <li>Established in September 2007 by the State Council as a Self Regulatory Organization (SRO)</li> <li>Goal is to promote sustainable development of China's over-the-counter (OTC) markets</li> </ul>	<ul style="list-style-type: none"> <li>Owner of bond repurchase master agreement</li> </ul>
MARKETS	Interbank Market (IB)	<ul style="list-style-type: none"> <li>Established in 1990, regulated by the PBoC</li> <li>One-to-one OTC platform for trading bonds &amp; repo</li> </ul>	<ul style="list-style-type: none"> <li>Operates interbank repo market</li> <li>94% of bonds trade on IB market</li> </ul>
	Shanghai Stock Exchange (SSE)	<ul style="list-style-type: none"> <li>Founded in 1990 as a membership-owned institution governed by the CSRC</li> <li>Largest stock exchange in China, with 1,041 listed companies and total market capitalization of CNY 34.8 trillion</li> </ul>	<ul style="list-style-type: none"> <li>Operates stock exchange repo market</li> <li>Both pledged &amp; agreement types</li> </ul>
	Shenzhen Stock Exchange (SZSE)	<ul style="list-style-type: none"> <li>Founded in 1990 as a self-regulated legal entity directly supervised by the CSRC</li> <li>Second-largest stock exchange in China, with 1,672 listed companies and total market capitalization of CNY 21 trillion</li> </ul>	<ul style="list-style-type: none"> <li>Operates stock exchange repo market</li> <li>Limited range of bonds and low repo volumes</li> </ul>
FACILITATORS	China Securities Depository & Clearing Corporation (CSDCC)	<ul style="list-style-type: none"> <li>Founded in 2001 by Shanghai and Shenzhen stock exchanges</li> <li>Regulated by the CSRC</li> </ul>	<ul style="list-style-type: none"> <li>Clearing agent for all stock exchange transactions</li> <li>Collateral holder for stock exchange repo</li> </ul>
	China Central Depository & Clearing (CCDC)	<ul style="list-style-type: none"> <li>Founded in 1996 by PBoC and Ministry of Finance</li> <li>Regulated by the PBoC</li> </ul>	<ul style="list-style-type: none"> <li>Depository and clearing agent for all interbank transactions</li> <li>Collateral holder for interbank repo</li> </ul>
	Shanghai Clearing House (SCH)	<ul style="list-style-type: none"> <li>Founded in 2009 by the PBoC</li> <li>Central clearing agent for all RMB and foreign currency transactions, including derivatives and cross-border trades</li> </ul>	<ul style="list-style-type: none"> <li>Collateral holder for interbank repo involving commercial paper or private placement corporate bonds</li> </ul>

Source: The People's Bank of China, China Securities Regulatory Commission, China Banking Regulatory Commission, National Association of Financial Market Institutional Investors, Interbank Market, Shanghai Stock Exchange, Shenzhen Stock Exchange, China Securities Depository & Clearing Corporation, China Central Depository & Clearing, Shanghai Clearing House; as of June 30, 2015.

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