

Shanghai Clearing House Central Counterparty Clearing services

Principles for Financial Market Infrastructures (PFMI)

Information Disclosure

February 2023

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Shanghai Clearing House Central Counterparty Clearing services

Principles for Financial Market Infrastructures Disclosure Report

Name of organization: Shanghai Clearing House (SHCH)

Jurisdiction of financial market infrastructures (FMI): the People's Republic of China

The administrative department to manage, supervise or regulate FMI: the People's Bank of China (PBC).

Disclosure time: February 28, 2023

For relevant information, see also <https://www.shclearing.com.cn/>

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1. Executive Summary

Shanghai Clearing House ("SHCH") is a central counterparty (CCP) serving China's financial market. SHCH's main business is to provide clearing services for direct and indirect RMB and foreign currency as well as other derivatives to the financial market, including: clearing, settlement, delivery, margin management, collateral management; information services, consultation services; any other services approved by PBC.

SHCH's CCP clearing service involves direct and indirect participants. Direct participants include general clearing members, direct clearing members and special clearing members, among which general clearing members can participate in all or part of CCP clearing services for their own transactions or customers' transactions, while direct clearing members can participate in all or part of CCP clearing for their own transactions. The specific provisions on Special Clearing Members participating in CCP clearing services can refer to the relevant rules of SHCH. As different kinds of clearing members need to undertake varying degrees of potential risk, SHCH has set up corresponding access standards for each kind of clearing members, including financial indicators, business management system, risk management system, IT system, etc. In addition to direct participants, there are indirect participants (non-clearing members, also called customers¹) who participate in CCP services indirectly through becoming customers of general clearing members.

Currently, SHCH conducts CCP clearing service under Chinese laws, and these services have sound, clear, transparent and executable legal basis. SHCH is supervised by PBC and provides services in accordance with the relevant laws, regulations and supervisory requirements. SHCH's shareholders include China Foreign Exchange Trade System & National Interbank Funding Center (CFETS), China Central Depository & Clearing Corporation Limited (CCDC), China Banknote Printing and Minting Corporation (currently renamed as China Banknote Printing and Minting Group Corporation Limited, CBPM) and China Gold Coin Incorporation (currently renamed as China Gold Coin Group Corporation Limited, CGCCL).

¹ PFMI principles generally use the word "customer" when describing "indirect participants." For consistency, the term "customer" and "client" are used instead of "non-clearing members" in this report.

In terms of CCP clearing service, SHCH undertakes internal and external risks which may come from within SHCH, or from external participants or other entities. These risks include: legal risk, credit risk, liquidity risk, operational risk, market risk, concentration risk, general business risk, custody and investment risks, etc. SHCH has set up stable risk management framework to identify, measure, monitor and manage credit risk, liquidity risk and operational risk. SHCH also considers concentration risk, market risk, general business risk, and custody and investment risk as well as the specific risks for different kinds of products.

This report is a self-assessment carried out by SHCH on the CCP clearing services operated by it, in accordance with the requirements of Principles for Financial Market Infrastructures (PFMI). The self-assessment is carried out according to the disclosure framework and the assessment methodology for PFMI published by The Committee on Payment and Settlement Systems (CPSS, now known as the Committee on Payments and Market Infrastructures CPMI) and the International Organization of Securities Commissions (IOSCO). The assessment period is until December 31, 2022.

2. Summary of major changes since last disclosure

This disclosure is SHCH's eighth public disclosure. Major changes since the last disclosure include the following:

1. Updates about the major businesses, financial information and statistical data; and
2. Modification of risk management related contents, including stress testing, eligible collateral, risk reserve resources and default management, etc.
3. Adds new progress of cross-border regulatory recognition work, including obtain EU "third-country central counterparty" recognition, etc.

3. General background on SHCH

I. General description of SHCH, CCP clearing services and market

SHCH was established on November 28, 2009. SHCH is a professional CCP for financial market in China. Since its establishment, it is subject to the strict supervision of PBC. Based on effective risk management and efficient clearing framework, SHCH offers centralized and standardized RMB and foreign currencies clearing services for spot and derivatives transactions as well as RMB cross-border transactions approved by regulators.

SHCH has steadily established and expanded the CCP clearing mechanism, and gradually expanded its services to cover five categories, including bonds, interest rate derivatives, FX spots & derivatives, credit derivatives and commodity derivatives, the related development process is as follows:

1. Bonds

On December 19, 2011, SHCH first launched the CCP clearing service for clearing cash bond transactions which was the first CCP clearing service of China's interbank bond market, marking the formal establishment of CCP clearing mechanism of interbank bond market. SHCH expanded the CCP clearing service for cash bond transactions since March 30, 2015, carrying out unified netting treatment of cash bond, pledged repo and outright repo, applying it to all the fixed income instruments under the registration

and custody of SHCH, thus SHCH has realized the full support to a variety of transaction modes of fixed income products of interbank market, comprehensively upgrading its capability of risk management and market service.

2. Interest rate derivatives

SHCH launched the CCP clearing service of RMB interest rate swap (IRS) on January 2, 2014. On July 1, 2014, SHCH started to provide the client CCP clearing service of RMB IRS. On January 28, 2014, the PBC issued the Notice of the People's Bank of China on Issues Concerning the Establishment of the Central Clearing Mechanism for Over-the-Counter Financial Derivatives and the Launching of the Central Clearing of RMB Interest Rate Swaps (No. 29 [2014] of the People's Bank of China), announcing that RMB IRS trades would be subject to mandatory clearing as from July 1, 2014. Thereby China realized the mandatory clearing of OTC derivatives. In order to further reduce the cost of participants, since October 2014, SHCH has provided the collateral management service. In the participation of the IRS CCP clearing service, clearing members can submit eligible collaterals to offset the minimum margin requirement. From July 22, 2017, SHCH launched long and medium-term IRS CCP clearing service, by extending product periods that were included into the scope of services from 5 days-5 years, to 10 years, which has strengthened the price discovery of swap products, and provided effective long and medium-term interest rate risk management tools for market institutions. On November 10, 2017, IRS CCP clearing system initiated contract compression function, which can satisfy market participants' needs for lowering nominal principal and releasing credit. In June 2019, SHCH improved the charging function of the IRS system, enabling market participants to choose charging scheme according to their own trading characteristics to reduce the clearing cost. On August 2019, the IRS system added the function of real-time clearing, realizing the risk control function at the trading platform to improve the efficiency of CCP clearing. Since November 8, 2021, LPR1Y IRS transactions with maturity of 3 years or less have been officially included in CCP clearing, further expanding the varieties of CCP clearing of IRS. In February, 2022, the online filing of RMB interest rate swap customers was launched, and the general clearing members could complete the filing process in a "one-stop" manner, effectively improving business efficiency. On 4 July, 2022, PBC, the Hong Kong Securities and Futures Commission and the Hong Kong Monetary Authority issued a joint announcement, agreeing that SHCH, the CFETS and the Hong Kong OTC Clearing should carry out cooperation on the interconnection of interest rate swap markets between Hong Kong and the mainland of China, so as to facilitate domestic and foreign investors to participate in the financial derivatives markets of the two places.

Besides, on April 7, 2015, SHCH launched the CCP clearing service of Standard Bond Forward, providing CCP clearing services to bond forward contracts traded in the interbank market with standardized product elements, such as underlying bonds and settlement day. In March, 2018, SHCH optimized the cash settlement for the CCP clearing service of Standard Bond Forward, to further increase the correlation between standard bond forward contracts and China Development Bank bond, and improve the settlement price formulation mechanism. In October 2020, SHCH launched the Standard Bond Forward services for Agricultural Development Bank of China bonds, further expanding the underlying bonds from China Development Bank bonds to Agricultural Development Bank of China bonds to meet the diversified demands of the market. The physical delivery mechanism for Standard Bond Forward was launched in November 2021 to further improve the price convergence mechanism in the cash and forward markets and improve market efficiency.

3. FX spots & derivatives

On August 22, 2011, SHCH undertook interbank market FX spot auction clearing service and the market realized a smooth transition, which marked SHCH formally providing netting settlement service for the

financial market. On April 12, 2013, SHCH undertook interbank market RMB FX netting settlement service (including RMB FX spot, forward and swap netting settlement service). On November 3, 2014, SHCH formally launched FX CCP clearing service. On April 27, 2015, SHCH formally launched RMB FX transaction CCP customer clearing service. FX general clearing members can clear FX products for their customers. On August 15, 2016, SHCH formally included the USD/RMB vanilla European option transactions with maturity of one year or less into CCP clearing, as the first clearing house in the world to provide CCP clearing service to OTC FX option transactions. On February 2, 2018, SHCH formally launched CCP clearing service to cross-border FX spot transactions. In November 2020, SHCH further expanded the clearing maturity and clearing product scope of FX CCP clearing services, adding T+1 day trades and FX option portfolio trades into CCP clearing.

So far, SHCH had comprehensively covered main products and transaction modes of FX market, to promote the enhancement of services processing capability, the improvement of service quality and the support of more product innovation through realizing the integration of FX clearing service.

4. Credit derivatives

On May 2, 2017, SHCH launched bilateral trade-by-trade clearing services for non-standardized credit default swap (CDS) contracts to market, contributing to the smooth connection between trading and clearing and the enhancement of clearing and settlement. In addition, as an independent counterparty, SHCH has been capable to offer mark-to-market valuation services to the market by the end of each day.

On January 30, 2018, the CCP clearing service for CDS has been launched. Release of CDS clearing service fills the gap of China financial market in credit derivative CCP clearing services, shows that SHCH is capable of pricing, clearing and risk management about credit derivatives, and signifies that SHCH moves to a new level in risk management.

5. Commodity derivatives

On April 16, 2013, SHCH formally launched the CCP clearing service of RMB forward freight agreement (FFA), the first batch including the CCP clearing service of Capesize time-charter FFA (CTC), Panamax time-charter FFA (PTC) and Supramax time-charter FFA (STC). On August 4, 2014, SHCH launched CNY Iron Swap (CIS) and CNY Steaming-coal Swap (CSS) to provide CCP clearing for OTC commodity derivatives. On February 6, 2015, SHCH further launched Shanghai Free Trade Zone (FTZ) Copper Premium Swap (FCP), the world's first commodity derivative product with copper price premium index as its underlying. The launch of this product effectively promoted the development of the Free Trade Zone. On July 20, 2015, SHCH launched CCP clearing service for RMB Styrene Monomer Swap and FTZ Mono Ethylene Glycol Import Swap. On December 11, 2015, SHCH launched CCP clearing services for China's Coastal Coal FFA and RMB Container Swap. On July 18, 2016, SHCH launched CCP clearing service for RMB Electrolytic Copper Swap. On January 12, 2017, SHCH launched Shanghai Emission Allowance Forward (SEAF) CCP clearing service. On January 8, 2018, SHCH launched CCP clearing service for CNY Mono Ethylene Glycol Swap. On April 2, 2018, SHCH launched CCP clearing service for CNY Methanol Swap. On May 7, 2018, SHCH launched CCP clearing service for CNY Platts Index Swap. On May 17, 2021, SHCH launched CCP clearing service for RMB Benzene Swap, RMB Paraxylene Swap and RMB P TA Swap.

In 2022, the volume of SHCH's CCP clearing services is 150.7 trillion CNY, 0.5% more than the previous year.

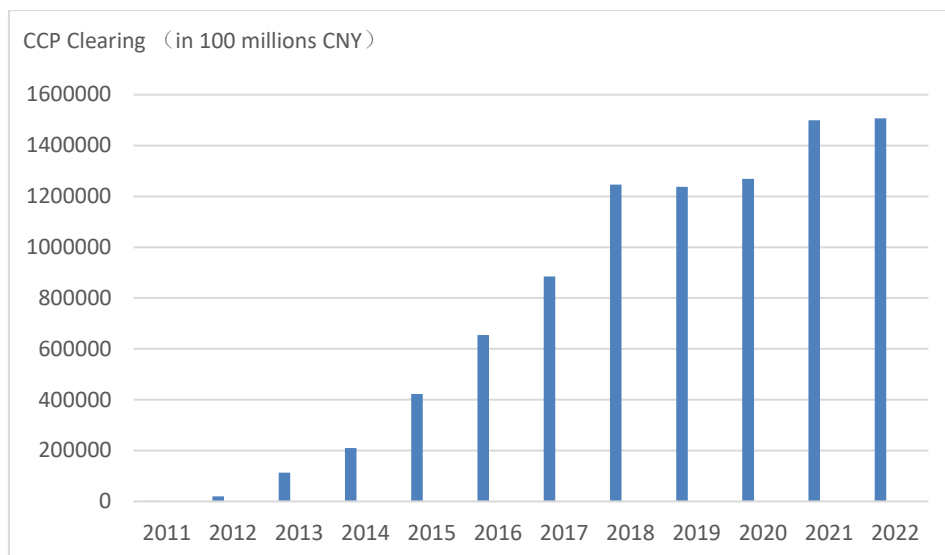


Figure 1: Annual volume of the CCP clearing services of SHCH

In 2022, the CCP clearing services of each market is shown in table 1, among which the CCP clearing services of FX had the largest scale of 126.06 trillion CNY, and its year-on-year growth was 0.9%. The number of participants of each CCP clearing services in the end of 2022 is shown in table 2.

Table 1: Volume of each CCP clearing services in 2022

(in 100 millions CNY)	2022	2021	year-on-year
Bonds services	35974.26	37638.73	(4.4%)
Interest rate derivatives services	210291.24	211448.45	(0.5%)
FX services	1260627.23	1249576.81	0.9%
Credit derivatives services	1.15	4.20	(72.6%)
Commodity derivatives services	143.76	261.90	(45.1%)

Note: Negative values are shown in parentheses in the table.

Table 2: Number of participating institutions of each CCP clearing services at the end of 2022

		General Clearing Member	Direct Clearing Member	Client	Other participants
Bonds		7	58	16	
Interest rate derivatives	IRS	9	40	337	
	Standard bond forward	6	43	44	
FX	RMB FX	9	37	31	
	FX auction				246
	Cross-border FX		5		
Credit derivatives		5	20	2	
Commodity derivatives		7	8	636	

II. Organizational structure of SHCH

The authority of SHCH among its management structure is the general meeting of shareholders, which has the board of directors and the board of supervisors. The business management committee, risk management committee and remuneration and appraisal committee are established under the board of directors, which have respective work regulations and fulfill the relevant functions of consulting, etc. The business management team of SHCH reports to the board of directors, carries out the work in accordance with the provisions of the laws, regulations and articles of association, and is in charge of the daily business activities of the company. The specific organizational structure of SHCH until December 31, 2022 is shown in the figure below:

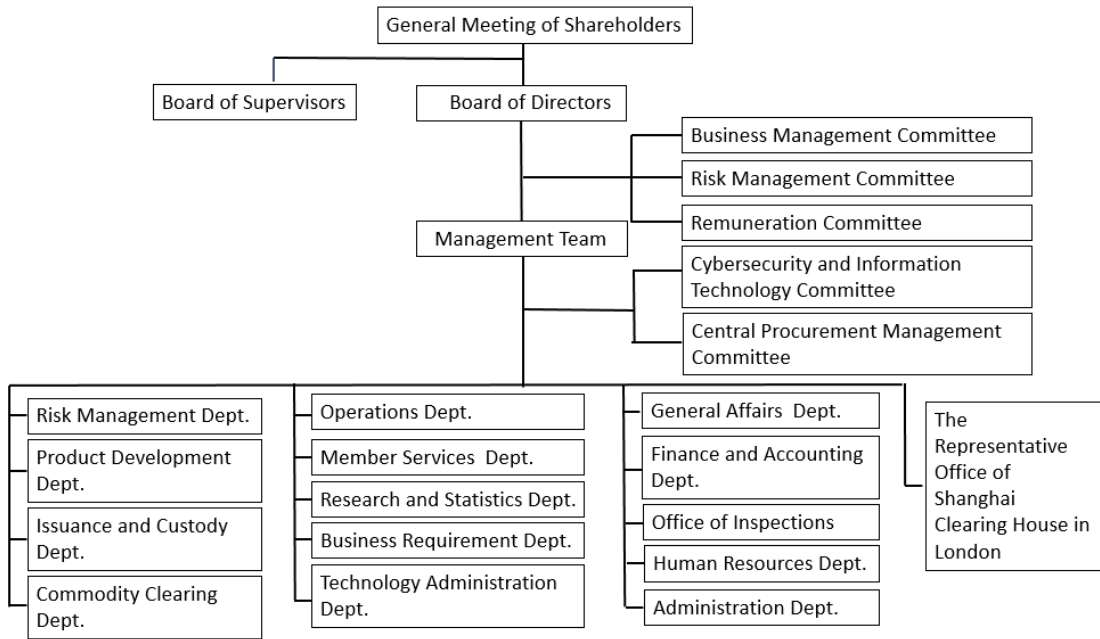


Figure 2: Organizational structure of SHCH

III. Legal and regulatory framework

SHCH is a limited liability company established in accordance with the Company Law of the People's Republic of China and other relevant laws and regulations, and supervised by PBC.

SHCH was established on November 28, 2009, by CFETS, China Central Depository & Clearing Corporation Limited (CCDC), China Banknote Printing and Minting Group Corporation Limited (CBPM) and China Gold Coin Group Corporation Limited (CGCCL). The shareholding structure of SHCH is shown in the figure below:

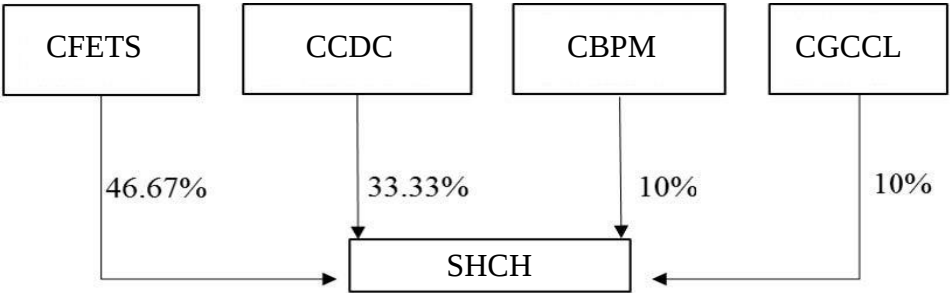


Figure 3: the shareholding structure of SHCH

As of December 31, 2022, SHCH conducts CCP clearing services under Chinese laws, and these services have sound, clear, transparent and executable legal basis. These laws include: Futures and Derivatives Law of the People's Republic of China, Law of the People's Republic of China on People's Bank of China, Company Law of the People's Republic of China, The Civil Code of the People's Republic of China, Securities Law of the People's Republic of China, Law of the People's Republic of China on Commercial Banks, Securities Investment Fund Law of the People's Republic of China, Electronic Signature Law of the People's Republic of China, Trust Law of People's Republic of China, Enterprise Bankruptcy Law of the People's Republic of China, etc.

IV. System design and operation

The core technology system of SHCH is its self-developed technology platform integrating CCP clearing, central registration and custody. With the core technology system, SHCH has not only improved the comprehensive efficiency of financial market, but also effectively managed and mitigated all kinds of risks in operation.

The business treatment process of SHCH are generally: order reception, compliance check, novation, risk monitoring, and settlement processing. Specifically, after reception of data, SHCH shall review the elements and carry out novation. Meanwhile, SHCH manages potential risks through mark-to-market profit and loss monitoring, margin calculation, back testing, stress testing and adjustment of risk control parameters. In settlement, the system uses straight-through processing: the internal system process the settlement of funds and bonds; the external and High Value Payment System (HVPS)² are connected through private wire network, automatically completing cash settlement and real-time interaction.

In addition, SHCH has actively promoted the direct-connection interface standardization to facilitate the services participation of market institutions; taking the initiative to optimize workflow and effectively shorten the internet access period of market institutions. So far the number of accessed institutions has increased to more than 3000. Through the website account opening and information inquiry function, SHCH has greatly enhanced the convenience of market institutions to obtain services through the Internet.

V. Information record and storage

SHCH has strict requirements for information record and storage. Specifically, SHCH's each key step of information processing is recoverable; the original content of each record before correction or revision will be accurately recorded with traceability and restorability; there are corresponding preventing measures when making unauthorized changes to information; there are appropriate measures to ensure the security and confidentiality of recorded data; the record keeping system is embedded with the mechanism for automatic identification and correction; when there is a system error, the record keeping system can quickly restore the record.

² HVPS is an application system developed by PBC according to China's demand in payment and clearing and utilizing modern computer technology and communication network, to deal with city-wide, trans-regional inter-bank, internal high value credit and urgent low value credit payment transactions, as well as credit payment transactions and real-time transfer transactions of PBC system. HVPS is a real time gross settlement (RTGS) system.

4. Principle-by-principle summary narrative disclosure of PFMI

Principle 1: Legal Basis

Key Consideration 1.1: The legal basis should provide a high degree of certainty for each material aspect of an FMI's activities in all relevant jurisdictions.

Summary narrative:

So far, SHCH carries out the CCP clearing service under Chinese laws, and the services has sound, clear, transparent and executable legal basis. These laws include: Futures and Derivatives Law of the People's Republic of China, Law of the People's Republic of China on People's Bank of China, Company Law of the People's Republic of China, The Civil Code of the People's Republic of China, Securities Law of the People's Republic of China, Commercial Bank Law of People's Republic of China, Securities Investment Fund Law of People's Republic of China, Electronic Signature Law of the People's Republic of China, Trust Law of People's Republic of China, Enterprise Bankruptcy Law of People's Republic of China, etc.

Article 8 of the “Futures and Derivatives Law of the People's Republic of China” stipulates that the derivatives market shall be supervised and administered by departments authorized by The State Council according to the division of duties. Article 4, Article 27 and Article 32 of the “Law of the People's Republic of China on People's Bank of China” authorizes PBC in the form of law to supervise the interbank funding market, interbank bond market, interbank foreign exchange market and the clearing activities among finance institutions. As OTC derivatives are one of interbank market's trade categories, PBC has clear and legally authorized regulatory power over it. PBC's regulatory powers over interbank market derivatives include but are not limited to: right to approve establishment of professional institutions to conduct interbank market derivatives' clearing services, and right to decide clearing mode adopted by each specific services. SHCH's “Business Supervision and Management Rules”, “Notice by PBC on Matters of Establishing Central Clearing Mechanism for OTC Financial Derivatives and Conducting Central clearing services for RMB Interest Rate Swap” (Yin Fa (2014) No.29), and “The Reply of State Administration of Foreign Exchange on Expanding the Scope of Interbank Foreign Exchange Market Netting Settlement Services and Conducting CCP Clearing Services” (Hui Fu (2014) No.293) is the direct basis for PBC to authorize SHCH to conduct CCP clearing services for OTC derivatives. In conclusion, SHCH mainly serves interbank market and PBC administers it.

The legal basis of novation is Article 543 and Article 555 of The Civil Code of the People's Republic of China. The above two articles support SHCH to intervene as CCP between the clearing participants reaching transaction agreements, to be the buyer for each seller and the seller for each buyer, so as to ensure the fulfillment of all contracts. Therefore, the connotation of agreement content change and agreement subject change in the concept of novation are supported by Chinese laws. Novation realizes the transfer of rights and obligations of two trading parties in a trade agreement into the rights and obligations of CCP clearing service between SHCH and two trading parties. The successive relationship of rights and obligations has certainty in legal effect.

Netting settlement has legal support under Chinese legal environment. 1. Article 37 of the Futures and Derivatives Law of the People's Republic of China stipulates that close-out netting can be carried out in accordance with the law if derivatives transactions are centrally settled through central counterparties. This provides a solid legal basis for close-out netting under Chinese law and clarifies key legal issues in netting settlement. 2. Articles 568 and 569 of The Civil Code of the People's Republic of China have respectively provided legal foundation for netting settlement between similar and dissimilar products under Chinese law; 3. “Notice by PBC on Matters of Establishing Central Clearing Mechanism for OTC Financial Derivatives and Conducting Central clearing services for RMB Interest Rate Swap” (Yin Fa (2014) No.29) and other regulating documents have clarified that CCP clearing services shall be conducted through netting

settlement; “The Guideline for Central Clearing of Shanghai Clearing House” approved by regulators, further clarifies the method of netting calculation; 4. Article 40 of “Enterprise Bankruptcy Law of People's Republic of China” and Article 43 of “The Regulation of Supreme People's Court on Several Issues regarding Applying the Enterprise Bankruptcy Law of People's Republic of China (II)” have also effectively exclude the effect of bankruptcy proceedings on netting settlement.. 5. SHCH’s relevant rules approved by regulators and the CCP clearing services agreement have provisions for relevant arrangement of netting settlement. The above laws, standard legal documents and agreement provide legal basis for confirming netting settlement.

Settlement finality has legal support under Chinese legal environment. 1. It is clearly stipulated in the Article 37 of the Futures and Derivatives Law of the People's Republic of China that the settlement property shall be given priority for settlement and delivery and shall not be enforced, and the central settlement shall not be suspended, invalid or cancelled due to the bankruptcy of any party involved in the settlement, which provides a solid legal basis for the finality of the settlement of derivatives. 2. Article 40 and 43 of “The Interbank Bond Market Bond Registration, Custody and Settlement Management Measures” (PBC Order (2009) No.1) and Article 6.2 of “Notice by PBC on Matters of Establishing Central Clearing Mechanism for OTC Financial Derivatives and Conducting Central clearing services for RMB Interest Rate Swap” (Yin Fa (2014) No.29), have clearly stipulated that settlement funds and securities stored in special clearing and settlement accounts and collateral involved in the settlement can only be used for clearing and settlement, and cannot be enforced; 3. It is also explicitly stipulated in the regulations or judicial interpretation issued by the Supreme People's Court, the Supreme People's Procuratorate, the Ministry of Public Security and other judicial and administrative organs that, settlement funds and securities cannot be frozen or deducted. This has guaranteed the realization of settlement finality at the judicial level; 4. SHCH’s relevant rules approved by regulators and the CCP clearing services agreement have provisions for settlement finality. The assets of clearing participants in the central clearing services such as securities to be settled, funds and other assets, as well as the performance security assets such as margin and clearing fund, are owned by the clearing participants and can only be used for the central clearing services. SHCH manage assets of clearing participants based on the relevant provisions, other units and individuals shall not use them. Based on the results of central clearing and the principle of synchronous settlement, SHCH shall organize and complete the settlement with all clearing members, including securities settlement, capital settlement, etc. The settlement is irrevocable once completed. The above law, regulations, standard legal documents and agreement have provided legal basis for settlement finality.

Margin equity isolation is confirmed under the framework of Chinese laws. 1. Margin equity isolation is realized in the form of real rights granted by security. According to Article 109 of “Enterprise Bankruptcy Law of People's Republic of China”, when the submitter of margin equity becomes insolvent, the security’s obligee has priority rights over the margin equity for payment. The conditions for the establishment of margin security are stipulated in the Article 70 of the “Interpretation of the Supreme People's Court of the Application of the Relevant Guarantee System of the Civil Code of the People's Republic of China”. The margin system of SHCH meets the requirements of the establishment of margin security, clearing participants deposit the margin into margin accounts set by SHCH, and SHCH has all specific accounting details. 2. It is also explicitly stipulated in the standard documents of law issued by PBC that the margin and clearing fund submitted to SHCH by clearing participants due to their participation in the CCP clearing services, belong to the submitter, shall only be used for fulfilling the credit, debt and default management arising from CCP clearing services, and shall be separated from the equity owned by SHCH and shall not be used for any other purposes. 3. SHCH’s relevant rules approved by regulators and the CCP clearing services agreement have provisions for margin equity isolation. SHCH shall conduct classified and independent accounting of the margin of each clearing member, and the margin equity shall be separated from the equity owned by SHCH. When the clearing members apply for withdrawal from the clearing

services, SHCH will refund the balance of the margin after they settling the relevant claims and debts with SHCH. Therefore, margin isolation has strong legal basis under Chinese laws.

There is certainty in rapid processing of margin equity under the framework of Chinese laws. 1. According to the stipulation of the finality of settlement in Article 37 of the Futures and Derivatives Law of the People's Republic of China, the rapid disposal of margin assets are not blocked by the judiciary, and are not be affected by the bankruptcy of the participants. 2. According to provisions in Article 436.2 of “Civil Code of the People's Republic of China”, in event of occurrence of pre-agreed circumstance on part of the clearing participants where the right of pledge is exercisable, SHCH can negotiate with clearing participants to convert margin equity into money, or take priority compensation from the income received due to auction and disposal of pledged properties; 3. SHCH relevant rules approved by regulators and the CCP clearing services agreement have provisions for rapid processing of margin equity; 4. With the approval of regulators, a complete process of auction and sale by financial market infrastructure has been established in the disposal of inter-bank bond repurchase defaults. The above laws, regulations, standard documents and agreement of law provide legal basis for margin equity rapid processing.

Key Consideration 1.2: An FMI should have rules, process, and contracts that are clear, understandable, and consistent with relevant laws and regulations.

Summary narrative:

All relevant rules, services processes and agreements of the CCP clearing service of SHCH are clear and pellucid and consistent with relevant laws and regulations. All formal documents of SHCH including relevant rules, services processes and agreements for all services are accurate and make daily updates.

Before formulating relevant rules, services processes and agreements for all services, SHCH will firstly solicit opinions from market participants, and then draft the above formal documents based on the processing and analysis of market opinions. During the drafting of relevant rules, services processes and agreements for all services, SHCH will also invite experts from law firms and judiciary authorities to carry out discussion and evaluation on the involved legal problems in the services. When the drafting of above formal documents is finished, SHCH will also invite market participants and law firms to a panel discussion and further solicit opinions concerning formal documents, and make explanation and communication on the relevant legal arrangement.

All relevant rules, services processes and agreements of all service formulated by SHCH shall be submitted to regulators for approval or reported to regulators. The above formal documents shall be published after approval, mainly released on the official website of SHCH, which is accessible by the clearing participants through services system client application or website.

SHCH will modify formal documents at appropriate time, such as relevant rules, services processes and agreements for all services, and its modification process is the same as its formulation process.

Key Consideration 1.3: An FMI should be able to illustrate the legal basis for its activities to relevant authorities, participants, and, where relevant, participants' clients, in a clear and understandable way.

Summary narrative:

SHCH has established a full set of easily understood file system, to respectively explain the legal basis for all activities to relevant authorities, participants and their clients.

To regulators, the way utilized by SHCH to explain the legal basis of services activities is: to submit relevant rules, services processes and agreements of all services to regulators for approval or reported to regulators. In the process of examination and approval, SHCH will also submit detailed supporting papers.

To legislative, judicial and administrative organs, SHCH communicates through submitting written reports, accepting survey and consultancy, cooperating in research projects, and solicits opinions on the legal problems involved in specific services, so as to obtain confirmation and support from legislative, judicial and administrative practice.

SHCH explains the legal basis of relevant rules, services processes and agreements to clearing participants and their clients, by way of signing agreements, services questions and answers, specific services guide, services training and clearing house salons, so as to ensure clearing participants and their clients comprehensively understand the same.

Key Consideration 1.4: An FMI should have rules, process, and contracts that are enforceable in all relevant jurisdictions. FMI shall ensure that activities carried out based on such rules and process will not be voided, reversed, or subject to stays.

Summary narrative:

The relevant rules, services processes and agreements of the CCP clearing service of SHCH are formulated according to Chinese laws and are executable within the territory of China. According to the CCP Clearing Agreement, the relationship of rights and obligations between clearing participants and SHCH are governed by Chinese laws.

PBC supervises the CCP clearing service of SHCH according to the authorization of the Law of the People's Republic of China on People's Bank of China, to approve each specific CCP clearing service's rules, services processes and agreements, etc. SHCH carries out services according to rules, services processes and agreements, which will not be abolished, cancelled or suspended. In addition, Securities Law of the People's Republic of China and relevant judicial interpretation of financial market have confirmed the effectiveness of services rules approved by regulators.

There is no circumstance where the system of SHCH will be abolished, cancelled or suspended, nor there is any circumstance where its actions are invalidated, cancelled or suspended. So far, there is no court decision to deny the relevant actions or system arrangement made by SHCH.

Key Consideration 1.5: An FMI conducting business in multiple jurisdictions should identify and mitigate the risks arising from any potential conflict between different jurisdictions.

Summary narrative:

So far, the main location of CCP clearing service of SHCH is China. SHCH has been a "third-country central counterparty" recognized by the European Securities and Markets Authority (ESMA) since September 2022, and also received a no-action letter from the U.S. Commodity Futures Trading Commission, allowing SHCH to provide proprietary clearing services for swaps products for U.S. institutions until July 31, 2023. When foreign financial institutions are involved in the CCP clearing service of SHCH, the signed agreements are governed by Chinese laws.

Principle 2: Governance

Key Consideration 2.1: An FMI should have objectives that place a high priority on the safety and efficiency and explicitly support financial stability and other relevant public interest considerations.

Summary narrative:

The purpose of SHCH is to explicitly support financial stability and other relevant public interest, giving priority to safety and efficiency.

As a FMI of China's financial market with systemic importance, the purpose of SHCH is: to establish a standardized, market-oriented international clearing service provider, providing the CCP clearing and other

services for the financial market, maintaining the safe, efficient and stable operation of clearing system through effective risk management, satisfying diversified clearing demands, and serving the development of financial market. This purpose has been included into Articles of SHCH (hereinafter referred to as the articles of association), which has been approved by regulators and passed at the general meeting of shareholders. Since the establishment, SHCH adheres to this mission, contributing to the safe and efficient operation of the market and endeavoring to guarantee financial stability and development.

SHCH accepts the strict supervision and management of regulators. In the Business Supervision and Administration Rules for SHCH formulated by regulators and the articles of association approved by regulators, they explicitly require SHCH to strictly maintain the system safety, efficient and stable operation of the clearing, satisfying diversified clearing demands and serving the development of financial market, further standardizing SHCH from the regulatory level, so as to guarantee the safe and stable operation of financial market.

According to the supervisory requirements, SHCH is committed to promoting the construction of the technical system and risk control mechanism. SHCH has established and will continuously improve special services system, network and related hardware facilities; has established and will continuously improve system trouble emergency response mechanism and disaster backup mechanism, equipped with complete data security protection and data backup measures, so as to ensure the safety of relevant data and system; has established and will continuously improve inner control mechanism and risk management system according to the actual situation, and has been continuously improving risk management system according to PFMI, conducting services risk analysis and evaluation on a regular basis; has formulated and implemented relative services rules and operating details in strict accordance with the administrative requirements of regulators, meanwhile actively strengthening the management of key positions by establishing checking and rotating system, in order to ensure the safety and stability of the market.

At the same time, all CCP clearing services of SHCH including bonds, interest rate derivatives, FX spots & derivatives, credit derivatives and commodity derivatives are under the supervision of regulators. SHCH carries out its services upon the approval of regulators in which SHCH is required to be committed to guaranteeing the safe and stable operation of services, to strengthening the system construction, to enhancing the risk control and management of services, to improving risk control measures, to doing a good job in risk response plans, and to practically contributing to the safe and stable operation of market. SHCH strictly implements all requirements of regulators, persistently constructing the system and risk control and supporting the stable operation of financial market.

Based on the evaluation according to the PFMI, PBC recognizes SHCH as a qualified CCP and requires SHCH to provide CCP clearing service in accordance with relevant regulations and international standards, to strengthen risk management, and to ensure the safe, efficient and stable operation, which further ensures and urges SHCH from the supervision and management perspective to give priority to safety and efficiency and fully supports financial stability.

In order to improve the comprehensive management level and treatment ability against emergencies, since the establishment, SHCH has formulated and issued Emergency Management Measures for the comprehensive specification of treatment scheme and operating behavior from beforehand prevention, incident response, incident treatment and aftermath management. The specific scope of defined emergencies includes services operation, system security, public relations, and social image.

In addition, the core values of SHCH include "innovation, service, profession, standardization", among which "standardization" implies "to establish professional and standardized system and framework for the CCP clearing services, to improve the qualified CCP risk management rule system in line with the international standards, to play the role of FMI, and to support the healthy development of market

standardization." The company culture ensures that the company has a spontaneous and endogenous driving force to contribute to the safe, efficient and stable operation of financial market.

Key Consideration 2.2: An FMI should have documented governance arrangements that provide clear and direct lines of responsibility and accountability. These arrangements should be disclosed to owners, relevant authorities, participants, and, at a more general level, the public.

Summary narrative:

SHCH has established a sound corporate governance structure according to the Company Law of the People's Republic of China with available governance arrangement. This governance arrangement is disclosed to shareholders and relevant management departments, and disclosed to the public through the company's official website.

SHCH has 4 shareholders, namely, CFETS, CCDC, CBPM and CGCCL, with respective shareholding percentage of 46.67%, 33.33%, 10% and 10%. This shareholder structure is conducive to ensuring the consistency between interests of shareholders and the company's development objective, implementing regulators' supervisory requirements for interbank market, and the company's contribution to the safe and efficient operation of market.

In accordance with the market-oriented operation mode of joint-stock enterprises, SHCH has established a normalized corporate governance structure including the general meeting of shareholders, the board of directors, the board of supervisors and the management team, etc. Among them, the general meeting of shareholders is the power organ of the company, and exercises its authority according to the articles of association. The company has set up the board of directors who reports to the general meeting of shareholders, and exercises decision-making authority including to decide the company's business plans and investment plans. The company has set up the management team with the general manager as the responsible person, who reports to the board of directors, to carry out the daily business operation of the company in accordance with the provisions of the laws, regulations and articles. The company has set up the board of supervisors who exercises supervision authority, including to supervise the directors and senior operating personnel's behaviors in performing their duties, etc. The above corporate governance structure has been listed in details in the articles of association, and has been approved by regulators.

In daily work, multiple management departments conduct relevant inspection to SHCH, in order to promote the company's legal compliance in operation and ensure the safety and stability of financial market. For example, National Audit Office (NAO) and PBC carry out audit or inspection to SHCH and give feedback reports, and SHCH shall rectify anything not conforming to relevant provisions. Meanwhile, SHCH orderly carries out the internal audit of internal control and services operations annually according to the actual situation, to inspect the management mechanism and operation safety of departments and positions, to constantly improve the internal control mechanism, and to strengthen the construction of internal control.

Key Consideration 2.3: The roles and responsibilities of an FMI's board of directors (or equivalent) should be clearly specified, and there should be documented process for its functioning, including process to identify, address, and manage member conflicts of interest. The board should review both its overall performance and the performance of its individual board members regularly.

Summary narrative:

SHCH's articles of association have explicitly specified the job-related functions and powers of the board of directors, and the process for exercising its authority, thereby ensuring the board's functionality. The articles of association have also explicitly specified the power of supervision of the board of supervisors and the process for exercising its authority, thereby enforcing the board's supervisory functions. The articles of association have also explicitly specified the job-related functions and powers of the management team to ensure the orderly operation of the company.

Since its establishment, the company has convened the general meeting of shareholders, board meeting and supervisor meeting annually, to perform relevant responsibilities, to form relevant resolutions and meeting minutes which are kept in SHCH.

In order to avoid conflicts of interest in governance, the roles and responsibilities of members of the board of directors, members of supervisor and the management team are clearly defined in the articles of association, and the procedures for their exercise of responsibilities (including the procedures for identifying, dealing with and managing conflicts of interest of members) are recorded. The annual general meeting of shareholders holds regularly to listen to and review the report of the board of directors about its overall performance of responsibilities. Every year the board meeting listens to and reviews the report of the management team about the company's overall work process. Every year the supervisor meeting supervises and reviews the company operation, financial status, and the overall performance of responsibilities by the directors and management team. In addition, the company's management team makes work report to regulators, and accepts the performance review from regulators.

Key Consideration 2.4: The board of directors should contain suitable members with the appropriate skills and incentives to fulfill its multiple roles. This typically requires the inclusion of non-executive board member(s).

Summary narrative:

All directors (including the non-executive directors) of SHCH are experienced experts in financial industry who have suitable experience, multiple skills and the professional integrity required to perform the operation and risk management duties of FMI.

All directors (including the non-executive directors) of SHCH are elected after the rigorous review of the shareholders meeting and reported to regulators for fit-and-proper test. The chairman is elected by the board of directors. The shareholders meeting has the right to decide the remuneration of directors and supervisors.

At the same time, SHCH specifies that directors (including the non-executive directors) shall abide by the laws, administrative regulations and the articles of association, and bear the duty of loyalty and diligence to the company, and shall not abuse their authorities by accepting bribes or receiving other illegal income, or misappropriate company assets.

SHCH's stipulation of the election procedure and relevant obligations of directors (including the non-executive directors) and chairman can ensure the members of the board of directors to have appropriate experience and skills to perform their duties from the level of regulators and shareholders. At the same time, the shareholders meeting implements incentive measures to directors by deciding their remuneration.

Key Consideration 2.5: The roles and responsibilities of the management should be clearly specified. An FMI's management should have the appropriate experience, a mix of skills, and the integrity necessary to discharge their responsibilities for the operation and risk management of the FMI.

Summary narrative:

The articles of association has clearly outlined the role and duties of the management team by specifying that the Company's management team shall be led by a general manager who reports to the board of directors and is responsible for carrying out the Company's day-to-day services activities in accordance with laws, regulations and the articles of association .

The roles of senior managers are undertaken by highly experienced experts from the financial industry, who are all selected and evaluated through rigorous procedures. The articles of association clearly outline the eligibility and duties of senior managers, as well as prohibited stipulations and consequences. These rules ensure that the management team complies with professional discipline and performs duties effectively.

Key Consideration 2.6: The board should establish a clear, documented risk-management framework that includes the FMI's risk-tolerance policy, assigns responsibilities and accountability for risk decisions, and addresses decision making in crises and emergencies. Governance arrangements should ensure that the risk-management and internal control functions have sufficient authority, independence, resources, and access to the board.

Summary narrative:

The company has established the internal risk control system and specific operation requirements for chairman of the board, chairman of the board of supervisors, management team and all departments, and made clear the risk management and internal control requirements, responsibility, accountability and decision-making mechanism.

The board of directors of SHCH has set up a risk management committee under it, which supervises and evaluates the company's risk management situation and risk control ability, and review and make decisions on important risk management matters of the company, such as risk management planning, framework, etc. Its main responsibilities include reviewing the risk management plan, risk management framework and important risk management system of SHCH; reviewing the margin system and stress testing framework of SHCH; evaluating the effectiveness of margin system and stress testing framework of SHCH; on the premise of taking into account the stability of the financial market and the pro-cyclical impact, evaluating the adequacy of internal and external risk reserve resources in the CCP clearing services; evaluating SHCH's major risk disposal plan and emergency treatment plan; reviewing periodic risk analysis report and emergency risk analysis report of SHCH; determining the clearing members perpetual default; reviewing the credit evaluation of clearing members, suspension or termination of membership, etc. The meeting of the risk management committee hold as required by the work. The meeting make decisions based on the opinions of all the participants to ensure the fairness and independence of the conclusion.

The members of risk management committee are market specialists, well-known scholars in universities, and the company's chairman of the board, directors, senior management and internal business backbone. The external committee members have the same rights to know, to review and to vote as those the internal committee members have. The opinions of all participating members would be comprehended at the meeting for the final decision, so as to realistically ensure the fairness and independence of the review conclusions. Meanwhile, the company has specialized risk management departments to carry out relevant risk management and research according to the requirements of risk management committee, so as to ensure the safe and stable operation of company business.

SHCH implements multi-field, multi-path and multi-approach risk management to prevent various kinds of risks in financial market, including clearing members credit evaluation, limits management, compliance inspection, margin, marking-to-market, clearing fund, risk reserve, and default process, etc.

SHCH has strengthened prevention mechanism against all kinds of risks including market systemic risk, clearing members credit risk, operational risk, legal risk and other kinds of risks; strengthened the real-time monitoring of abnormal and illegal transactions of all kinds of market participants of registration, custody, clearing service; issued relevant risk analysis reports and submitted them to the board of directors, risk management committee and the company's business management; in case of critical incidents or serious irregularities, SHCH takes necessary remedial measures in accordance with the relevant provisions of regulators and the board of directors, and makes timely disclosure to the market.

The company has set up the Internal Auditing Dept. separately to independently conduct internal auditing, and to form valid restriction and supervision mechanism, so as to ensure the efficiency and independence of internal management. The company formulated and issued Internal Audit Management Measures. The specific responsibilities of the internal auditing include: to implement the policies and instructions of the

board of directors and to meet the relative requirements of PBC; to study and formulate annual audit project plan; to adhere to the risk-oriented auditing, focusing on internal control management, including the soundness and implementation of the system, services operation, financial management, risk control, etc.; to carry out the supervision functions and improve the internal control of the company, so as to prevent operation risk; to report the problems found during the audit as well as audit suggestions to the company management team, and to the board of directors, in a timely manner.

Key Consideration 2.7: The board should ensure that the FMI's design, rules, overall strategy, and major decisions reflect appropriately the legitimate interests of its direct and indirect participants and other relevant stakeholders. Major decisions should be clearly disclosed to relevant stakeholders and, where there is a broad market impact, the public.

Summary narrative:

As a FMI, SHCH has been entrusted with many responsibilities including the implementation of regulatory requirements, the coordination of industry cooperation, satisfying market demands and leading the market in development, etc. Both regulators and shareholders require SHCH to be committed to contributing to the safe, efficient and stable operation of financial market. At the same time, the articles of association of SHCH also specified that, its purpose is to contribute to the stable operation of financial market. All these indicate that the overall strategy and major decisions of SHCH reflect the legitimate interests of direct participants, indirect participants and relevant stakeholders.

SHCH strictly follows the Company Law of the People's Republic of China and the articles of association, and has policies in place to regulate convention of general meetings of shareholders and board of directors meetings as a means to enhance communication and cooperation with shareholders. The Company actively coordinates with peers to facilitate growth of the interbank market. The Company operates based on the needs of market participants, and has positioned itself to serve participants of financial market, thereby providing safe and efficient infrastructure services for financial market.

As a company limited by shares, SHCH carries out services activities in strict compliance with the laws, administrative regulations and relevant provisions of PRC; complies with social ethics, business ethics, in the principle of honesty and trustworthiness; accepts the supervision of the government and the public and take social responsibility. The business management committee and risk management committee under the board of directors include many experts from participating services institutions and scholars from well-known institutions. When providing recommendations for services development decisions, formulating risk control rules, discussing relevant services development and risk control management, and making relevant business or risk control decisions, both of them can widely reflect the opinions and suggestions of participating services institutions and relevant stockholders, so as to reflect its legal interest.

In carrying out SHCH's business, including formulating the services system, services rules, the opinions and suggestions from all kinds of market participants, relevant experts and scholars as well as regulators are sought, and these rules and systems are not implemented until receive the approval of regulators or report to regulators. All services rules are disclosed to the public through the official website of the company, and the company shall convene relevant training or seminars in a timely manner to promote services rules to the market and respond to the market consultations, so as to ensure that all services rules are fully understood by the market. At the same time, all stakeholders or the public can also learn about the business development of SHCH through SHCH's catalog disclosed on the company website and member journal distributed publicly. The implementation of major decisions shall be reported to the shareholders and PBC in a timely manner, so as to protect the interests of all stakeholders.

Principle 3: Framework for the comprehensive management of risks

Key Consideration 3.1: An FMI should have risk-management policies, process, and system that enable it to identify, measure, monitor, and manage the range of risks that arise in or are borne by the FMI. Risk-management frameworks should be subject to regular review.

Summary narrative:

In carrying out the CCP clearing services, SHCH undertakes series of internal and external risks which may come from the inside of the SHCH or from the participants, the customers of participants or other units. These risks include: legal risk (see Principle 1), credit risk (see Principle 4), liquidity risk (see Principle 7), operation risk (see Principle 17), market risk (see Principle 6), concentration risk (see Principle 6), general business risk (see Principle 15), custody and investment risks (see Principle 16) etc.

SHCH has set up risk management committee which monitors and evaluates risk management system framework as well as review and makes decisions on important risk management issues (see Principle 2).

SHCH has set up a series of risk management measures to manage the credit risk discussed in Principle 4 and the liquidity risk discussed in Principle 7, so as to ensure the effectiveness and conformability of the overall risk management of SHCH, participants, and other units. These measures contain credit assessment and collateral management, etc. SHCH updates the management measures according to the need so as to ensure high standard of the acceptable collateral, and has other essential tools to manage the credit risk and the liquidity risk. SHCH manages and copes with the liquidity risk effectively through a series of measures including the monitoring and early warning of intraday tiered liquidity, delivery versus payment (DVP) settlement mechanism, the provision of liquidity by credit bank, the provision of liquidity by monetary market, and the delay in pre-agreed delivery (see Principle 7).

When designing margin calculation scheme, SHCH has considered concentration risk and market risk, as well as the unique risks faced by all kinds of products. Detailed introductions are set out in Principle 6. SHCH has carried out the back testing of margin calculation model for all kinds of products on a regular basis, so as to ensure that a variety of identified risks, including model risk, have been eliminated. SHCH has managed default risk through waterfall risk prevention structure and default management process. Further descriptions are set out in Principle 13.

Where appropriate, SHCH adopts necessary system to monitor the participants and evaluate corresponding risks. These systems can integrate the risk exposure of all kinds of accounts, and monitor and measure the accounts of the participants and the concentration of market fund.

SHCH has made detailed description for the management of operational risk in Principle 17. To some extent, the operational risk is managed through full system test and continuous system monitoring. SHCH will carry out comprehensive assessment and inspection on a regular basis.

In addition to the discussed risks, the risk management of SHCH also includes the real-time monitoring of exchange activities, price dynamics and collateral requirements.

Under the current risk management system, the risk management department of SHCH monitors and controls the risks, and verifies all risk control measures on this basis, and submits reports to the risk management committee for review when necessary. Under circumstance of strained market and evolving environment, the risk management department will carry out surveillance and analysis more frequently and submit it to management team and risk management committee for review.

In addition, SHCH has established internal audit system that includes risk management. Internal audit staff independently carry out all kinds of special audits based on internal control and risk every year, the audits covering the entire company's business and operations, so as to ensure the normal operation of the CCP clearing services. Internal audit mainly puts forward opinions on asset management, information security,

operation standards, process compliance and other aspects, and puts forward suggestions on improving system regulations, strengthening internal control, optimizing business processes, improving personnel professional skills and so on, and supervises the implementation of rectification. In terms of external audit, SHCH accepts audit of its annual financial statements by National Audit Office, PBC and a third-party auditor engaged by the company. The content of audit should be risk control oriented, including for the services system, system operation, internal management, etc.

Key Consideration 3.2: An FMI should provide incentives to participants and, where relevant, their customers, to manage and contain the risks they pose to the FMI.

Summary narrative:

SHCH motivates clearing members to strengthen their risk control through tiered management, member's rating, continuous monitoring, membership training, and default management, etc.

SHCH has divided clearing members into general clearing members, direct clearing members and special clearing members, and set up corresponding participation standards for each kind of clearing members, including financial indicators, business management system, risk management system, technical system, etc.

General clearing members are divided into SHCH general clearing members and product type general clearing members. Among them, SHCH general clearing members can participate in all the self-operated clearing and agency clearing among the CCP clearing services, while product type general clearing members can participate in the self-operated CCP clearing of all products that are included into CCP clearing and agency clearing of corresponding products.

Direct clearing members can apply for all or part of CCP clearing services for their own transactions. Direct clearing members are categorized into Class A, Class B and Class C. A Class A member can apply for all CCP clearing services for its own transactions, a Class B member can participate in two or more CCP clearing services for its own transactions, and a Class C member can only participate in one CCP clearing services for its own transactions.

The specific provisions on special clearing members participating in CCP clearing services can refer to the relevant rules of SHCH.

SHCH implements annual assessment system for clearing membership. This assessment is based on the clearing members' audited financial report, risk status and other relevant information of the last fiscal year. The assessment results can be divided into qualified result, basic qualified result, and unqualified result. After the annual assessment on the clearing membership, SHCH will notify clearing members of the assessment results in writing. SHCH retains the right to suspend the membership of such clearing member if the annual membership evaluation result of the clearing member is unqualified or in circumstances that meet the membership termination requirements of SHCH.

SHCH has also set up corresponding membership credit factor and tolerance according to the clearing members' credit assessment. Among them, membership credit factor is used as the risk control multiplier in calculating the margin. The clearing members with lower credit level need to pay more margin and SHCH is less tolerant to them. The clearing member credit assessment by SHCH includes the initial credit assessment when applying for membership qualification, annual credit assessment and dynamic tracking assessment. SHCH takes differentiated and customized risk prevention and control measures according to the credit assessment results of clearing members.

SHCH has established a detailed default management rule and waterfall risk prevention structure to ensure that participants can continue to perform their services in case of default and solve the problem of resource

replenishment after the occurrence of default. In case of default of the clearing members, SHCH gives priority to the margin and clearing fund paid by the clearing members in the CCP clearing services involved in the default to cover the default loss.

In addition, SHCH regularly organizes services training, which market institutions could decide to participate to their own choice, so as to strengthen the services ability of members, and encourage the clearing members to strengthen the construction of their risk control, and warn of risks through daily liaison mechanism in practice.

Key Consideration 3.3: An FMI should regularly review the material risks it bears from and poses to other entities (such as other FMIs, settlement banks, liquidity providers, and service providers) as a result of interdependencies and develop appropriate risk-management tools to address these risks.

Summary narrative:

Against risks resulting from the interaction with units of different natures, SHCH has adopted different ways of risk assessment and control.

Against the risks (credit risk, liquidity risk, etc.) caused by clearing members and customers in the CCP clearing services, SHCH recognizes, measures and monitors the risks through the overall risk control system and principles described in the above Key Consideration 3.1.

Against the credit banks providing liquidity support to SHCH and other relevant financial institutions, SHCH will carefully select the financial institutions which satisfy the needs of the CCP clearing services of SHCH as liquidity suppliers (credit banks) based on such elements as asset scale, profitability, liquidity providing ability, system importance level, internal control level, technical support ability, credit assessment, risk resources, and carry out assessment according to the actual services situation. So far, the actual credit banks of SHCH are banks with higher credit assessment, better market reputations, and higher regulatory recognition in China, so as to reduce the possibility of substantial risks. If these selected institutions are the clearing members of SHCH, SHCH will also carry out comprehensive and continuous monitoring and management against the credit risk, liquidity risk and operational risk of these institutions in accordance with the relevant management measures of clearing members.

For electric power departments, IT technical service providers, telecommunications and other public service providers, SHCH will monitor and manage the substantial risks of these institutions in accordance with the relevant provisions, and the detailed information can be found in Principle 17: Operational risk.

The FMI connected to SHCH's CCP system are SHCH's central securities depository/security settlement system (CSD/SSS), CFETS, and HVPS. SHCH needs to connect with its own CSD/SSS when providing CCP clearing services to the bond market, so as to receive and deliver bonds. As a CCP, SHCH fully considers potential risks of its connection with its own CSD/SSS.

SHCH conducts real-time monitoring of data transmission with CFETS, conducts regular screening of potential risks, and makes a complete contingency plan. In clearing section, SHCH connects with HVPS through the special network line, interacts with the data in real time, continuously monitors various risks related to the connection, and makes solutions.

Key Consideration 3.4: An FMI should identify scenarios that may potentially prevent it from being able to provide its critical operations and services as a going concern and assess the effectiveness of a full range of options for recovery or orderly wind-up. An FMI should prepare appropriate plans for its recovery or orderly wind-up based on the results of that assessment. Where applicable, an FMI should also provide relevant authorities with the information needed for purposes of resolution planning.

Summary narrative:

SHCH carries out comprehensive and systemic importance assessment and inspection against the circumstances which might hinder its continuous provision of key operation and service, and formulates contingency plans.

In accordance with Emergency Response Law of the People's Republic of China and Emergency Response Plan Management Measures of PBC and other rules and regulations, SHCH formulated “Emergency Response Plan Management Measures of Shanghai Clearing House” and “Overall Emergency Plan of Shanghai Clearing House”, so as to cope with multiple types of risk events, such as failure to normally, comprehensively and fully perform the CCP clearing services or carry out regular operational and management activities.

Default management and loss allocation mechanisms have been adopted in the CCP clearing services. In event of default by the members, SHCH uses the risk reserve resources to make up for the default loss, and puts in place the loss allocation plan, which can prevent the spread of financial risks. SHCH carries out default management practice jointly with market institutions on a regular basis, and has developed default management rules which are complete in theory and practicable and executable in practice.

Principle 4: Credit Risk

Key Consideration 4.1: An FMI should establish a robust framework to manage its credit exposures to its participants and the credit risks arising from its payment, clearing, and settlement processes. Credit exposure may arise from current exposures, potential future exposures, or both.

Summary narrative:

SHCH has a set of comprehensive and sound management measures to manage the credit exposure of participants and the credit risks in the process of payment, clearing and settlement.

Regarding the management system of clearing members, SHCH has set a series of risk-related access requirements and strictly implemented hierarchical access to ensure that clearing members have sufficient financial resources and operational capabilities to meet various obligations. After access, a detailed and quantifiable credit evaluation system should be established based on financial statements, operating conditions and other factors to continuously track the credit status of clearing members.

In response to the changes in environment and market as well as the emergence of new products, the risk management committee conducts review of all credit risk management measures and framework. When clearing members apply for participation in new services, the management team further review the credit risk of clearing members and, at the same time, review the risk control parameters of clearing members in new services. Besides, SHCH will review the assessment result of membership credit, credit assessment and continuous monitoring result on a regular basis.

Establishing a risk monitoring and early warning system. SHCH has established a daily and event-driven risk monitoring and management system to track market dynamics in a timely manner and monitor participants' risk exposure changes and fund delivery in real time. At the same time, SHCH conducts daily credit stress testing and back testing, adjusts risk control parameters and risk reserve resources scale according to test results.

Establishing a risk prevention structure based on market risk measurement with valuation and mark-to-market, margin, clearing fund and risk reserve as the core. SHCH adopts a waterfall risk prevention structure in line with international practices, and carries out mark-to-market profit and loss, calculation of potential risk exposure and calculation of potential loss under various stress scenarios to ensure that risk

reserve resources can cover the maximum risk exposure caused by the default of two clearing members under extreme but plausible market conditions.

Key Consideration 4.2: An FMI should identify the sources of credit risk, routinely measure and monitor credit exposures, and use appropriate risk-management tools to control these risks.

Summary narrative:

The credit risks faced by SHCH are mainly the failure of participants to make payments during the settlement in all CCP clearing services, including the current exposure and potential exposure of participants. SHCH controls the above risks through real-time monitoring, margin and clearing fund system.

SHCH realizes the effective monitoring of credit risk by means of daily valuation of mark-to-market, etc. SHCH calculates the value of each clearing participant's portfolio daily and collects mark-to-market deposits to limit the accumulation of current risk exposure. In case of abnormal market conditions or abnormal clearing participants' contract combinations, SHCH can calculate margin and make margin call for several times a day according to the market conditions.

Margin calculations by SHCH take into account a number of factors designed in accordance with the principle of adequate protection for clearing members, CCP and against systemic risk in the markets involved. Minimum margin requirements for all products of the SHCH are met within a confidence interval of not less than 99% to cover potential future exposure.

SHCH holds sufficient additional financial resources to cover potential losses under extreme but possible stress scenarios. SHCH adopts a waterfall risk prevention structure in line with international practices to ensure that risk reserve resources can cover the maximum risk exposure caused by the default of two clearing members under extreme but plausible market conditions.

Key Consideration 4.4: A CCP should cover current and potential future exposures of each participant with a high degree of confidence coefficient by using margin and other prepayment financial resources (see Principle 5 on collateral and Principle 6 on margin). In addition, a CCP that is involved in activities with a more-complex risk profile or that is systemic important in multiple jurisdictions should maintain additional financial resources to cover a wide range of potential stress scenarios that should include, but not be limited to, the default of the two participants and their affiliates that would potentially cause the largest aggregate credit exposure for the CCP in extreme but plausible market conditions. All other CCPs should maintain additional financial resources sufficient to cover a wide range of potential stress scenarios, which should include, but not be limited to, the default of the participant and its affiliates that would potentially cause the largest credit exposure for the CCP under extreme but possible market conditions. In all cases, a CCP should document its supporting rationale for, and should have appropriate governance arrangements relating to, the amount of total financial resources it maintains.

Summary narrative:

SHCH has covered the current and potential exposure of each participant of each services with a confidence coefficient of at least 99%, and ensure the sufficiency of risk reserve resources by means of stress testing and back testing. SHCH does not involve in the situations that it is systemically important in multiple jurisdictions.

In event of breach of contract, SHCH can complete the payment to the non-defaulting party in a timely manner by borrowing sufficient liquidity resources, so as to prevent risk spread. At the same time, losses may be made up for in a timely manner through the subsequent default management rules and default loss allocation mechanism, so as to prevent the subsequent effects on the market. Usually, the margin can cover the loss with at least 99% confidence coefficient. Under very extreme market conditions, SHCH can

dissolve the risk by successively using the clearing fund of the defaulting members, part of the risk reserve of SHCH, the clearing fund of the non-defaulting members, and the remaining risk reserve of SHCH, etc.

SHCH recalculates the value of the asset portfolio of each clearing participant every day which is used for the margin calculation of asset portfolio, so as to ensure the accurate calculation of the current risk exposure of clearing participants.

SHCH formulated prudent collateral discount rate and management standards (see Principle 5) based on factors such as market liquidity, so as to ensure the coverage of potential risk exposure with high confidence coefficient. SHCH has set prudent liquidation deadline and confidence coefficient which are used for calculating and collecting sufficient minimum margin. SHCH respectively calculate the margin requirements and gross margin requirements for each client, so as to ensure sufficient margin in agency services. SHCH's management of gross margin has improved the transferability when dealing with defaulting clearing members.

During the day, SHCH monitors the product portfolio of clearing members and customers, and requires those with exaggerated concentration to provide additional margin.

SHCH has set up clearing fund which is the cash collateral paid by clearing members participating in the CCP clearing services, so as to make up for the loss not covered by the default margin of clearing members. SHCH carries out stress testing by using the extreme but possible risk scenarios on a regular basis (including theoretical scenario and historical scenario). Historical scenario is a real extreme scenario in the history, and theoretical scenario is a more extreme scenario based on real historical scenario. Historical scenarios include the historical extreme volatility of market, the liquidity tension, the policy adjustment, liquidity tension, etc., so as to ensure that the risk reserve resources can cover the maximum risk exposure caused by the default of two clearing members under extreme but plausible market conditions.

SHCH has also established a risk reserve which is a special fund, withdrawn according to certain proportion of main business income, used to make up for major default losses of clearing members as well as the losses related to major risk events in the financial market clearing services activities of SHCH. SHCH determines the withdrawal limit of risk reserve in accordance with the relevant provisions. If the total risk reserve of SHCH has reached or exceeded the limit at the end of a fiscal year, then the risk reserve shall not be withdrawn or shall be increased in the next fiscal year. SHCH can adjust the scale, withdrawal method and proportion of risk reserve according to the national policy and the risk status of financial market.

Key Consideration 4.5: A CCP should determine the amount, and regularly test the sufficiency of its total financial resources available in the event of a default or multiple defaults in extreme but plausible market conditions through rigorous stress testing. A CCP should have clear process to report the results of its stress tests to appropriate decision makers of CCP and to use these results to evaluate the adequacy of, and adjust its total financial resources. Stress tests should be performed on a daily basis by using standard and predetermined parameters and assumptions. A CCP should perform a comprehensive and thorough analysis on the stress testing scenarios, models, and underlying parameters and assumptions used at least on a monthly basis, to ensure they are appropriate for determining the CCP's required level of default protection in light of current and evolving market conditions. A CCP should conduct such analysis more frequently when the products cleared or markets served display higher volatility, become less liquid, or when the size or concentration of positions held by a CCP's participants increases significantly. A full validation of a CCP's risk-management model should be verified at least once a year.

Summary narrative:

SHCH has adopted standard methods for stress testing, setting up credit risk scenario and market risk scenario, to measure the two largest clearing members' default loss among uncovered liquidation loss by

placing the daily position of clearing members under stress scenarios. Stress scenarios include theoretical scenario and historical scenario. Historical scenario is a real extreme scenario in the history, and theoretical scenario is a more extreme scenario developed based on real historical scenario.

SHCH carries out stress testing of each services on a daily basis, with daily rolling updates on stress testing and daily generation of stress testing results. SHCH regularly reports the stress testing results of the CCP clearing services to the management team and risk management committee, and adjust the scale of risk control resources, the model of risk control and parameters according to the stress testing results, so as to ensure the adequacy of overall risk reserve resources of SHCH in extreme circumstances. In addition, SHCH carries out complete and comprehensive analysis on a variety of scenarios, models, relevant parameters and assumed conditions of stress testing at least once a month. In the current and developing market environment, SHCH shall ensure the compliance with the default protection level required by the CCP clearing requirements (enough to cover the maximum risk exposure caused by the default of two clearing members under extreme but plausible market conditions).

In event of increase in market volatility, decrease in liquidity, or significant increase in size or concentration of position of the CCP clearing participants, SHCH will carry out stress testing and other analysis more frequently, such as many times a day, and convene meetings of risk management committee, so as to ensure the risks to be controllable in extreme circumstances.

Key Consideration 4.6: In conducting stress testing, a CCP should consider the effect of a wide range of relevant stress scenarios in terms of both defaulters' positions and possible price changes in liquidation periods. Scenarios should include relevant peak historic price volatilities, changes in other market factors such as price determinants and yield curves, defaults by participants in various time horizons, simultaneous pressures in funding and asset markets, and a spectrum of forward-looking stress scenarios in a variety of extreme but possible market conditions.

Summary narrative:

When carrying out stress testing, SHCH sets up extreme market scenario and credit risk scenario so as to ensure SHCH has sufficient financial resources to cover a series of prospective stress scenarios under extreme market conditions.

The credit risk scenario shall be set as simultaneous default of two largest members in uncovered liquidation loss, and market risk scenario and historic price fluctuations, change in position and market liquidity, etc, shall also be taken into consideration.

Historical price fluctuation scenarios include: the historical extreme fluctuation of market; the market liquidity tension; the policy adjustment; the liquidity tension, etc.

Position change: using the extreme risk exposure during the testing period of clearing participants of all services.

Factors in market liquidity change: included in the fluctuation factors of historical prices, and the historical extreme volatility is amplified properly.

The stress testing hypothesis, model and parameters of SHCH have given full consideration to extreme market conditions, peak value of historic price fluctuations, drastic fluctuation of yield curve, etc.

Key Consideration 4.7: An FMI should formulate clear rules and processes to enable it to fully respond to any potential credit loss. Such credit loss may arise from the breach of FMI's single debt or portfolio of debts by the participant. These rules and processes shall be used to allocate any potential uncovered credit loss, including those arising from the repayment of borrowings by the FMI to the liquidity providers. FMI's rules and processes shall also set out the processes for its making up for financial resources during the pressure event, so as to ensure its safe and stable

operation.

Summary narrative:

SHCH has formulated clear rules and processes to fully respond to any potential credit loss and to allocate any potential uncovered credit loss, and specifies the processes for its making up for financial resources during the pressure event.

According to SHCH's waterfall risk prevention structure, default losses will be apportioned in the following order:

- (1) The margin of the defaulting clearing member in the defaulting clearing service.
- (2) The default fund contributed by the defaulting clearing member in the defaulting clearing service.
- (3) Not more than 10% of the total amount of the risk reserve disclosed by SHCH to the clearing members at the end of the previous fiscal year prior to occurrence of such default.
- (4) The default fund contributed by the non-defaulting clearing members in the defaulting clearing service.
- (5) Supplementary default fund contributed by the non-defaulting clearing members in the defaulting clearing service.
- (6) The remaining risk reserve of SHCH;
- (7) Other resources designated by SHCH.

As a qualifying CCP (QCCP) of systematic importance recognized by the PBC, SHCH establishes daily report mechanism, and makes timely report to PBC of any material matters, including breach of contract, in accordance with PBC's regulatory requirements. As a participant in interbank bond market, SHCH may fulfill its payment obligations to the non-defaulting party by borrowing sufficient liquidity resources from the market in a timely manner, so as to prevent risk spread. Meanwhile, the loss may be recovered subsequently through the default loss allocation mechanism, so as to prevent any subsequent influence on the market.

Principle 5: Collateral

Key Consideration 5.1: An FMI should generally limit the assets it (routinely) accepts only to such assets with low credit, liquidity, and market risks.

Summary narrative:

SHCH has established strict standard for acceptable collateral and reviews it on a regular basis, which complies with the requirements of low credit risk, liquidity risk and market risk.

Currently SHCH accepts cash (RMB and USD) and qualified guaranty bonds (which refer to marketable securities, including bonds and fund shares, etc., contributed by clearing participants which can be used to meet the minimum margin requirements for CCP clearing services) as collateral. The fund share in the qualified guaranty bonds must be recognized by SHCH. The bond in qualified guaranty bonds are determined according to the credit level of the bond subject, the remaining maturity of the bond, the price fluctuation and the market liquidity. In addition, in order to prevent the risk of concentration, SHCH sets the upper limit of the total face value of a single bond in qualified guaranty bonds and the upper limit of the minimum margin offset by qualified guaranty bonds for each clearing member. SHCH carries out daily credit risk monitoring and early warning of bond issuers, and remove the list of qualified guaranty bonds and qualified pledge bonds from the list of issuers with higher risk levels in time.

In order to ensure that the collateral accepted by SHCH has lower credit risk, liquidity risk and market risk, SHCH manages the collaterals by daily evaluation and review, setting prudent discount rate, daily credit risk monitoring on the issuer, regular issuance of valuation quality inspection report, valuation correction, etc. In event that the mark-to-market value of collateral is lower than a certain proportion of face value, the rating is lowered, adverse changes in price information, or credit risk events occurs, SHCH will adjust the discount rate of collateral or not to accept the collateral any more or take other measures.

In addition, based on the relevant provisions on default management, SHCH has the right to immediately dispose the qualified guaranty bonds pledged by the defaulting institutions, so as to make up for the default loss.

Key Consideration 5.2: An FMI should establish prudent valuation practices and develop haircuts that are regularly tested and take into account the stressed market conditions.

Summary narrative:

SHCH has formulated prudent valuation convention and set discount rate for acceptable collateral, and considered to regularly detect the market environment.

Starting in 2019, SHCH has set cash collateral haircut in FX spots & derivatives CCP clearing services to cover FX risks caused by differences in the currency in which the collateral and risk exposure are denominated. SHCH regularly adjusts the conversion rate and haircut of cash collateral every quarter. If in the quarter the threshold exchange rate on one day is less than the conversion rate on that day, it shall be adjusted immediately. For qualified guaranty bonds, SHCH has set haircut based on the issuer's rating, type of issuer and bond, residual maturity, historical price volatility, market liquidity, etc., and set more conservative collateral rate. The haircut for fund share is determined by reference of the weighted average haircut of the component bonds, and is adjusted appropriately according to the characteristics of bond index funds. SHCH updates the list of qualified guaranty bonds on a monthly basis, so as to adopt appropriate haircut that used to calculate the collateral value of qualified guaranty bonds. SHCH also adopts daily marking to the market approach for qualified guaranty bonds.

Key Consideration 5.3: In order to reduce the need for pro-cyclical adjustments, an FMI should establish stable and conservative haircuts and adjust the same accordingly, by taking into consideration the stressed market period, to the extent practicable and prudent.

Summary narrative:

SHCH has set prudent discount rate of acceptable collateral conservative enough to cover widespread marketing environment and remain stable. SHCH will make adjustment to reduce the possibility of procyclical adjustment in stressful situations.

The collateral valuation discount can cover widespread marketing environment and remain stable, and the discount rate will be published on the website of SHCH. By the end of each day, if the collateral value calculated by SHCH is insufficient or excessive within a certain range, SHCH will send the additional/release list to clearing members.

Clearing members can check information about disposal of the collateral from the client terminal of SHCH, and can withdraw releasable collateral at the time prescribed in margin release notice. In addition, clearing members can transfer in and out the qualified guaranty bonds every day.

Key Consideration 5.4: An FMI should avoid concentrated holdings of certain assets, which would significantly impair FMI's ability to quickly liquidate such assets without material adverse effect on the price.

Summary narrative:

SHCH has set threshold value for concentration of bonds in the qualified guaranty bonds, which is used to manage the concentration risk for excessive holding of single bond, so as for a rapid disposal of collateral.

SHCH accepts collaterals that can be disposed within a short time or can be realized in time.

To avoid concentration risk, SHCH specifies the lower limit of the issuance scale and total denomination of single bonds for eligible collateral, etc.

SHCH evaluates and assesses the liquidity of collateral, discount rate coverage, and market transactions on a regular basis.

Key Consideration 5.5: An FMI that accepts cross-border collateral should mitigate relevant risks and ensure that the collateral can be used in a timely manner.

Summary narrative:

SHCH does not accept cross-border collateral at present.

Key Consideration 5.6: An FMI should use a collateral management system that is well-designed and operationally flexible.

SHCH has a collateral management system that is well-designed and operationally flexible.

At the end of each day, SHCH calculates the collateral value. If the value is insufficient, SHCH will send the margin call notifications to the clearing members; if the value is excessive, the clearing members can withdraw releasable collateral at specified time-point and check collateral handling information through SHCH's client terminal.

In addition, clearing members can transfer in/out the qualified guaranty bonds every day.

Principle 6: Margin

Key Consideration 6.1: The margin levels established in a CCP's margin system shall match the risks and characteristics of each product, portfolio, and the market it serves.

Summary narrative:

Margin is the margin submitted by clearing members to SHCH in form of cash or securities, which is used for making up for the losses caused to SHCH due to the violations and defaults of clearing members. SHCH has made explicit stipulation for the management system and collecting approaches of margin.

SHCH has formulated the general framework of margin system. SHCH determines the relevant parameters, calculation method, method of payment and withdrawal of margin and the amount of margin payable by clearing members to participate in the clearing services, in accordance with the relevant services rules of CCP clearing services (including but not limited to, services rules, services guidelines, methods, notices, announcements, instructions and operation process, etc.) and the decisions of SHCH risk management committee.

The model, parameters, and collection time of margin have been specified in "The Guideline for Central Clearing of Shanghai Clearing House" and "The Rules for Central Clearing of Shanghai Clearing House", etc.

The margin of SHCH includes initial margin, mark-to-market margin and special margin.

The initial margin is used for making up for the potential losses of SHCH under certain confidence coefficient incurred in default management in event of default by clearing members. Initial margin is composed of minimum margin and excess margin. The minimum margin shall be assessed according to the clearing limit. Excess margin is the margin paid when the net position or risk exposure of a clearing member exceeds the clearing limit. When a clearing member default, excess margin is used to make up for the potential loss caused by the default management of SHCH, which cannot be covered by the minimum margin.

Mark-to-market margin is used to cover mark-to-market losses on positions held by clearing members. At the end of each day, SHCH will make mark-to-market settlement or margin call and margin release based on the mark-to-market situation of clearing members.

Special margin is used for making up for the potential extra losses caused to SHCH due to default of clearing members in exceptional circumstances. The exceptional circumstances include: abnormal fluctuations of market price, excessive concentration of the position held by clearing members, consecutive holidays, etc.

SHCH verifies the level, model and parameters of margin through stress testing and back testing, so as to ensure that they match the risk characteristics of products and market.

SHCH has given full consideration to the characteristics of products and served markets when designing its margin model and parameters, so as to ensure that such model and parameters match such characteristics. For example, as for the initial margin requirements, SHCH has considered its historical data fluctuations, historical scenarios, and the credit level of clearing members. The calculation of risk exposure is based on the potential risk exposure under confidence coefficient no less than 99%. The margin calculation model and related parameters are verified quarterly by means of stress testing and back testing, the risk management committee conducts a follow-up assessment of the margin system and the stress testing framework.

If the failure of clearing members to pay margin has constituted the default of margin, SHCH will handle the case in accordance with relevant provisions of Shanghai Clearing House Guidelines on Default Management of Central Counterparty Clearing Services (2022 Year Version) and the guide on default management of central clearing service (See Principle 13).

Key Consideration 6.2: A CCP should have a reliable source of timely price data for its margin system. A CCP should also have process and sound valuation models for addressing circumstances in which pricing data are not readily available or reliable.

Summary narrative:

The price data of SHCH is from direct market data, including transaction price, limitation, etc. The data sources include trading platforms, market makers, etc. SHCH also uses the information of other eligible data sources to supplement price data, so as to ensure reliable and timely data sources of the margin model of SHCH.

SHCH is a registration and custody organization for interbank market bonds, with comprehensive credit bond settlement data. As a clearing organization, SHCH can directly obtain comprehensive and reliable transaction data of participants.

All services of SHCH mainly reflects the real market information of the latest financial products, and calculates the fair value of clearing products by reference to historical data and adopting specific financial model and using the fair valuation method of each services. The market information shall be used in the following order of priority:

- (1) The transaction price reflecting the true will in relation to the transaction;
- (2) The two-way quotes from the parties to the transaction which reflect the true will in relation to the transaction;
- (3) Quote from the market-maker or the brokerage company;
- (4) Quote from fair and equal market participants;
- (5) Other data acknowledged by SHCH;

Under particular circumstances, the order of priority may be adjusted according to actual needs of the services.

Before put into practice, the valuation method and model of each services of SHCH have been discussed by experts and scholars, and have been verified by market institutions by reference to the internal data. In the process of operation, SHCH invites market institutions to participate in valuation salons, seminars, etc., discloses the overall valuation method to the market institutions and takes opinion from the market.

If relevant market price data is not readily available or not reliable, SHCH will use reliable valuation data for margin calculation. The valuation model is based on opinions from many market institutions, and has been recognized by them. The model will be adjusted regularly based on market data, thereby it can accurately reflect the market price.

Key Consideration 6.3: A CCP should adopt a risk-based initial margin models and parameters, and generate margin requirements sufficient to cover its potential future exposure to participants in the interval between the last margin collection and the close out of positions following a participant default. The initial margin should meet an established single-tailed confidence level of at least 99 percent with respect to the estimated distribution of future exposure. For a CCP that calculates margin at the portfolio level, this requirement applies to each portfolio's distribution of future exposure. For a CCP that calculates margin at more-granular levels, such as at the sub-portfolio level or by product, the requirement must be met for the corresponding distributions of future exposure. The model should (a) use a conservative estimate of the time horizons for the effective hedging or close out of the particular types of products cleared by the CCP (including in stressed market conditions), (b) have an appropriate method for measuring credit exposure that accounts for relevant product risk factors and portfolio effects across products, and (c) to the extent practicable and prudent, limit the need for unstable, pro-cyclical changes.

Summary narrative:

The margin calculation of SHCH has considered a series of factors and is designed in the principle of protecting the clearing members and CCP, and preventing the systemic risk of the involved markets. The initial margin of all products of SHCH can cover potential risk exposure with the confidence interval no less than 99%. SHCH has set relatively stable and conservative liquidation periods, sufficient observed value of stress scenario, price fluctuation elements, and position limits, so as to ensure margin model to be stable and conservative and not easily influenced by market change, which has effectively limited the need of unstable and pro-cyclical change.

The assumptions for the margin model of SHCH include liquidation periods, market volatility and risk position, etc. SHCH has prudently set the liquidation periods according to the characteristics and market liquidity of each product (services). Due to the large volume of bonds, IRS and FX transactions, which give rise to large volume of default management and which may possibly involve position division, SHCH has set longer liquidation periods for above types of services based on the actual difficulty of liquidation management. The liquidation periods for bond services are 3 days, and the liquidation periods for IRS clearing service are 10 days, and the liquidation periods for FX transaction are 5 days. Besides, the liquidation periods for commodity derivatives services are 2 days, because commodity derivatives services uses standardized contracts, its disposal method is relatively simple, and contracts which cannot be closed out within the prescribed time can be compulsorily settled at the settlement time-point of the next day (9 a.m.). The liquidation periods for the Standard Bond Forward services are 2 days, because the Standard Bond Forward uses the standardized contracts, and the margin is settled at T+1, and the overnight risk is also taken into consideration. The liquidation periods for CDS are 10 days, and the liquidation price differential loss in 10 days at the levels above 99.9% is calculated by historical Value at Risk (VaR), which is the risk exposure of contracts on the day).

SHCH uses different risk factors based on the risk characteristics of each product, to ensure the margin level, and these factors include:

Historical volatility: the historical price fluctuation measured within different time slots;
Clearing limits: with respect to a single member, SHCH determines the relevant clearing limits based on its professional skill and nature of membership;

Credit factor: According to the financial situation in the latest fiscal year and business results of clearing members, as well as the situation of clearing members' participation in the CCP clearing services of SHCH, SHCH adopts the credit assessment model to comprehensively analyze the credit level of clearing members, generate the credit score, and determine the credit factors of clearing members.

For the margin model and parameters, SHCH carries out regular inspection through strict back testing. SHCH guarantees the coverage of margin by way of daily monitoring on price fluctuations of all products and comparing them with the current margin level, and adjusts all parameters based on the test results. In addition, SHCH carries out stress testing on a regular basis.

The Risk Management Department regularly calibrates the parameters of the product's margin model and reviews the results. Historical market volatility parameters are monitored through quantitative methods and models to ensure that the observed market parameters are appropriate variables for margining.

Key Consideration 6.4: A CCP should mark participant positions to market and collect variation margin at least on a daily basis, to limit the build-up of current exposures. A CCP should have the authority and operational capacity to make intraday margin calls and payments, both scheduled and unscheduled, to participants.

Summary narrative:

The model of variation margin and the collection time-point of margin have been specified in “The Guideline for Central Clearing of Shanghai Clearing House” and “The Rules for Central Clearing of Shanghai Clearing House”, etc. SHCH calculates and recovers variation margin on a daily basis. In special circumstances, such as market anomalies or portfolio anomalies of clearing participants, SHCH can calculate and recover margin many times a day according to the market conditions. SHCH adjusts the available amount and recoverable amount of margin of clearing participants according to the latest risk exposure and corresponding margin requirement, and limits the accumulation of risk exposure in a timely manner.

SHCH can require the clearing members to provide additional intraday margin according to service conditions and the credit position of clearing members. Clearing members shall make full payment of intraday margin to SHCH before the prescribed time-point after SHCH's delivery of notice regarding additional intraday margin.

The time-point of margin call includes daytime and the end of the day. SHCH sends margin calls to clearing members via the client. Clearing members shall transfer the payable money into the margin accounts of SHCH within the prescribed period of time according to the notice or authorize SHCH to collect the margin. If the failure of clearing members to pay the margin within the prescribed period of time constitutes margin default, SHCH shall handle the case according to the margin default procedures put in place.

Key Consideration 6.5: In calculating margin requirements, a CCP may allow the required margin to be offset or reduced across products that it clears or between products that it and another CCP clear, if the risk of one product is significantly and reliably correlated with the risk of the other product. Where two or more CCPs are authorized to offer cross-margining, they must have `

Summary narrative:

SHCH carries out the CCP clearing services against multiple products, and has considered the correlation

between the risks of products in calculating model of margin. If two products have obvious, verifiable, and measurable risk relevance, SHCH will reduce the margin payable by clearing members against risks which are mutually offset. At present, SHCH has reduced or offset the margin requirement, according to the risk relevance among different terms and products, in FX CCP clearing services, IRS CCP clearing services, bond CCP clearing services. In the CCP clearing services of commodity derivatives, SHCH launched the commodity portfolio margin program in 2020 to realize reasonable risk hedging of intra-commodity spread positions. In the bonds CCP clearing services, SHCH launched the bonds CCP clearing risk control model based on the historical simulation method on VaR in 2021, which classifies the products according to the differences in risk variables and default management methods, etc., and carries out reasonable offsets within product class and among similar classes.

The margin offsets or reduction in SHCH's margin calculation model is conducted prudently, and verified by using data in back testing and stress testing.

SHCH does not enter into a cross-margining arrangement between or among the CCPs.

Key Consideration 6.6: A CCP should analyze and monitor its model performance and overall margin coverage by conducting rigorous daily back testing – and at least monthly, and more-frequent where appropriate, sensitivity analysis. A CCP should regularly conduct an assessment on the theoretical and empirical characteristics of its margin model for all products it clears. In conducting sensitivity analysis on the model's coverage, a CCP should take into account a wide range of parameters and assumptions that reflect possible market conditions, including the most-volatile periods that have been experienced by the markets it serves and extreme changes in the correlations between prices.

Summary narrative:

SHCH carries out back testing on a daily basis and sensitivity analysis on a monthly basis. The current market data as well as the historic and theoretical extreme scenario are used to verify the appropriateness of margin model, so as to ensure the margin model is enough to cover the volatility during different historical points, which guarantees sufficient margin.

The back testing of all services of SHCH is based on historical membership risk exposure and market curve volatility, to verify the margin model, the rationality of the parameters, including the clearing limits of all services, calculation model of bond risk exposure, calculation model of FX risk exposure, calculation model of IRS risk exposure, margin model of Standard bond forward services, calculation model of CSD risk exposure and margin model of commodity derivatives services.

SHCH has specifically specified the back testing days for different services, fully covering the market volatility of all services, assessing the back testing results on a regular basis, and adjusting margin model and parameters in a timely manner. The risk management committee reviews various margin systems and stress testing frameworks. If the back testing fails, SHCH will analyze and evaluate it and make appropriate adjustment on the model parameters, especially extreme values, so as to adapt to the current market environment.

SHCH carries out sensitivity analysis for different services, and chooses such fluctuation scenarios as corresponding to each parameter in the margin model of such services. In the sensitivity analysis on margin model, SHCH calculates and assesses the upward and downward fluctuation of each element in the assessment model and the effect of different fluctuation on the coverage adequacy of margin model.

Key Consideration 6.7: A CCP should regularly review and verify its margin system.

Summary narrative:

SHCH assesses and verifies the margin model on a regular basis, analyzing and verifying the rationality of the model and parameters, and submits the results to the risk management committee for review on a regular basis.

If the existing margin model is changed or a new margin model is used, SHCH will increase the assessment frequency for the model. SHCH assesses the appropriateness of the model, and inspects the testing results and various parameters of the model.

After the margin model of new services is launched, SHCH will compare it with the margin models of other services and make corresponding improvement. If the IRS clearing service calculates margin based on the risk exposure of historical VaR, SHCH will apply such model to FX services after its assessment. In 2021, SHCH developed and launched the risk exposure calculation model based on historical VaR in the bond CCP clearing service to promote accurate and efficient risk measurement.

The evaluation and optimization conducted by SHCH include initial margin, mark-to-market margin and other margin models. Holiday margin has been applied to better measure risks; bi-directional mark-to-market margin is used to moderately reduce the risk cost of profiting party.

SHCH upgrades margin system in a timely manner so as to realize the automation of margin model. Before the new model system is formally used, SHCH will carry out full service testing and join-testing by a dozen or dozens of clearing members and nonmember participants, so as to ensure that the margin system is operated stably and that the margin model is appropriately applied to each services and achieving the required standard of coverage. In 2021, SHCH launched the FX risk management engine system, greatly improving the calculation efficiency of the system by three times.

Principle 7: Liquidity risk

Key Consideration 7.1: An FMI should have a robust framework to manage its liquidity risks from its participants, settlement banks, agents, custodian banks, liquidity providers, and other entities.

Summary narrative:

SHCH manages and effectively copes with the liquidity risk through a series of measures including the monitoring and early warning of intraday tiered liquidity, DVP settlement mechanism, the provision of liquidity by credit banks, the provision of liquidity by monetary market, and the delay in pre-agreed delivery.

Against the institutions' demand of withdrawing released margin, SHCH will prepare adequate fund for withdrawal on the next business day.

SHCH conducts liquidity tests regularly to examine whether its liquidity resources are sufficient to cover the total liabilities in all currencies of SHCH caused by the default of the largest single clearing participant under extreme market conditions, and to calculate the corresponding gap. The extreme scenario of the liquidity testing is consistent with the extreme scenario of the stress testing and assumes simultaneous defaults across all services, taking into account the default of the credit granting institution. The risk management committee regularly reviews liquidity risk assessment reports to avoid liquidity shortages.

Key Consideration 7.2: An FMI should have effective operational and analytical tools to identify, measure, and monitor its settlement and funding flows on an ongoing and timely basis, including its use of intraday liquidity.

Summary narrative:

SHCH carries out recognition, measurement and monitoring for all settlement funds, settlement bonds, and capital flow of margin call of relevant currencies on the continuous and timely basis within the management framework of liquidity risk, and provides corresponding support with a variety of liquidity support means, so as to prevent the shortage of liquidity.

SHCH monitors the positions of fund settlement of single day and multiple days in the future through system query. SHCH publishes the clearing documents of the next working day by the end of each day, so that clearing participants can prepare in advance adequate fund according to the documents; SHCH publishes the settlement documents after settlement.

SHCH monitors financial liquidity on a daily basis. Against clearing participants with overlarge settlement funds, SHCH will give significant attention and reminder in the daytime. Against clearing participants with inadequate balance of margin, SHCH will contact them for additional margin, so as to ensure adequate liquidity resources.

Clearing participants have opened bonds accounts in SHCH, so that SHCH can learn about their position in real time. Once clearing participants are inadequate in bonds, SHCH can assist them on bond trading or bond lending in a timely manner according to their real time position and complete the delivery.

For clearing participants who have not opened a clearing account in HVPS, they must make fund settlement through their "special accounts for fund settlement" opened at SHCH. Through the real-time monitoring of their fund accounts, SHCH has effectively avoided the occurrence of the risk events of financial liquidity.

In addition, in view of the daily transaction of clearing participants, SHCH has set up supporting reminder mechanism to contact the participants with overlarge exposure to prepare corresponding cash and bonds for settlement.

Key Consideration 7.4: A CCP should maintain sufficient liquid resources in all relevant currencies to settle securities- related payments, make required variation margin payments, and meet other payment obligations on time with a high degree of confidence under a wide range of potential stress scenarios that should include, but not be limited to, the default of the participant and its affiliates that would cause the largest aggregate payment obligation to the CCP in extreme but possible market conditions. In addition, a CCP that is involved in activities with a more-complex risk profile or that is systemic important in multiple jurisdictions should consider maintaining additional liquidity resources sufficient to cover a wider range of potential stress scenarios that should include, but not be limited to, the default of two participants and their affiliates that would cause the largest aggregate payment obligation to the CCP in extreme but possible market conditions.

Summary narrative:

SHCH monitors the intraday liquidity, and improves liquidity resources by requiring additional variation margin, and carries out liquidity testing on a regular basis to ensure adequate liquidity resources of all currencies and bonds. Prudent liquidity risk management is sufficient to avoid all kinds of potential liquidity shortage.

SHCH assess the settlement demand in the daytime of the current day or multiple days through real-time monitoring in the daytime, combining with clearing members management, limits of liquidation, etc. to control the liquidity risk of participants. The details can be found in the specification about limits of liquidation and margin in “The Guideline for Central Clearing of Shanghai Clearing House”.

SHCH carries out liquidity testing on a regular basis, testing under various potential stress scenarios if the liquidity resources of SHCH are sufficient to cover the total obligations in all currencies caused by the

default of the largest clearing participant in SHCH. SHCH has launched the collateralized credit services on a pilot basis in 2020 to further expand liquidity resources. The liquidity testing report of SHCH would be regularly submitted to management team and risk management committee for review. SHCH also obtains the needed liquidity resources in a timely manner through the credit agreements with many banks and performs the obligation of delivery to non-defaulting parties. SHCH has signed bonds lending agreements with a number of institutions to provide favorable support for bond settlement liquidity. PBC has approved SHCH to enter the interbank market to carry out transaction in cash, bond repurchase, bond lending, corresponding derivatives and other tractions, so as to get liquidity resources. SHCH chooses the banks that have robust accounting practices, safekeeping procedures and internal controls as well as strong systematic, credit and financial position as credit banks, and monitors and manages their credit risk, liquidity risk and operational risk.

Key Consideration 7.5: For the purpose of meeting its minimum liquid resource requirement, an FMI's qualifying liquid resources in each currency include cash at the issuing central bank and at creditworthy commercial banks, committed lines of credit, committed FX swaps, and committed repos, as well as highly marketable collateral held in custody and investments that are readily available and convertible into cash with prearranged and highly reliable funding arrangements, even in extreme but possible market conditions. If an FMI has access to routine credit at the issuing central bank, the FMI may count such access as part of the minimum requirement to the extent it has collateral that is eligible for pledging to (or for conducting other appropriate forms of transactions with) the relevant central bank. All such resources should be available when needed.

Summary narrative:

SHCH ensures to obtain high quality liquidity resources of all kinds of currencies and bonds through credit agreements in advance and bond lending agreements. In the event of a member default, its margin and asset receivable will be frozen by SHCH. In this case, margin and asset receivable in the default currency can be directly used as liquidity resources.

SHCH obtains unconditional and conditional credit facilities through signing credit agreements with many banks, and uses these credit facilities to perform the obligation of delivery to non-defaulting parties in the event of clearing members default. Therefore, when the default or delay in payment of large clearing members occurs and the liquidity resources are not enough to cover the shortage, SHCH has a complete mechanism of delay delivery, default management process and a waterfall risk prevention structure (See Principle 13). SHCH has piloted the collateralized credit business, in which the receivables of defaulting clearing members are used as collaterals to obtain the liquidity resources of credit banks.

SHCH only chooses the banks that have robust accounting practices, safekeeping procedures and internal controls as well as strong systematic, credit and financial position as credit banks, in order to reduce risk. SHCH carries out comprehensive continuous monitoring and management against the credit risk, liquidity risk and operational risk from these institutions. Meanwhile, SHCH has selected many credit banks against all kinds of services. In extreme cases, if the default of one of these credit banks occurs, SHCH can obtain the needed liquidity resources by choosing other credit banks.

Key Consideration 7.6: An FMI may supplement its qualifying liquid resources with other forms of liquid resources. If the FMI does so, then these liquid resources should be in the form of assets that are likely to be saleable or acceptable as collateral for lines of credit, swaps, or repos on an ad hoc basis following a default, even if this cannot be reliably prearranged or guaranteed in extreme market conditions. Even if an FMI does not have access to routine central bank credit, it should still take account of what collateral is typically accepted by the relevant central bank, as such assets may be more likely to be liquid in stressed circumstances. An FMI should not assume the availability of emergency central bank credit as a part of its liquidity plan.

Summary narrative:

SHCH obtains cash and bond liquidity by direct bond transactions; further obtains liquidity resources by freezing and selling the payable assets of defaulting participants; provides reasonable time for the access of liquidity resources by delay in delivery.

PBC has approved SHCH to enter the interbank bond market for transactions. As a participant of interbank bond market, SHCH can carry out direct transaction to obtain cash, bonds and other liquid resources.

SHCH has adopted DVP settlement mechanism to freeze the payable assets of defaulting participants during settlement, so as to provide the guarantee of consideration for the settlement of liquidity risk. If liquidity shortage occurs in extreme cases, SHCH has provided a reasonable grace period for the guarantee of delivery through the mechanism of delay in delivery.

Key Consideration 7.7: An FMI should obtain a high degree of confidence, through rigorous due diligence, that each provider of its minimum required qualifying liquid resources, whether a participant of the FMI or an external party, has sufficient information to understand and to manage its associated liquidity risks, and that it has the capacity to perform as required under its commitment. Where relevant to assessing a liquidity provider's performance reliability with respect to a particular currency, a liquidity provider's potential access to credit from the central bank of issue may be taken into account. An FMI should regularly test its process for accessing liquid resources from a liquidity provider.

Summary narrative:

SHCH has the ability to obtain sufficient liquidity support, as well as to predict and avoid potential liquidity shortage through liquidity testing.

SHCH only chooses the banks that have robust accounting practices, safekeeping procedures and internal controls as well as strong systematic, credit and financial position as liquidity providers, in order to reduce risk. SHCH carries out comprehensive continuous monitoring and management against the credit risk, liquidity risk and operational risk from these institutions.

SHCH has set up liquidity ratio and other indexes for liquidity evaluation in the annual clearing members credit assessment system, so as to carry out regular tracking for the liquidity of the relevant institutions as liquidity provider.

SHCH has cooperated with the above institutions for many times to carry out emergency credit practice. In extreme circumstances, SHCH has the conditions to initiate liquidity arrangement in a timely manner.

SHCH has selected many credit banks against all kinds of services. In extreme cases, SHCH can obtain the needed liquidity resources from many institutions in a timely manner.

Key Consideration 7.8: An FMI with access to central bank accounts, payment services, or securities services should use these services, where practical, to enhance its management of liquidity risk.

Summary narrative:

SHCH has acquired central bank account service and payment service.

SHCH is a privileged participant of the HVPS of central bank, and has acquired daily PBC account service. Credit banks can provide liquidity support to SHCH through its excess reserve account in central bank.

As a registration and custodian institution of inter-bank market bonds, SHCH monitors the needs of bond settlement in the daytime and makes bond settlement by the end of the day. SHCH directly manages the bond collaterals in the bond accounts of participants.

Key Consideration 7.9: An FMI should determine the amount, and regularly test the sufficiency of its liquid resources through rigorous stress testing. An FMI should have clear process to report the results of its stress tests to appropriate decision makers at the FMI and to use these results to evaluate the adequacy of, and adjust its liquidity risk-management framework. In conducting stress testing, an FMI should consider a wide range of relevant scenarios. Scenarios should include relevant peak historic price volatilities, shifts in other market factors such as price determinants and yield curves, multiple defaults over various time horizons, simultaneous pressures in funding and asset markets, and a spectrum of forward-looking stress scenarios in a variety of extreme but possible market conditions. Scenarios should also take into account the design and operation of the FMI, include all entities that might pose material liquidity risks to the FMI (such as settlement banks, agents, custodian banks, liquidity providers, and linked FMIs), and where appropriate, cover a multiday period. In all cases, an FMI should document its supporting rationale for, and should have appropriate governance arrangements relating to, the amount and form of total liquid resources it maintains.

Summary narrative:

The liquidity risk management of SHCH ensures that there are sufficient liquidity resources covering all relevant currencies at any time to cover the liquidity needs caused by the default of potential clearing participants in settlement business. Against all potential sources of liquidity risk, SHCH has set different scenarios for liquidity testing.

SHCH carries out liquidity testing regularly, so as to verify whether the liquidity resources of SHCH are adequate to perform payment obligation for a single day or a consecutive period. SHCH has launched the collateralized credit business on a pilot basis in 2020 to further expand liquidity resources from credit banks. In terms of other currencies, the amount of credit lines that SHCH acquired from commercial banks through unconditional credit and conditional credit can cover the liquidity needs in case of the default for single day or multiple days.

SHCH will test the influences of market stress scenarios used for stress testing on credit risk on liquidity demand and shortfall. These stress scenarios include extreme bond yield fluctuation, extreme exchange rate/interest rate fluctuation, extreme financing interest rate fluctuation and issuer rating decline leads to bonds price fluctuations, etc., and the default of liquidity provider is considered at the same time. When performing liquidity stress testing, SHCH assumes that credit facility and settlement facility provided by defaulting institutions are deducted from liquidity resources at the same time.

Key Consideration 7.10: An FMI should establish explicit rules and process that enable the FMI to affect same-day and, where appropriate, intraday and multiday settlement of payment obligations on time following any individual or combined default among its participants. These rules and process should address unforeseen and potentially uncovered liquidity shortfalls and should aim to avoid liquidation, revoking, or delaying the same-day settlement of payment obligations. These rules and process should also indicate the FMI's process to replenish any liquidity resources it may employ during a stress event, so that it can continue to operate in a safe and sound manner.

Summary narrative:

SHCH has made clear specifications for the default management of clearing members in “The Guideline for Central Clearing of Shanghai Clearing House” by managing liquidity risk with clearing limit and mark-to-market margin, so as to ensure the liquidity resources of SHCH can cover risks in accordance with the established process and complete the obligations of settlement.

SHCH has specified clearly the default management procedures for defaulting clearing participants in “The Guideline for Central Clearing of Shanghai Clearing House” and “Shanghai Clearing House

Guidelines on Default Management of Central Counterparty Clearing Services (2022 Year Version)”, in order to ensure timely settlement of payable obligations generated on the same day, intraday and in several days (if necessary) when one participant defaults or multiple participants default jointly.

In case of default by one or multiple participants who default jointly, SHCH will firstly freeze the clearing participant’s margin asset of the default services and clearing fund asset as well as all receivable assets in relation to the defaulting services within default management period; secondly SHCH will trigger liquidity support mechanism to perform settlement obligations during default management period by financing bonds and capital, depending on the seriousness of the actual default conditions; lastly, after those defaulting clearing participants make up for the default fund, margin and default penalties, SHCH will return the frozen assets back to them and make repayment to the liquidity support institution.

In the meantime, SHCH has many credit banks as liquidity support institutions for all kinds of clearing services to ensure the procurement of necessary liquidity resources from multiple institutions to complete the payment and settlement obligations in a timely manner in extreme cases.

Principle 8: Settlement finality

Key Consideration 8.1: An FMI's rules and process should clearly define the point at which settlement is final.

Summary narrative:

SHCH makes settlement for the CCP clearing services of bond CCP clearing services, interest rate derivatives CCP clearing services, FX CCP clearing services, credit derivative CCP clearing services, commodity derivatives CCP clearing services in accordance with the legal provisions, judicial interpretation and the relevant provisions of regulations (see Principle 1: Legal Basis). In accordance with the above law and regulations, once the settlement of CCP service is completed, the settlement is final and irrevocable.

At the same time, SHCH has clear definitions for clearing finality in “The Guideline for Central Clearing of Shanghai Clearing House”, “The Rules for Central Clearing of Shanghai Clearing House” and clearing agreements. In detailed “The Guideline for Central Clearing of Shanghai Clearing House” and operation guide, SHCH has clear specifications for the starting time-point and ending time-point of all CCP clearing services. (see Principle 8.2)

Key Consideration 8.2: An FMI should complete final settlement no later than the end of the value date, and preferably intraday or in real time, to reduce settlement risk. An LVPS or SSS should consider adopting RTGS or multiple-batch processing during the settlement day.

Summary narrative:

The CCP clearing services are all finally settled before the end of the effective day. The day end settlement process includes: netting settlement, generation of margin settlement, settlement list and other clearing documents. At the end of the day, SHCH calculates the payable funds, payable bonds and pledged bonds of each clearing member, and generates a settlement list based on the result of the settlement mangle. The settlement list is the valid certificate for SHCH and clearing members to handle the settlement of principal. Settlement process includes margin settlement process, capital settlement process and bond settlement process.

For bond services, the time-points of bonds and fund settlement are 16:15. For IRS clearing service, the time-point for payment is 15:00. For Standard Bond Forward services, clearing members perform the obligation of fund settlement before 11:00. For CDS services, the time-point for membership payment is 15:00. For FX CCP clearing services, the time-point for clearing members to make payment is 15:00; upon

receipt of all currency funds due from the relevant clearing member, the final time-point for SHCH to pay receivable fund to clearing members is 15:30. For commodity derivatives services, clearing members will perform the obligation of fund settlement before 10:00 each day. All RMB CCP clearing services use batch settlement via HVPS. The RMB funds of FX CCP clearing services are settled through RMB HVPS, and FX funds are settled through the FX settlement bank specified by SHCH. RMB settlement guarantees payment and settlement finality according to relevant HVPS rules. Funds transfer for FX settlement are completed for the settlement party by the FX settlement bank within the settlement account, according to the SWIFT instruction sent by the settlement party, clearing members handle foreign currency fund settlement through the FX settlement bank designated by SHCH.

Key Consideration 8.3: An FMI should clearly define the point after which unsettled payments, transfer instructions, or other obligations may not be revoked by a participant.

Summary narrative:

After SHCH completed the compliance check and risk control compliance check, and after general clearing member completed the agency confirmation, then as the central counterparty, SHCH intervened and inherited the rights and obligations of the funds settlement and settlement of both parties in the transaction. According to the result of central clearing and the principle of synchronous settlement, SHCH organizes and completes the settlement with the clearing members, including securities settlement, physical settlement and capital settlement. The settlement is irrevocable upon completion.

Principle 9: Monetary settlement

Key Consideration 9.1: An FMI should conduct its monetary settlements in central bank money, where practical and available, to avoid credit and liquidity risks.

Summary narrative:

All RMB fund settlement in the CCP clearing services of SHCH uses central bank money.

SHCH is the privileged participant of the HVPS of PBC, and has opened chartered accounts in the HVPS through which SHCH completes the RMB fund settlement in the CCP clearing services. At the same time, the central clearing services system and HVPS of SHCH has realized STP, so as to ensure the prompt completion of RMB fund settlement. The above measures are used to avoid the credit risk and liquidity risk of RMB fund settlement.

Key Consideration 9.2: If central bank money is not used, an FMI should conduct its monetary settlements using a settlement asset with little or no credit or liquidity risk.

Summary narrative:

In the CCP clearing services, in relation to the fund settlement of the currencies other than RMB, SHCH uses commercial banks with systemic importance and high credit assessment as settlement banks. The above commercial banks are Global Systemically Important Banks (G-SIB) published by Financial Stability Board (FSB), as well as direct participants of PBC's HVPS of the undertaken settlement currencies. SHCH carries out the fund settlement of US dollars, Euros, pounds, yens, Australian dollars, and Hong Kong dollars through the above settlement banks, basically without credit risk and liquidity risk.

Key Consideration 9.3: If an FMI settles in commercial bank money, it should monitor, manage, and limit its credit and liquidity risks arising from the commercial settlement banks. In particular, an FMI should establish and monitor adherence to strict criteria for its settlement banks that take account of, among other things, their regulation and supervision, creditworthiness, capitalization, access to liquidity, and operational reliability. An FMI should also monitor and manage the concentration of credit and liquidity exposures to its commercial settlement banks.

Summary narrative:

SHCH uses commercial banks for the settlement of foreign currencies, which has strict selection indicators and daily monitoring standards.

The selection indicators include: the capital fund of commercial banks is sufficient; the direct qualification of participation of the central bank HVPS of the countries (areas) of currency issue; the HVPS provides daytime liquidity support for the fund settlement of SHCH and its clearing members; SHCH has the straight-through processing capacity of fund settlement; the processing system of fund settlement has high availability. For US dollars and other currencies with large settlement amount, SHCH chooses two commercial banks as settlement banks.

The daily monitoring standards include: the real-time monitoring of the balance of settlement accounts; the real-time processing of the posting reports of the settlement fund of settlement banks; a series of measures such as the credit assessment and liquidity risk inspection of settlement banks on a regular basis, so as to monitor and manage the credit risk, liquidity risk and the risk exposure concentration of settlement banks.

Key Consideration 9.4: If an FMI conducts monetary settlements on its own books, it should minimize and strictly control its credit and liquidity risks.

Summary narrative:

For banking institutions directly involved in HVPS, fund settlement of its CCP services can be completed directly through its HVPS clearing account. For other banking institutions involved in the CCP services with a self-support identity, their fund settlement is completed through SHCH's settlement account. If it is involved in the services as the principal, the fund settlement should be completed through the path of general clearing members. For the second type of institutions (not directly involved in HVPS, and participating in CCP services with a self-support identity), SHCH shall complete payment and settlement bookkeeping through the central clearing system's fund subsystem, in order to maintain the internal account. SHCH strictly controls funds usage, so as to guarantee security of settlement funds, and effectively avoid credit and liquidity risks. SHCH conducts regular update, upgrade and maintenance of the accounting system.

Key Consideration 9.5: An FMI's legal agreements with any settlement banks should state clearly when transfers on the books of individual settlement banks are expected to occur, that transfers are to be final when effected, and that funds received should be transferable as soon as possible, at a minimum by the end of the day and ideally intraday, in order to enable the FMI and its participants to manage credit and liquidity risks.

Summary narrative:

The central clearing system and HVPS of SHCH has realized straight-through processing, so as to ensure the fund settlement instructions of RMB can be completed promptly, thus effectively avoid credit risks and liquidity risks.

The agreement between SHCH and settlement banks explicitly specifies the settlement's finality. The fund settlement accounts of SHCH and clearing members opened at settlement banks are only used for specified fund settlement of CCP clearing services. The transfer is done via the settlement accounts at the same settlement bank, and it has finality once completed. All fund settlement occurs in the daytime, and all fund settlement is completed before 17:00.

Principle 10: Physical deliveries

Key Consideration 10.1: An FMI's rules should clearly state its obligations with respect to the delivery of physical instruments or commodities.

Summary narrative:

All bonds in SHCH's custody are in paperless form³, as well as the trading, clearing and settlement of financial instruments. Principle 10 does not apply.

Key Consideration 10.2: An FMI should identify, monitor, and manage the risks and costs associated with the storage and delivery of physical instruments or commodities.

Summary narrative:

All bonds in SHCH's custody are in paperless form, as well as the trading, clearing and settlement of financial instruments. Principle 10 does not apply.

Principle 12: Exchange-of-value settlement system

Key Consideration 12.1: An FMI that is an exchange-of-value settlement system should eliminate principal risk by ensuring that the final settlement of one obligation occurs if and only if the final settlement of the linked obligation also occurs, regardless of whether the FMI settles on a gross or net basis and when finality occurs.

Summary narrative:

SHCH ensures to eliminate principal risks through DVP or payment versus payment (PVP) in the CCP clearing services.

Against all bond transactions or FX transactions with SHCH as the CCP, SHCH is engaged in the transactions as the buyer for all sellers and the seller for all buyers, inheriting the rights and obligations of two transactions sides as CCP, and carrying out multilateral netting settlement in accordance with the clearing members, settlement date, varieties and currencies of bonds, and calculating the volume of receivable/payable fund or bonds, based on which SHCH respectively carries out fund settlement or bond settlement with clearing members according to DVP or PVP mechanism. Against any clearing member, if and only if the clearing members pays its payable fund or bonds, will SHCH ensure to pay the clearing members its payable funds or bonds, and the fund payment or delivery of bonds will be completed in real time.

The DVP mechanism in the CCP clearing services of SHCH is realized through the straight-through connection between the clearing system of SHCH and the HVPS of PBC, and the settlement is completed in real time using central bank money. The fund settlement or bond settlement has irrevocability and finality once completed.

SHCH does not involve the connection with other CCPs.

Principle 13: Participant-default rules and process

Key Consideration 13.1: An FMI should have default rules and process that enable the FMI to continue to meet its obligations in the event of a participant default and that address the replenishment of resources following a default.

Summary narrative:

SHCH has established detailed default management rules and waterfall risk prevention structure, so as to ensure participants can continue to perform obligations and solve the problem of resource complement after the default of participants. SHCH has classified default events of clearing members into operational default and perpetual default, and has established different default management processes according to different natures of default.

³ The Standard Bond Forward physical delivery mechanism of SHCH is also in paperless form.

If the margin, clearing fund, settlement assets (including but not limited to funds, bonds and physical assets) or penalty funds are not fully paid to the account by the clearing member before the specified time, then it can be determined as operational default.

In case of other defaults than operational defaults by a clearing member, the defaulting clearing member's failure to timely eliminate operational situation of default on next working day, or recurrence of operational default, SHCH has the right to determine that the clearing member perpetually defaults.

SHCH uses risk reserve for default management in the following orders to compensate the default losses in SHCH caused by the default of clearing members:

- (1) The margin of the defaulting clearing member in the defaulting clearing service.
- (2) The default fund contributed by the defaulting clearing member in the defaulting clearing service.
- (3) Not more than 10% of the total amount of the risk reserve disclosed by SHCH to the clearing members at the end of the previous fiscal year prior to occurrence of such default.
- (4) The default fund contributed by the non-defaulting clearing members in the defaulting clearing service.
- (5) Supplementary default fund contributed by the non-defaulting clearing members in the defaulting clearing service.
- (6) The remaining risk reserve of SHCH.
- (7) Other resources designated by SHCH.

Key Consideration 13.2: An FMI should be well prepared to implement its default rules and process, including any appropriate discretionary process provided for in its rules.

Summary narrative:

The default rules and process of SHCH ensure the continuous operation of services by minimizing the effects of default. SHCH has explicitly specified the default treatment scheme, and reserved the discretion to deal with some special circumstances (such as the judgment of default, the judgment of successful auction, etc.).

If a clearing member has an operational default in a CCP clearing services, SHCH will take one or more of the following measures until such operational default is eliminated: to restrict or suspend the defaulting member to participate in the services that clearing members defaults; to freeze defaulting clearing member's receivable assets of the default services; to freeze default clearing member's margin account and clearing fund account of the default services; to start the bank credit or bonds borrowing and lending mechanisms, and integrate funds or bonds to complete the clearing and settlement obligations to the non-defaulting clearing members; in the case of physical delivery defaults, to start cash balance compensation, default delivery distribution mechanism and other corresponding default management processes; to levy default penalty funds according to the calculations of the default amount.

If the event of a perpetual default, in addition to the measures involved in the management of operational default, SHCH can also take one or more of the following measures:

- (1) Terminate the defaulter's qualification of participation in the defaulting CCP services.
- (2) Transfer the positions and collateral of the defaulting clearing member in the corresponding CCP clearing service to the SHCH default management special account.
- (3) Initiate rapid liquidation process on non-cash collateral (if any) in part or in whole. SHCH is entitled to liquidate the non-cash collateral in part or in whole to cover the default losses.
- (4) Liquidate assets (including cash, bonds and physical assets) and margin receivable of the defaulting clearing member on an as-needed basis to complete the relevant payment obligations or to repay bank credit lines and return bonds borrowed.

- (5) If physical delivery is involved, in accordance with the actual failure situation, SHCH will take measures such as cash differential compensation mechanism and default delivery distribution mechanism.
- (6) According to the actual default situation, SHCH may convene the DMG to assist SHCH in default management.
- (7) If the defaulting clearing member is a general clearing member, SHCH will port the positions of its eligible non-defaulting non-clearing members in accordance with the relevant provisions of SHCH.
- (8) Conduct forced liquidation on defaulting clearing member's positions, and execute the transfer of cash and non-cash collateral and positions.
- (9) In accordance with the loss allocation process, the risk reserve resources are used to cover losses caused by the forced liquidation or forced settlement (if any) of the defaulting clearing member's positions.
- (10) Close the relevant accounts of the defaulting clearing member at SHCH and terminate its clearing membership.
- (11) Report to the regulator on the clearing member's default and default management process.
- (12) Timely disclose to the market of the default and default management process. Disclose to relevant clearing members the use of risk reserve (if any).

SHCH carries out default management practice every year and tests the steps of default management, and the participating institutions improve their familiarity with default management process through practice and put forward opinions and suggestions, so as to realize the continuous optimization and perfection of default management process. The results of the practice shall be submitted to the management team and published to all participating institutions. SHCH also carried out a joint default management practice of RMB IRS and FX services, fully verifying the operation efficiency of the system and the effectiveness of the overall default management processes in the case of simultaneous defaults of multiple services.

In 2020, SHCH and CFETS signed the cooperation plan and memorandum on default management of FX CCP clearing services, which were approved by the State Foreign Exchange Administration of the People's Republic of China. In 2022, the joint test of default management of FX CCP clearing services project was completed. SHCH exercised and sort out the default management process together with CFETS to ensure the smooth implementation of the default management.

SHCH together with the Shanghai Financial Court, market institutions and law firms, successfully promoted the implementation of the first financial market test case in China. In December 2022, Shanghai Financial Court publicly heard the test case, which involving the default management of clearing services of SHCH. This first financial market test case is deepening the construction of the marketization and legalization of the inter-bank market.

Key Consideration 13.3: An FMI should publicly disclose key aspects of its default rules and process.

Summary narrative:

In September 2022, SHCH officially released "Shanghai Clearing House Guidelines on Default Management of Central Counterparty Clearing Services (2022 Year Version)" to integrate and update the default management rules, processes and implementation methods of various CCP clearing services. Actively respond to market demands, and simultaneously release the English version of "Shanghai Clearing House Guidelines on Default Management of Central Counterparty Clearing Services (2022 Year Version)" to facilitate overseas participants to participate in CCP services of SHCH and understand the key content of the default management rules and procedures.

SHCH has published default recognition and classification; the management process of operational default; the management process of perpetual default; the steps and implementation plan of mandatory liquidation

(including division of position, risk hedging, incentive pool of auction, auction of position); the relevant provisions on default management expert group; the default management measures of customers; the position transfer and fund settlement; the transfer of position; information communication, etc.

SHCH continuously updates and refines the detailed rules and regulations of default management through default practice, discussion with institutions, etc.

Key Consideration 13.4: An FMI should involve its participants and other stakeholders in the testing and review of the FMI's default process, including any close-out process. Such testing and review should be conducted at least annually or following material changes to the rules and process to ensure that they are practical and effective.

Summary narrative:

When formulating or amending default management guidelines, SHCH will invite clearing members and their customers to discuss and comment on such rules so as to improve them. Each year, different types of clearing members and their customers will be invited to participate in the default management practice and to examine and evaluate the procedures for default management. During default management practice, SHCH shall solicit extensively feedback from clearing members and their customers to perfect default management procedures, such as the details of hedging and liquidation. For example, before SHCH officially issued "Shanghai Clearing House Guidelines on Default Management of Central Counterparty Clearing Services (2020 Year Version)" in March 2020, it underwent a 6-year revision process, through 6 default management practices and 9 rounds of consultation of market institutions, widely absorbing their opinions and opinions of all market participants. For the key and difficult steps of default management, such as transaction counterparties, portfolio splitting scheme and hedging scheme, it reaches an agreement after a full discussion. In September 2022, before issued "Shanghai Clearing House Guidelines on Default Management of Central Counterparty Clearing Services (2022 Year Version)", SHCH solicited the opinions of 57 major market institutions and absorbed relevant feedback.

SHCH should submit the analysis report of the default management practice for all services to management team for review and inform the clearing members and their customers of the exercise result.

SHCH also sets up a default management expert group consisting of representatives from clearing members for the related products and arrange the default management practice regularly to ensure its operability. In 2020, SHCH completed the signing of the first batch of cooperation agreement on default management expert group and cooperation agreement on default management hedging, further strengthening the implementation basis of the system of default management expert group and risk hedging mechanism.

In August 2022, SHCH revised the "Articles of Default Management Committee (DMC)", improving the responsibilities of DMC, and clarifying the contents of conflict of interest, information management and insider trading. At the same time, the selection operation plan of DMC and the hedge transaction trustee institution have been formulated to improve the selection efficiency and try to eliminate the potential conflict of interest risk.

In December 2022, SHCH successfully promoted the implementation of the first financial market test case. Shanghai Financial Court publicly heard the test case involving the default resolution of the CCP clearing services of SHCH. SHCH and Shanghai Financial Court jointly promote the study and resolution of judicial difficulties in the field of default management of CCP clearing services, guide the market to form a stable expectation of risk management, and help improve the legal environment.

Principle 14: Segregation and transfer

Key Consideration 14.1: A CCP should, at a minimum, have segregation and transfer arrangements that effectively protect a participant’s customers’ positions and related collateral from the default or insolvency of that participant. If the CCP additionally offers protection of such client positions and collateral against the concurrent default of the participant and a fellow client, the CCP should take steps to ensure that such protection is effective.

Summary narrative:

SHCH uses tiered clearing system for each services, the direct services participants are general clearing members or direct clearing members, and the indirect participants are customers of general clearing members. SHCH has clear system and rules for agent clearing services, with clear segregation and transfer arrangement, which can effectively protect the client's position and relevant margin (collateral) from the effects of members' default or bankruptcy.

SHCH specifies that general clearing members shall segregate proprietary from agent clearing services. General clearing members have set up a special agent clearing services team to manage agent clearing services; general clearing members abide by the principle of segregating the fund account and margin account of proprietary services from that of agent clearing services, and is not allowed to misappropriate the agent clearing fund and margin.

Against general clearing members, SHCH requires the self-supporting and agent accounts to be segregated in fund and position, and “The Guideline for Central Clearing of Shanghai Clearing House” has made clear specifications for the management of differential accounts and segregated accounts for the fund account of fund customers and the self-supporting fund of general clearing members, etc. The position management of the self-supporting and agent services of general clearing members, initial margin calculation, margin account (including collateral and RMB in cash), and fund settlement accounts are completely segregated; the position management between general clearing members customers and initial margin calculation are completely segregated.

If the default or bankruptcy of general clearing members occurs, SHCH will complete the transfer of position and margin (including collateral and cash) for its customers within a certain time at the customers' written request.

Key Consideration 14.2: A CCP should employ an account structure that enables it readily to identify positions of a participant’s customers and to segregate related collateral. A CCP should maintain client positions and collateral in individual client accounts or in omnibus client accounts.

Summary narrative:

SHCH executes strict management of differential accounts, establishing position account for each client respectively, recording its transaction information in the duration and calculating the margin requirements respectively; SHCH opens for each general clearing members fund settlement account and margin account completely independent from its self-supporting account, and general clearing members have obligations and responsibilities to carry out daily check and account maintenance of the position information, margin account balance and fund settlement balance for the customers.

SHCH has clearly specified the management of differential accounts for the equity capital of general clearing members and the fund accounts of its customers in “The Guideline for Central Clearing of Shanghai Clearing House”, so as to ensure the request of segregated accounts and the account system design of agent clearing services follow the principle of isolation and transferability. The position management of the self-supporting and agent services of general clearing members, initial margin calculation, margin account (including collateral and RMB in cash), and fund settlement accounts are completely segregated; the position management between customers of general clearing members and initial margin calculation are completely segregated.

Key Consideration 14.3: A CCP should structure its transfer arrangements in a way that makes it highly likely that the positions and collateral of a defaulting participant’s customers will be transferred to one or more other participants.

Summary narrative:

If the default of general clearing members occurs, SHCH will allow its customers' position and collateral to be transferred to other non-defaulting general clearing members for agency.

SHCH has defined clearly in the “The Guideline for Central Clearing of Shanghai Clearing House” and “Shanghai Clearing House Guidelines on Default Management of Central Counterparty Clearing Services (2022 Year Version)”, that if a general clearing member is in permanent default in a certain CCP clearing service, SHCH will allow its eligible non-defaulting non-clearing members (if any) in that CCP clearing service to port their positions, including specifically the transfer of client clearing relationship, positions and margin in that CCP clearing service to a new general clearing member. The defaulting clearing member's proprietary positions and client clearing positions that have not been successfully ported shall be closed out by SHCH.

Besides, the Chinese laws also provide protection for the successful transfer of a default participant’s client’s position and collateral to another or several other participants. According to the Chinese laws, a client’s position and collateral is part of the client’s property which does not belong to the general clearing member. When a general clearing member goes bankrupt, the client has the right to dispose the position and collateral at its own discretion, without being affected by the clearing member’s bankruptcy.

Key Consideration 14.4: A CCP should disclose its rules, policies, and process relating to the segregation and transfer of a participant’s customers’ positions and related collateral. In particular, the CCP should disclose whether a client’s collateral is protected on an individual or omnibus basis. In addition, a CCP should disclose any constraints, such as legal or operational constraints, that may impair its ability to segregate or transfer a participant’s customers’ positions and related collateral.

Summary narrative:

SHCH has published “The Guideline for Central Clearing of Shanghai Clearing House” and “Shanghai Clearing House Guidelines on Default Management of Central Counterparty Clearing Services (2022 Year Version)” on the company website to specify the arrangements, rules and system of segregation and transfer.

In SHCH, the client’s position and collateral are recorded and operated under the clearing member’s account, and under segregation protections as agreed, and cannot be used in case of default by clearing members or other customers.

SHCH has considered the segregation protection for the position and collateral of customers in conducting clearing members business due diligence, marking-to-market, arrangement and use of all levels of risk reserve resources, customer protection, business continuity, etc.

In the operation of services, SHCH has recorded the collateral details of each client. If collateral can be used to offset margin, SHCH will release the updated list of eligible collateral on its company website, system client terminal and other channels on a regular basis.

In default management, SHCH specifies that, in event of default by general clearing members, if its non-defaulting customers have satisfied the payable fund requirements and successfully specified the new general clearing members, SHCH will modify the agency relationship of such client, and transfer all their transferable positions and margin balances under the name of the new general clearing members, thus a new agency relationship comes into effect, upon which the collateral will still be recorded under the name of the non-defaulting customers.

Principle 15: General business risk

Key Consideration 15.1: An FMI should have robust management and control system to identify, monitor, and manage general business risks, including losses from poor execution of business strategy, negative cash flows, or unexpected and excessively large operating expenses.

Summary narrative:

SHCH determines general business risks by taking into account business conditions that could impair financial conditions. Reasonably predictable general business risk drivers for SHCH include cost overruns, emergency events, etc. In order to identify specific general business risks it faces, SHCH identifies the drivers of general business risks, reviews the existing framework and quantifies the potential financial impact of reasonably foreseeable loss events.

SHCH gives full consideration to the potential impact on the cash flow in services risk assessment, and covers the potential losses of general business risk through risk reserve and capital fund under normal circumstances. The current regular stress testing of SHCH against various CCP clearing services indicates that, the existing risk control resources can cover the risk loss in extreme cases. The rapid accumulation of risk reserve has guaranteed that, under the rapid development of services, it can still cover the risk loss in extreme conditions. In addition, the capital fund of the company is sufficient, and the scale of net liquid assets is much larger than the current 6-month operating costs, which mainly is bank deposits and is stored in well-managed relevant banks with efficient supervision and distinguished reputation. In unfavorable market environment, it can meet the current and projected operating expenses.

SHCH has a series of risk management system meeting international standards to manage various risks in the CCP clearing services. These systems include: clearing members system, margin system, fair valuation and marking-to-market system, clearing fund and risk reserve system, default management and loss allocation system. Under the joint action of these systems, SHCH can timely and effectively identify, monitor and measure various risks, take effective targeted measures to dissolve risks in a timely manner.

At the same time, SHCH monitors and resolves market risks continuously in a timely manner through risk control on a daily, weekly, monthly basis and other regular reports, and all kinds of special market research reports. SHCH has a special risk management department to monitor the daily operation of various CCP clearing services, summarize risk control, understand the opinions of market institutions on a timely manner, validates the risk control systems and systems of each services, and submitted to the risk management committee for consideration. Under the circumstance of strained market and changing environmental, the risk management committee will carry out surveillance and analysis more frequently and submit it to the meeting of risk management committee for review.

For emergency events, SHCH has set up the emergency mechanisms for risk management, and formulated “SHCH Overall Emergency Plan”. The services operation department formulated concrete business contingency plans, and regularly carries out emergency drills, so as to make good disposal preparation for emergency circumstances from technology system and personnel as well as actively cope with the risks brought by emergencies or service failure.

Key Consideration 15.2: An FMI should hold liquid net assets funded by equity (such as common stock, disclosed reserves, or other retained earnings) so that it can continue operations and services as a going concern if it incurs general business losses. The amount of liquid net assets which is funded in form of equity and which an FMI should hold should be determined by its general business risk profile and the length of time required to achieve a recovery or orderly wind-up, as appropriate, of its critical operations and services.

Summary narrative:

SHCH has accumulated relatively rich equity liquidity assets which are growing at a rapid rate, and has the ability to support the CCP clearing services to operate continuously and steadily in case of general business losses. On December 31, 2021, the equity held by SHCH's stockholders was around 14.6 billion CNY, which can be used to continue operations and provide services in the face of general business losses. The equity assets of SHCH have strong liquidity and can maintain continuity between services operation and service in case of general business risks.

Key Consideration 15.3: An FMI should maintain a viable recovery or orderly wind-up plan and should hold sufficient liquid net assets funded by equity to implement this plan. At a minimum, an FMI should hold liquid net assets funded by equity equivalent to at least six months of current operating expenses. These assets are different from resources held to cover participant defaults or other risks as stipulated under the financial resources principles. However, equity held at the international risk-based capital standards can be included, where relevant and appropriate, to avoid duplicate capital requirements.

Summary narrative:

SHCH is committed to maintain the continuity of business under any conditions, and it has practical business emergency plans, and has sufficient net liquid assets of equity to support the business continuity and business recovery. At the end of 2021, the equity assets with high liquidity held by SHCH is above 40 times of the six-month operating costs of SHCH, which can support and guarantee the continuity of business.

Key Consideration 15.4: Assets held to cover general business risk should be of high quality and sufficient liquidity in order to allow the FMI to meet its current and projected operating expenses under a range of scenarios, including in adverse market conditions.

Summary narrative:

The equity liquidity assets of SHCH mainly consists of short-term bank deposits deposited in the banks that have robust accounting practices, safekeeping procedures and internal controls as well as strong systematic, credit and financial position, and these banks are under the effective supervision by Chinese regulators. Under unfavorable market environment, it can satisfy the operating expenses of the current and projected period. SHCH carries out regular assessment for net liquidity assets with the principle of simple composition, high liquidity, and strong cashability.

Key Consideration 15.5: An FMI should maintain a feasible and practicable plan for raising additional equity, should its equity fall close to or below the amount needed. This plan should be subject to the approval by the board of directors and updated regularly.

Summary narrative:

According to the national policy, SHCH keeps risk reserve, which will be mainly used for making up for the major default losses of clearing members in the CCP clearing services of SHCH and the major risk accident losses related to the financial market clearing services of SHCH. SHCH entrusts an independent third party to conduct a special audit on the withdrawal, management and use of risk reserve according to relevant state laws and regulations as well as financial and accounting rules.

Principle 16: Custody and investment risks

Key Consideration 16.1: An FMI should hold its own and its participants' assets at an custodian entity that have robust accounting practices, safekeeping process, and internal controls that enable the custodian entity to fully protect these assets.

Summary narrative:

SHCH has realized rigorous segregated accounting for self-owned assets and non-self-owned assets at the technical standard and operational procedure level. The self-owned assets of the CCP clearing services include capital fund of SHCH, risk reserve, etc.; the non-self-owned assets of the CCP clearing services mainly include the margin and clearing fund paid by the clearing participants. The accounting firm audits the risk reserve, balance of margin, clearing fund of SHCH every year and issues special audit reports, main content of which is to ensure that, the total number of all detailed statements of clearing fund and margin matches the amount of the other liquid liabilities items as shown in the balance sheet.

In regard to the custody of assets, margin, clearing fund and risk reserve shall be deposited according to the rules, which has sound accounting practice, safekeeping procedures and internal control. Among them, the cash margin is deposited in the banks that have robust accounting practices, safekeeping procedures and internal controls as well as strong systematic, credit and financial position. Also, the clearing fund and risk reserve are deposited in the banks that have robust accounting practices, safekeeping procedures and internal controls as well as strong systematic, credit and financial position in the way specified by SHCH.

These banks are under the strict management of national regulatory authority. They have good credit, sound accounting practice and internal control, which enable them to realize safe custody of assets.

Key Consideration 16.2: An FMI should have prompt access to its own assets and the assets provided by participants, when required.

Summary narrative:

SHCH carries out stringent prudential management of owned assets and non-owned assets in strict accordance with the relevant provisions, and has the right of rapid acquisition and disposal of the assets. SHCH has strictly distinguished owned assets from non-owned assets, to deposit them respectively in the banks that have robust accounting practices, safekeeping procedures and internal controls as well as strong systematic, credit and financial position by using the most reliable investment way of "callable fixed deposit", so as to fully protect those assets, and keep the best liquidity and disposition. SHCH can give direct instructions to custodian banks for the transfer, distribution and other disposal of assets. When the default of clearing members occurs, SHCH can obtain the margin paid by the clearing members in the CCP clearing services involving default from custodian banks, so as to make up for the losses caused to SHCH.

SHCH has not been involved in the custody of assets in other time zones and legal administrative regions, including bonds.

Key Consideration 16.3: An FMI should evaluate and understand its exposures to its custodian banks, taking into account its relationships with each custodian bank in full aspects.

Summary narrative:

SHCH adheres to prudent and strict selection of custodian banks and carries out continuous assessment and monitoring of the risk exposure of the custodian banks. All custodian banks selected by SHCH are the banks that have robust accounting practices, safekeeping procedures and internal controls as well as strong systematic, credit and financial position, so as to ensure the safety of the custodian banks while dispersing the risk exposure of the custodian banks.

Key Consideration 16.4: An FMI's investment strategy should be consistent with its overall risk-management strategy and fully disclosed to its participants; investments should be secured by, or should be claims against, high- quality obligors. These investments should allow for quick liquidation almost without any adverse effect on the price, if any.

Summary narrative:

The overall risk management strategy of SHCH is basically steady, and the investment strategy shall match the overall risk management strategy. SHCH is required to obtain a certain amount of revenue on the basis of capital preservation, and realize rapid realization without affecting the asset price. In addition, SHCH discloses investment, asset custody and other information to market participants in the form of targeted publication of third party audit reports. SHCH uses the most reliable investment way of "callable fixed deposit" to deposit the assets in the banks that have robust accounting practices, safekeeping procedures and internal controls as well as strong systematic, credit and financial position, so as to protect their security and stability. In case of need for rapid realization, only part of the interest over the fixed deposit will be lost, with no adverse impact on asset prices. At the same time, SHCH has selected many banks that have robust accounting practices, safekeeping procedures and internal controls as well as strong systematic, credit and financial position to act as custodian banks, so as to disperse the overall exposure and prevent excessive concentration of credit risk.

In addition, considering robustness and liquidity, all the assets of SHCH are deposited in the banks that have robust accounting practices, safekeeping procedures and internal controls as well as strong systematic, credit and financial position on a long-term basis. So far, no assets of participants are invested in bonds.

Principle 17: Operational risk

Key Consideration 17.1: An FMI should establish a robust operational risk-management framework with appropriate system, policies, process, and controls to identify, monitor, and manage operational risks.

Summary narrative:

As a qualified CCP recognized by PBC, SHCH has established the risk management framework of multi-level operation, so as to take appropriate effective measures to identify and monitor the operational risks in daily services operation, and carries out the real-time dynamic management for operational risks.

The services operational risks of SHCH can be divided into two main categories: one is the operational risks of technology system while the other is operational risks of business. The former mainly refers to the uncertainty caused to the CCP clearing services of SHCH due to the operating problem of technology system, including equipment failure, application exception, etc.; the latter mainly refers to the uncertainty on the level of services operations, including the risks caused by imperfect system process, personnel operating errors, etc.

Since its establishment, SHCH has always attached great importance to operation risk management, planning and promoting operation risk management and business development at the same time, and has established a complete set of risk management system in line with the international practice and standard and suitable for the business of SHCH.

1. On the settings of organizational system, the board of directors has examined and approved the frame for operation risk management. At the same time, the company has set up the departments responsible for compliance, auditing works, including operational risk management, so as to implement internal audit, risk assessment, and compliance inspection. In addition, as FMI, SHCH is subject to the external inspection from National Audit Office, PBC and so on.
2. On the system design, SHCH has established multilevel operation risk management systems on corporate level, department level and against specific services, and assesses the system effectiveness on a regular basis, so as to ensure the adaptability and effectiveness of system in the process of operation risk management.

3. SHCH carries out internal inspection of risk management to review the implementation of the operation risk management system, to investigate the potential risk points, so as to ensure the implementation of operation risk management ideas and relevant systems in specific working.

4. SHCH carries out operational risk education, from product development, online tutoring to the mature period of product operation, so as to strengthen the operation risk management ideas in each link of clearing services development, and improve the predictive and identification ability of business personnel and technical personnel for operation risk management, and make the concept of risk prevention deeply rooted in people's hearts.

5. SHCH strengthens the potential risks in the operation of management technology system. The core technology system of SHCH carries out the assessment of classification protection once a year, the latest one was passed the classification protection level-3 assessment carried out by professional assessment organization in December 2022. SHCH is rigorous and prudent about the treatment of system variation, and carries out operation after approval according to “SHCH Production System and Alternation Management Method”. The operating terminal of SHCH cannot be directly connected to production systems, and all system changes are operated through using bastion host, and bastion host can record and store all the operations on the system.

Key Consideration 17.2: An FMI's board of directors should clearly define the roles and responsibilities for addressing operational risk and should endorse the FMI's operational risk-management framework. System, operational policies, process, and controls should be reviewed, audited, and tested regularly and after significant changes.

Summary narrative:

The board of directors of SHCH has set up a risk management committee under it, which supervises and evaluates the company's risk management situation and risk control ability, and review and make decisions on important risk management matters of the company. The office under risk management committee is established in the risk management department, which is responsible for managing daily risk management.

As the managers of each various works, the company's business management integrates the operation risk management with business work closely together, so as to guide each services department to implement the company's ideas of operation risk management in services development, launch and operation, as well as implement various requirements of operation risk management system.

The company has set up the internal auditing department to be responsible for audit, including operation risk management, so as to put forward professional opinions and suggestions for the operation risk management construction and implementation from the perspective of prudent compliance.

The relevant regulatory departments inspect the company's special operation risk management and forms the relevant audit results. SHCH is subject to the external inspection of the system, process and its implementation of operation risk management by National Audit Office, PBC and other external institutions; the core information system accepts the classification protection assessment by a third assessment party.

SHCH has a clear understanding of the potential operational risk brought by significant changes, first, SHCH carries out internal inspection and assessment on a regular basis, so as to ensure the adaptability of operation risk management system and the effectiveness of the system implementation; second, SHCH attaches great importance to the operation risk management in significant changes, and carries out comprehensive and prudent review, audit and testing for the system, operation system, process and control measures in the launch of new services and the upgrade of technology system. SHCH formulated the relevant standards for the primary design of information system and quality control of development testing.

In the process of software development, SHCH follows a series of rules and regulations, ensures the risks of design and access before the launch of software is controllable.

In addition, on the basis of doing a good job in various work of operation risk management, SHCH has set up the emergency working leading group, and formulated “SHCH Overall Emergency Plan” on the corporate level. The services operation department formulated concrete business contingency plans, and regularly carries out emergency drills, so as to make good disposal preparation for emergency circumstances from technology system and personnel as well as actively cope with the risks brought by emergencies or service failure.

Key Consideration 17.3: An FMI should have clearly defined operational reliability objectives and should have policies in place that are designed to achieve those objectives.

Summary narrative:

The general requirements of SHCH for system operation are safe, stable and efficient, and the availability ratio shall be stable at the levels above 99.9% since the launch of core system. To guarantee the reliability of system operation, SHCH guarantees the realization of usability object from many aspects including the software and hardware architecture design in technology, personnel guarantee, monitoring and management. The underlying system architecture of SHCH uses various high availability design, such as dual network redundancy, load balance, Real Application Cluster (RAC) database, storage synchronization, and mainframe cluster. The personnel allocation uses A/B double-post system, centralized monitoring system, and 7*24 hours monitoring of the system’s running status by the operational personnel. For all kinds of system, guaranteeing the usability object of information system, see 17.1.

In the aspect of services operation, the production operation of SHCH adopts the principle of "double entry check" with the aim of zero error in operation, and reduces operational risks through perfecting the system, and strengthening the personnel education, and strengthening services training and so on. 1. To establish operation manual for each services according to the operating habits of services personnel, and fill out the work flow table for each operation service, and clearly define the services process and determine the operating authorization, so as to implement the work of operational risk prevention to each services and even to each services link. 2. To support services launch and system upgrade and change with personnel training, and increase the degree of proficiency of personnel operation through sufficient services practice, so as to avoid errors in operation. 3. To groom and refine services operation process on a regular basis, as so to make the services logic simpler and more reasonable; 4. To establish post log and standing book for various services to facilitate operating personnel with reference in their operation, so as to make the operational risk responsibility to the people.

Key Consideration 17.4: An FMI should ensure that it has scalable capacity adequate to handle increasing stress volumes and to achieve its service-level objectives.

Summary narrative:

SHCH has been fully aware of the future services development prospect, carrying out the evaluation of services growth and making space for the services growth from hardware configuration system design, etc., so as to provide high quality clearing services based on the significant growth of services volume.

1. Reasonable assessment of services growth. On the one hand, SHCH carries out medium and long term forecast for services growth, fully considering the extension of transverse and longitudinal processing capacity in the initial design of technology infrastructure, technology platform and application system, so as to lay the foundation for long-term services development. On the other hand, SHCH carries out periodical assessment of services growth every year, and comprehensively assesses the services growth of the next year, on the basis of analyzing the quantitative structure of existing market members and historical growth rate, in accordance with many factors including economic trend forecast, regulatory policy analysis, and

market research, so as to include the related work into the annual plans and deal with services growth steadily.

2. In the process of actual operation, the monitoring system monitors the use of all kinds of resources at any time, and arranges the extension of processing capacity when finding the problems of insufficient resource.

Key Consideration 17.5: An FMI should have comprehensive physical and information security policies that address all potential vulnerabilities and threats.

Summary narrative:

In terms of physical security construction, in order to guarantee the stability of the day-to-day business, SHCH has independent data center site. SHCH has taken measures of physical isolation for the data center.

SHCH has used the network architecture with high performance and high reliability for network access security, and used special measures for membership access line including the isolation between communication line and the Internet, data transmission encryption, etc.

SHCH has deployed heterogeneous firewalls, intrusion detection, anti-DDOS, load balance, desktop access and other related safety equipment for the construction of system security protection. Integrating centralized monitoring system and 7 * 24 hours operation and maintenance shift system, SHCH comprehensively protects the information system security.

In addition, from the aspects of organization and management, SHCH has set up Cybersecurity and Information Technology Committee and, referring to the domestic and international relevant safety standards, formulated a series of SHCH security systems, including Computer Room Management Approach, Measures for Computer Terminals and Cyber, Measures for Data Security Management, etc., and passed the ISO27001:2013 certification

The core technology system of SHCH is constructed according to the relevant requirements of national standard "Information Security Technology - Network Security Level Protection Basic Requirements" (GB/T 22239), and has successfully passed the classification protection level-3 assessment of professional assessment organization. In addition, SHCH also uses Inter-bank Market Information eXchange Protocol (IMIX) for communication. Currently, the digital certificates used by the technology system are issued by China Financial Certification Authority (CFCA), and the using size of certificates is about 9600 copies.

Key Consideration 17.6: An FMI should have a business continuity plan that addresses events posing a significant risk of disrupting operations, including events that could cause a wide-scale or major disruption. The plan should incorporate the use of a secondary site and should be designed to ensure that critical information technology (IT) system can resume operations within two hours following disruptive events. The plan should be designed to enable the FMI to complete settlement by the end of the day of the disruption, even in case of extreme circumstances. The FMI should regularly test these arrangements.

Summary narrative:

SHCH's disaster recovery system is constantly improved. In 2017, offsite backup and disaster recovery center was completed and put into service, as a supplementary part of existing main data center and intra-city backup and disaster recovery data center. These have formed a complete disaster recovery network consisting of "two sites and three centers".

SHCH has formulated a set of information system emergency treatment plan, supported by measures for system backup and recovery and all kinds of emergency exercise, so as to improve the emergency treatment

and rapid disposal ability. The SHCH Overall Emergency Plan has defined the relevant responsibilities and communication mechanism of emergency working leading group and relative departments in charge.

Key Consideration 17.7: An FMI should identify, monitor, and manage the risks that key participants, other FMIs, and service and utility providers might pose to its operations. In addition, an FMI should identify, monitor, and manage the risks its operations might pose to other FMIs.

Summary narrative:

SHCH determines that the potential risk resources for FMI operation mainly include three aspects: 1. there is security risk in the system of market participants, such as system instability or virus; 2. the supply failure of key resources needed for electric power or communication; 3. other events of force majeure. Therefore, SHCH has deployed relevant network and information security equipment, centralized monitoring system and 7*24 hours operation and maintenance shift system. SHCH has signed contractual agreement with relevant service providing organizations to restrain the rights and obligations of both parties.

At the same time, SHCH does not outsource key business services, thus no relevant outsourcing risk. Against all kinds of cooperative partners, SHCH has relevant access and selection procedures and relevant contractual provisions to restrain the rights and obligations of both parties. Against all important key participants, FMI service providers, and other utilities including infrastructure suppliers and member units, SHCH has special departments to be responsible for the cooperation with above units.

According to the work requirements of PBC, SHCH carries out business risk control audit, internal management audit, information technology audit, and middle-level personnel economic responsibility audit, including internal control test, risk assessment, compliance inspection and other aspects, in order to identify, detect and manage daily operation risks.

As for the default risks that SHCH's clearing members may bring to other clearing members and then affect other FMIs, especially in regard of CCP services, SHCH has put in place a series of systematical arrangements to minimize the default risks which might be brought by the clearing members, to minimize the impact which might be brought by the defaulting clearing members to the non-defaulting clearing members, and to minimize the default probability, so as to mitigate the possibility of bringing risks to other CCPs to the greatest extent.

Firstly, SHCH keeps updating the information disclosure especially the risk related information disclosure practice, in accordance with the international standards and the best industry practice of CCP clearing services, improving the transparency of SHCH's CCP clearing services operation and maintaining and enhancing the market confidence.

Secondly, SHCH strictly complies with the PFMI and the latest international standards and follows the best industry practice and establishes and implements strict risk management system, which include: clearing members system, margin system, fair valuation and MTM (mark-to-market) system, clearing fund and risk reserve system, default management and loss sharing mechanism, etc. Based on this, SHCH will attach great importance to the procedures for continuous optimization operation, examine emergency responding and efficient handling abilities under extreme circumstances by way of emergency exercise, and constantly improve the efficiency and effects of the design and implementation of risk control system. All those measures are applied to ensure the controllability of risks and enhance the resilience of SHCH's CCP clearing services.

Finally, the management of differential accounts is strictly executed at SHCH, so the risks will not be conductive to each other. SHCH's disposal of the defaulting clearing members will not affect the security of the assets of those non-defaulting clearing members, except for the part of their clearing funds; nor will the risks be conducted to other CCP agencies that those non-defaulting clearing members participated in.

In the respect of macro-prudential supervision and cross-border cooperation, SHCH performs the obligation of information report, especially the risk information report in a timely and comprehensive manner, which provides a solid foundation for the regulator to pay attention to and deal with the inter-CCP-agency risk conduction problem from the perspective of macro-prudential supervision as well as to carry out cross-border regulatory cooperation. In addition, SHCH has established a clear contact channel and close cooperative relationship with the CCPs at home and abroad and supports the Global Association of Central Counterparties (CCP12) to establish the industrial standards and to study the key and hot topics like risk inter-CCP-agency conduction and recovery plan under extreme circumstances in the pursuit of establishment of a double ‘safety net’ of supervision and industry.

Principle 18: Access and participation requirements

Key Consideration 18.1: An FMI should allow for fair and open access to its services, by direct and, where relevant, indirect participants and other FMIs, based on reasonable risk-related participation requirements.

Summary narrative:

In order to enable all kinds of participants to receive service in a fair and open way, SHCH has drafted the hierarchy and participation of membership, and publicized it to market institutions on the SHCH’s website. Through strict implementation of hierarchical management in accordance with reasonable participation conditions related with risks, SHCH can ensure its clearing members to have sufficient financial resources and operational capacity to fulfill related obligations and minimize risks.

According to the scope of services to participate in, SHCH has mainly divided clearing members (direct participants) into general clearing members and direct clearing members, so as to implement tiered management. Among them, general clearing members can apply for all or part of the CCP clearing services for their own transactions or customers’ transactions, and direct clearing members can apply for all or part of the CCP clearing services for their own transactions. Because different types of clearing members need to undertake different degrees of potential risk, SHCH has set participation conditions for each type of clearing members, including related financial indicators, business management system, risk management system, and technology system rules.

SHCH will always listen to the opinions of main market participants before formulating, modifying and updating clearing members system.

Key Consideration 18.2: An FMI’s participation requirements should be justified in terms of safety and efficiency of the FMI and the markets it serves, tailored to and commensurate with the FMI’s specific risks, and be publicly disclosed. Subject to maintaining acceptable risk control standards, an FMI should endeavor to set requirements that have the least-restrictive impact on access that circumstances permit.

Summary narrative:

SHCH has set the relevant access conditions and material requirements of qualification application based on the industry and risk characteristics of SHCH. A series of qualitative and quantitative criteria in terms of the safety and efficiency of the market of SHCH is reasonable, and detailed material requirements of participation and qualification application materials requirements can be found in SHCH’s official website.

SHCH conducts tiered management for clearing members, controls risk and sets differential participation standards for different types of members. SHCH has set higher financial index requirements for general clearing members engaged in agent clearing services, requiring members to have relevant business management system, risk management system and technology system to support agent clearing services. In addition, SHCH also requires general clearing members to segregate the services, accounts, personnel of

proprietary clearing services from agent clearing services, and regularly assesses the customers and inspects agent clearing services.

SHCH makes efforts on the premise of risk control to set the requirements with least effect on the institutions participate business as far as the conditions allow. SHCH specifies that, if the relevant requirements for clearing membership of SHCH has not reached but comply with relevant policies or market development needs, etc., or issued eligible guarantees, it shall be regarded as conforming to the corresponding requirements after the examination and approval. But it also specifies that applicants shall bear all legal responsibilities for the authenticity, integrity and accuracy of submitted materials. In addition, regarding some legal or regulatory requirements imposed on indirect participants such as that applicants need to obtain the management qualification for relevant services and comply with the relevant provisions of the regulators, SHCH does not set other special conditions.

SHCH not only publicizes relevant services rules (including but not limited to services rules, services guide, measures, notice, announcement guide and operation process, etc.) on its website, but also assists and urges clearing members to strengthen their risk control construction and be familiar with the clearing services through providing training courses to members and other services. Besides, SHCH introduces its access system and requirements of membership to market institutions in detail through unscheduled SHCH salons, services promotion meetings and visiting market institutions.

Key Consideration 18.3: An FMI should monitor compliance with its participation requirements on an ongoing basis and have clearly defined and publicly disclosed process for facilitating the suspension and orderly exit of a participant that breaches, or no longer meets, the participation requirements.

Summary narrative:

“The Guideline for Central Clearing of Shanghai Clearing House”, “Measures for the Administration of Clearing Members of Central Clearing services of Shanghai Clearing House”, formulated by SHCH and publicized on the official website, have detailed provisions on the management rules of clearing member, including the obligations that clearing members shall fulfil and the requirement of default process. It specifies the clearing members should cooperate with SHCH every year in the annual assessment and business assessment, and standardizes the termination and withdraw services process of clearing members who violate or no longer meet the requirements of participants.

Clearing members shall not only pay the margin, clearing fund, annual fee of membership, clearing fee of CCP clearing services in full and on time, but also cooperate with SHCH to carry out annual assessment and business assessment. The annual assessment shall be conducted once a year, the clearing members shall submit the relevant assessment materials to SHCH before the end of May each year, including the audited financial report of the previous year, the statement of information changes of the clearing member, the self-assessment report of the clearing member's central clearing services, the anti-money laundering and anti-terrorist financing questionnaire and other materials required by SHCH. The clearing members shall ensure the authenticity, completeness and accuracy of the documents submitted by them, such as financial information. Based on the annual assessment materials provided by the clearing members, SHCH shall evaluate the qualified CCP policy implementation, risk management, rule compliance and system security of the clearing members, and submit them to the general manager's office for review, the assessment results shall be classified into qualified, basically qualified and unqualified. For clearing members whose annual assessment result is unqualified or whose assessment result is basically qualified for three consecutive years, SHCH has the right to suspend their clearing membership. At the same time, for participants whose credit status deteriorates, SHCH adjusts the credit factor and tolerance according to situation, and requires them to submit additional semi-annual reports, financial status improvement plans and situation statements; for the clearing members with poor credit status, SHCH has the right to suspend or restrict the its CCP clearing

services. The business assessment shall be conducted once a year, to evaluate clearing members active participation in relative CCP clearing services, cooperation with SHCH in terms of business innovation and market survey, etc. The assessment results shall be classified into qualified, basically qualified and unqualified. For clearing members whose business assessment result is unqualified or whose assessment result is basically qualified for three consecutive years, SHCH has the right to suspend their specific business qualification.

In addition to routine annual assessments, SHCH also operates a strict and prudent mark-to-market system in its daily clearing operations through arrangements to monitor the risk exposure of clearing members in real time. After the approval of the general manager's office meeting, SHCH restricts, suspends or terminates the membership of clearing members who violate the relevant provisions of “The Guideline for Central Clearing of Shanghai Clearing House”, “Measures for the Administration of Clearing Members of Central clearing service of Shanghai Clearing House” or violate the rules and breach of contract in the CCP clearing services. If the circumstances are serious, SHCH has the right to directly suspend the membership of clearing members. If SHCH decides to terminate the membership of the clearing member, SHCH shall complete the relevant procedures for suspending the membership of the clearing members and confirm that there is no creditor or debtor relationship with SHCH based on the CCP clearing services, then formally suspend the membership of the clearing members.

Principle 19: Tiered participation arrangements

Key Consideration 19.1: An FMI should ensure that its rules, process, and agreements allow it to gather basic information about indirect participation in order to identify, monitor, and manage any material risks to the FMI arising from such tiered participation arrangements.

Summary narrative:

The CCP clearing services of SHCH has used tiered clearing system consisting of direct and indirect participants. Direct participants are clearing members, indirect participants are the customers of general clearing members. SHCH formulated services rules and clearing agreement to specify the obligation of information reporting of clearing participants, and can collect the basic information of indirect participants, which is helpful to identify, monitor and manage any substantial risks caused to SHCH by the tiered clearing system. When carrying out specific services, the trading platforms and brokerage firms send real-time or periodical trading statistics and exchange information to SHCH. At the same time, SHCH also prevents the risks brought by indirect participants through the arrangement of tiered clearing and settlement.

SHCH specifies that, before carrying out specific services, general clearing members shall report the relevant services materials between them and the customers they act for to SHCH for record. General clearing members have the obligation to report the information of their customers to SHCH, including termination and change of agency relationship, adjustment of risk parameters, significant changes, change of management condition, litigation and punishment, etc.

Furthermore, SHCH specifies that, in addition to providing and preserving the relevant data and information of agent clearing services in accordance with the provisions, general clearing members shall regularly assess its customers and inspect its agent clearing services. In case of default or violation by customers, general clearing members shall report to SHCH in a timely manner, if necessary, general clearing members shall assist SHCH to inspect the indirect participation of the CCP clearing services by customers.

To ensure that risks are controllable, SHCH only makes fund clearing and settlement with general clearing members, the fund clearing and settlement of customers shall be made through general clearing members, and general clearing members shall bear the fund settlement responsibility for their customers. In addition, SHCH has the right to send special margin calls to the customers with significant changes in the intraday mark-to-market value, and has the right to adjust the risk exposure limits of customers according to the

actual situation, so as to ensure general clearing members to pay corresponding clearing fund according to actual risk exposure of their customers, as well as to ensure that risks are controllable and loss allocation is fair and just in case of default.

Key Consideration 19.2: An FMI should identify material dependencies between direct and indirect participants that might affect the FMI.

Summary narrative:

SHCH continuously inspects the important dependencies between direct participants and indirect participants. This relationship is reflected in the fact that, the fund clearing and settlement of customers are made through general clearing members. In order to reduce the impact of these dependencies to SHCH, SHCH asks general clearing members to fully collect payable money from their customers in a timely manner, and the performance of obligation by customers does not constitute the premise for the settlement between general clearing members and SHCH and their performance of corresponding obligation. General clearing members shall not refuse to fulfill its corresponding obligations for reason of the default of its customers. If general clearing members refuse to fulfill their obligations of performance security in a timely manner, they shall bear the responsibility of default to SHCH.

In addition, because general clearing members are responsible for the clearing and settlement of their customers, the default of customers will directly affect these general clearing members and thus affecting SHCH. Considering this factor, SHCH implements daily mark-to-market system and daily stress testing and back testing system in clearing services, so as to ensure SHCH can identify the position and risk information of each clearing members and client in a timely and accurate manner. Against the customers with significant changes in the intraday mark-to-market value, SHCH will send daytime margin calls to general clearing members, so as to ensure that risks are controllable when default occurs.

Key Consideration 19.3: An FMI should identify indirect participants responsible for a significant proportion of transactions processed by the FMI and indirect participants whose transaction volumes or values are beyond the capacity of the direct participants through which they access the FMI in order to manage the risks arising from these transactions.

Summary narrative:

SHCH uses internal system to identify and monitor indirect participants - the customers' account. The clearing system of SHCH records and monitors the position and margin information of each client in real time, so as to quickly identify the customers with significant proportion of transactions.

Against the customers in trading, SHCH sends the transaction data which has passed closing element inspection to the relevant general clearing members, so that they can undertake and confirm within the prescribed time. SHCH carries out the risk compliance inspection for the transaction data undertaken and confirmed by general clearing members. The inspection indicators include but are not limited to net positions or risk exposure, margin gap, price deviation, position concentration, etc. Against the transactions not passing the risk compliance inspection, SHCH can terminate the subsequent processing of the transactions.

Key Consideration 19.4: An FMI should regularly review risks arising from tiered participation arrangements and should take mitigating action when appropriate.

Summary narrative:

SHCH carries out review for the standard terms of clearing agreements of customers and the relevant systems of general clearing members. In addition, as stipulated, SHCH monitors the risk exposure of indirect participants every day, and has the right to use additional margin as the measures for risk mitigation. For the specific policies of risk exposure management, see Principle 19.1, 19.2, 19.3 and the risk

management framework of SHCH (Principle 3), and such risk management framework is subject to the examination and approval of special risk committee and the comprehensive validity evaluation at least once a year.

Principle 20: FMI connection

Key Consideration 20.1: Before entering into a connection arrangement and once the connection is established, an FMI should identify, monitor, and manage on an ongoing basis all potential sources of risk arising from the connection arrangement. Connection arrangements should be designed such that each FMI is able to observe the other principles in this report.

Summary narrative:

Before establishing the connection arrangement, SHCH fully identified and manage the potential risks caused by the connection. When establishing the connection, SHCH first understood the services scope, services process, applicable laws and regulations, and financial status of the other party. Second, SHCH evaluated the risks involved in cooperating with the other party and establishes preliminary business and technical contingency plans. After that, SHCH discussed with the other party on the agreement required for cooperation, clarified the rights and obligations of both parties. After clarifying above matters, SHCH submitted the cooperation plan to the PBC and connected with it upon the approval of the PBC.

As the CCP, SHCH has internal connection arrangement with its own central securities depository/security settlement system (CSD/SSS) and external connection with CFETS and HPVS. Specifically, SHCH needs to be connected with its own CSD/SSS when providing CCP clearing services to the bond market, so as to facilitate acceptance and delivery of bonds. As CSD/SSS, SHCH provides bond registration and custody services to the interbank market, and comply with relevant regulatory regulations. SHCH's connection with its own CSD/SSS as CCP has fully considered potential risks. In addition, SHCH has established a connection with the CFETS, and the transaction is transferred to SHCH after the conclusion of the exchange center. SHCH conducts real-time monitoring of data transmission with the CFETS, conducts regular screening of potential risks, and makes a complete contingency plan. SHCH connects the settlement link with HPVS through the special network line, interacts with the data in real time, continuously monitors various risks related to the connection, and makes solutions.

Key Consideration 20.2: The connection should have a well-founded legal basis, in all relevant jurisdictions, that supports its design and provides adequate protection to the FMIs involved in the connection.

Summary narrative:

As described in Principle 1, Chinese legal basis has provided a high degree of certainty for all kinds of services activities of SHCH. SHCH's connection with its own CSD/SSS, CFETS and HPVS, apply to the relevant legal arrangements within the territory of China as well as the relevant regulations of PBC.

The connection between SHCH and other FMI is approved by the regulatory authority, and the connection is designed in accordance with regulatory and legal requirements. Both parties agree to abide by regulation and law through legal agreement, which is the premise and basis of cooperation. At the same time, both sides pay close attention to the regulatory policy and legal environment, and take measures to deal with legal risks.

Key Consideration 20.7: Before entering into a connection with another CCP, a CCP should identify and manage the potential spill-over effects from the default of the linked CCP. If a connection has three or more CCPs, each CCP should identify, assess, and manage the risks of the collective connection arrangement.

Summary narrative:

SHCH has not connected with, nor does it have any linkage with, any other CCP either within or outside China. Therefore, this consideration is not applicable to SHCH for the time being.

Key Consideration 20.8: Each CCP in a CCP connection arrangement should be able to cover, at least on a daily basis, its current and potential future exposures to the linked CCP and its participants, if any, fully with a high degree of confidence without reducing the CCP's ability to fulfill its obligations to its own participants at any time.

Summary narrative:

SHCH has not connected with, nor does it have any linkage with, any other CCP either within or outside China. Therefore, this consideration is not applicable to SHCH for the time being.

Principle 21: Efficiency and effectiveness

Key Consideration 21.1: An FMI should be designed to meet the needs of its participants and the markets it serves, in particular, with regard to choice of a clearing and settlement arrangement; operating structure; scope of products cleared, settled, or recorded; and use of technology and process.

Summary narrative:

SHCH has attached great importance to satisfying the requests of participants and market requirements. The purpose of the establishment of SHCH is: to establish a standardized, market-oriented international clearing service provider, providing the CCP clearing service for the financial market, maintaining the safe, efficient and stable operation of clearing system through effective risk management, satisfying diversified clearing demand, and serving the development of the financial market.

As a CCP, SHCH is an important FMI. All the clearing service plans of SHCH shall be discussed with market institutions through convening clearing members symposium and giving out services survey questionnaire, and shall be implemented after being approved by the regulators or reporting to the regulators. In addition, SHCH also extensively listens to the feedback of market participants about service level and efficiency, designing and improving the rules, guidelines and agreements of all services and products in accordance with international practice, and selecting settlement banks by using different measures, such as bidding and rating, so as to satisfy the needs of participants and the service market.

In terms of technical construction, SHCH carries out full system testing before the launch of each services and invites market institutions to participate in the process. At the same time, in order to improve the service level, to further reduce the distance with market institutions, thus reducing the operational risk, SHCH actively organizes services introduction and system operation training targeted at market institutions. In daily services, SHCH makes efforts to reduce clearing fee and improve the efficiency of market services, thus not only promoting services integration, but also increasing services processing functions and data query functions including real-time order acceptance, collateral management, direct-connection interface, and customer information query system and contract compression automation function.

In terms of risk management, SHCH adheres to the goal of safety first. SHCH has established a set of effective risk management system according to international standards, and taken the initiative to invite market institutions to be a member of risk management committee of SHCH, so as to ensure the clearing system of SHCH always conform to the requirements of market participants. Similarly, market institutions also participate in the business management committee of SHCH, and make professional advices for the services development planning and other major issues in the services development of SHCH through meetings, etc. SHCH has also taken the initiative to introduce value-added risk management services to the

market. At present, it has provided market institutions with margin calculation and other services through the independently developed risk calculator.

Key Consideration 21.2: An FMI should have clearly defined goals and objectives that are measurable and achievable, such as in the areas of minimum service levels, risk-management expectations, and business priorities.

Summary narrative:

SHCH clearly defines measurable and achievable specific goals.

In terms of the minimum service level, SHCH has specified in “The Guideline for Central Clearing of Shanghai Clearing House” the operation schedule of handling various product transactions as a CCP, and has publicly disclosed it on the company website. SHCH also set a target availability percentage of 99.9% or more of its core system and made public its quantified information disclosure report on the company's website.

In terms of risk management expectations, as a QCCP recognized by PBC, SHCH sets standards for risk control strictly in accordance with PFMI, and breaks down PFMI to each functional department, reasonably and scientifically putting forward measurable and achievable goals from qualitative and quantitative angles. SHCH ensures safe and efficient clearing services are provided to financial market participants through the PFMI self-assessment every year.

In terms of business priorities, on the basis of protecting market security and business continuity, SHCH gives the first priority to the development of products urgently needed by participants and markets, and gives the second priority to the development of products (services) with perceptiveness.

Key Consideration 21.3: An FMI should have established mechanisms for the regular review of its efficiency and effectiveness.

Summary narrative:

SHCH discusses the company's business development strategy plan, services model of each services line, product structure adjustment and other important special issues, and provides suggestions for the company's business development decisions, in order to improve the level of service market.

SHCH has also set the shareholders meeting and the board of directors to assess the company's operation through regular meetings and formulating the company's business plans and investment plans. At the same time, PBC, the supervision entity of SHCH will also assess the performance of duties of SHCH and its managers on a regular basis.

Internal and external audit work is an important part of the efficiency and effectiveness evaluation mechanism. The internal audit work is designed to strengthen internal management, and promote compliance operations, and prevent services risks, and improve the operating efficiency by a full audit on the performance of the company's business and the duties of personnel. While establishing internal audit mechanism, SHCH is also being reviewed its efficiency and effectiveness by external auditors or institutions such as the National Audit Office, PBC and accounting firms, etc.

In addition, SHCH gives full consideration to the needs of participants and markets before the introduction of services and after the launch of services systems, and unscheduled invites market institutions for discussion, and upgrades systems and add new features according to the feedback.

Principle 22: Communication process and standards

Key Consideration 22.1: An FMI should use, or at a minimum compatible with, internationally accepted communication process and standards.

Summary narrative:

At present, the CCP clearing services of bonds and FX of SHCH is carried out in core technical system, and commodity derivatives, IRS clearing service, Standard Bond Forward services and CDS services are carried out in a separate independent operating system. Both the core technical system and independent operating system use or are compatible with international communication procedures and standards.

The core technical system of SHCH mainly uses the universal message agreement that covers all quote, conclusion and market information of domestic currency transactions, as well as the conclusion, market and clearing information of FX transactions. The agreement is formulated based on the FIX agreement which is an industrial standard widely used by international financial world, and now has become the interbank market data exchange standard certified by authority organizations, constantly tracking and becoming compatible with the international standard ISO20022.

In addition, during the transmission of settlement information, the core technical system also uses international communications program and standards. In terms of domestic currency services, SHCH mainly connects HVPS agreement with the second generation of payment system of PBC, used in the financial information transmission between interbank domestic currency markets and FX markets. The HVPS agreement mainly covers the information of fund settlement. In terms of cross-border FX services, SHCH mainly connects the SWIFT system with the relevant settlement banks of SWIFT, used for the financial information transmission between interbank FX markets. The SWIFT reports mainly covers the information of fund settlement.

Principle 23: Disclosure of rules, key process, and market data

Key Consideration 23.1: An FMI should adopt clear and comprehensive rules and procedures that are fully disclosed to participants. Relevant rules and key procedures should also be publicly disclosed.

Summary narrative:

The official website of SHCH (<https://www.shclearing.com.cn>) is the designated platform to disclose relevant rules and procedures of CCP clearing services, and has currently disclosed rules and procedures for services products, technology system, risk management, and membership, etc.

SHCH adopts a set of clear and comprehensive rules and procedures and has disclosed in full the same to the participants. SHCH fully discloses information to its participants through the following two ways: I. to make public the relevant rules and procedures on its official website, including services rules, services guidance and operation manual, etc. The public can also have access to such information through SHCH's website; II. to disclose information to the clearing members directionally. The directional disclosure information mainly includes the agreements between SHCH and its clearing members (i.e. clearing agreement and its supplemental agreements), the calculation models of risk control that the participants need to know and the data and information accessible by the participants only, so as to ensure the clearing members to have a good understanding of the rules they should comply with and to take actions to comply with such rules.

SHCH has set a column called "announcements" on the official website, presented at the most visible position on the front page, to inform market participants and the public of SHCH's latest developments in system design, operations, as well as rights and obligations of participants, to enable them to assess the risks of participating in the services of SHCH comprehensively, timely, accurately, objectively and

dynamically. At the same time, SHCH will update other columns on the official website in a consistent and timely manner.

Key Consideration 23.2: An FMI should disclose clear descriptions of the system's design and operations, as well as the FMI's and participants' rights and obligations, so that participants can assess the risks they would incur by participating in the FMI.

Summary narrative:

SHCH has provided detailed documentation to participants for service fulfillment and system access, and publicizes them through the official website, so as to facilitate participants and potential participants to understand the design and operation of services technology system. (See details: <https://www.shclearing.com.cn/hyfw/jszc/jszl/>)

For important decisions which may directly affect the system operation, SHCH will make decisions in accordance with the procedures and will make disclosure in the form of "Announcements" on the official website or client terminal.

In addition, SHCH discloses the detailed risk management framework on the official website, including the risk control system, the calculation method of margin, default management process, etc., so as to help clearing members and their customers to fully understand the benefits and potential risks of participating in the CCP clearing services of SHCH.

The rights and obligations of participants are clearly revealed through the agreement as well as the services rules and the management methods of clearing members that published on the official website.

Key Consideration 23.3: An FMI should provide all necessary and appropriate documentation and training to facilitate participants' understanding of the FMI's rules and process and the risks they face in participating in the FMI.

Summary narrative:

In accepting clearing members' application, SHCH requires them to have business management rules, risk management rules, technical systems and relevant qualified on-duty staff for central clearing, so as to ensure clearing members are able to fulfill their clearing duty. While introducing specific rules and operational procedures to the participants, the services training also reveals the potential risks for participants. In 2022, SHCH carried out various forms of training covering different SHCH businesses and operating systems, such as SHCH E-learning platform covers bond issuance, registration, custody and settlement business training. The training notifications and registration are open to market participants via the 'Business Training' column on SHCH official website or SHCH E-learning platform. In addition, SHCH pays attention to the communication with the participants, providing Member Communication (free of charge) to market members and regulators monthly, including the introduction to the latest services information, so as to help participants to understand and be familiar with new services. SHCH also convenes unscheduled special meetings according to the need, communicating information with market members, and directly listening to the opinions and query of market members, and making targeted explanation.

In order to make participants understand the risks of participating in the CCP clearing services, SHCH reports to market members the results of stress testing and risk assessment on a one-on-one basis.

Key Consideration 23.4: An FMI should publicly disclose its fees at the level of individual service it offers as well as its policies on any available discounts. The FMI should provide clear descriptions on charged services for comparability purposes.

Summary narrative:

SHCH has established clear and detailed standards for various expenses including services clearing fee and

certificate fee, and disclosed the information on the official website, annual membership fee of clearing members are specified in Clearing Membership Agreement signed by SHCH and its clearing members and relevant notices, defining the qualification types and criteria of annual membership fee.

All the current discount policy can also be learned through the official website of SHCH. These preferential policies apply to all market participants fairly.

Key Consideration 23.5: An FMI should complete regularly and disclose publicly responses to the CPSS-IOSCO disclosure framework for financial market infrastructures. An FMI also should, at a minimum, disclose basic data on transaction volumes and values.

Summary narrative:

SHCH completes "Financial Market Infrastructure Principles Information Disclosure of Shanghai Clearing House Central Counterparty Clearing Services" each year and has it disclosed its official website (refer to <https://www.shclearing.com.cn/cpyyw/pfmi/> for details).

Since October, 2017, SHCH discloses quantitative data on a quarterly basis on its official website in accordance with Standards for CCP Public Quantitative Disclosure made by CPMI-IOSCO and CCP12 Standards for Quantitative Disclosure Practice (CCP12 updated the standard on 4 November 2020, and SHCH updated it accordingly) issued by CCP12 (for details, refer to <https://www.shclearing.com.cn/cpyyw/pfmi/>).

In view of the basic data disclosure of trading volume, SHCH discloses its services data of the last business day including number and amount through the column of "research and statistics" of the official website every business day, and also provides corresponding monthly and annual accumulated value. In addition to the basic data, the official website of SHCH has "product and services", "member services" and other columns to disclose the types of product and services, the list of participating institutions and the risk management system including risk control parameters.