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FINANCIAL SECTOR ASSESSMENT PROGRAM

June 2021

DETAILED ASSESSMENT OF OBSERVANCE—HKFE CLEARING CORPORATION LIMITED (HKCC) PRINCIPLES FOR FINANCIAL MARKET INFRASTRUCTURES

This Detailed Assessment of Observance on Principles for Financial market Infrastructures for the People's Republic of China–Hong Kong Special Administrative Region FSAP was prepared by a staff team of the International Monetary Fund as background documentation for the periodic consultation with the member country. It is based on the information available at the time it was completed in June 2021.

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DETAILED ASSESSMENT OF OBSERVANCE

HKFE CLEARING CORPORATION LIMITED (HKCC) PRINCIPLES FOR FINANCIAL MARKET INFRASTRUCTURES

Prepared By
Monetary and Capital Markets Department

This Technical Note was prepared by IMF staff in the context of the Financial Sector Assessment Program in the People's Republic of China – Hong Kong Special Administrative Region, led by Ananthakrishnan Prasad. It contains technical analysis and detailed information underpinning the FSAP's findings and recommendations. Further information on the FSAP can be found at http://www.imf.org/external/np/fsap/fssa.aspx

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Glossary

AC	Audit Committee
AHT	After-hours Trading
API	Application Programme Interface
BCP	Business Continuity Plan
BCM	Business Continuity Management Policy
BRC	Board Risk Committee
CBPL	Capital Based Position Limit
CCASS	Central Clearing and Settlement System
CCMS	Common Collateral Management System
CCP	Central Counterparty
CDS	Credit default swaps
CHAT	Clearing House Automated Transfer System
CH Margin	Clearing House Margin
CMT	Contingency Management Team
CMU	Central Moneymarkets Unit
CNH	Renminbi Hong Kong
CP	Clearing Participant
CPMI	Committee on Payment and Market Infrastructure (previously CPSS)
CPSS	Committee on Payment and Settlement Systems
CRC	Clearing Risk Committee
CSD	Central securities depository
CSR	Corporate Social Responsibility
CVaR	Conditional value at risk
DCASS	Derivatives Clearing and Settlement System
DMG	Default Management Group
DVP	Delivery-versus-Payment
EFBN	Hong Kong Exchange Fund Bills and Notes
EP	Exchange Participants
ERiC	Executive Risk Committee
EUR	Euro
FMI	Financial Market Infrastructures
FPS	Faster Payment System
FRR	The Securities and Futures (Financial Resources) Rules
FS	Financial Secretary
FX	Foreign exchange
GCP	General Clearing Participant
GRM	Group Risk Management
HKD	Hong Kong Dollar
HKCC	HKFE Clearing Corporation Limited
HKEX	Hong Kong Exchanges and Clearing Limited
HKFE	Hong Kong Futures Exchange Limited
HKICL	Hong Kong Interbank Clearing Limited
HKMA	Hong Kong Monetary Authority
HKSAR	Hong Kong Special Administration Region
HKSCC	Hong Kong Securities Clearing Company Limited

HSI	Hang Seng Index
IC	Investment Committee
IAD	Internal Audit Department
ICAC	Independent Commission Against Corruption
IDM	Intraday Margin
IMF	International Monetary Fund
IOSCO	International Organization of Securities Commission
ISO	International Organization for Standardization
ITF	Information Technology Function
JPY	Japanese Yen
LME	London Metal Exchange
MCO	Multilateral Clearing Organization
MCP	Market Contingency Plan
MOF	Ministry of Finance
MOU	Memorandum of understanding
OTC	Over-the-Counter
OTC Clear	OTC Clearing Hong Kong Limited
PFMI	Principles for FMI
RBM	Risk-Based Margining
PBO	Prevention of Bribery Ordinance
PRiME	Portfolio Risk Management System
RC	Remuneration Committee
RCH	Recognized Clearing House
RF	Reserve Fund
RM Capital	Risk Management Capital
RMB	Renminbi
RMC	Statutory Risk Management Committee
ROCH	Recognized Overseas Clearing House
RTGS	Real Time Gross Settlement
RWG	Risk Working Group
SAR	Special Administrative Regime
SEHK	Stock Exchange of Hong Kong Limited
SEOCH	The SEHK Options Clearing House Limited
SFC	The Securities and Futures Commission
SFO	Securities and Futures Ordinance
SITG	Skin-in-the-game
SREP	Supervisory Review and Evaluation Process
SSS	Securities Settlement Systems
RI	Registered Institution
TR	Trade Repository
USD	United States Dollar
VA	Variation Adjustment

EXECUTIVE SUMMARY[1]

The HKFE Clearing Corporation Limited (HKCC) observes the CPSS/IOSCO Principles for Financial Market Infrastructures (PFMI). It has a sound, coherent and transparent legal basis. As an integral part of the Hong Kong Exchanges and Clearing Limited (HKEX Group), the HKCC has a comprehensive and adequate risk management framework to address financial, business, and operational risks. Participant assets as well as HKCC's collaterals are safely kept in several banks and regulated central securities depositories. The credit and liquidity risks are minimized by having a robust risk management framework, including rigorous stress testing methodology and access to qualifying liquid resources. Furthermore, the HKCC has clear rules and procedures to handle and manage a participant's default procedures. Moreover, the HKCC has established risk management framework to handle operational risk, including cyber risk, and business continuity management that addresses events posing significant risk of operational disruption.

The HKCC managed well to cope with the growth and diversification of the derivatives market in Hong Kong and strengthen its operations against international standards and is encouraged to enhance some functionalities to further contribute to the soundness and efficiency of financial market infrastructure in Hong Kong on an on-going basis.

- While the current hybrid organizational structure of the HKCC may be considered effective, it creates uncertainty with regard to the roles, responsibilities and accountability of HKCC's board, and potential conflict of interest between giving primacy to business development over adhering to appropriate risk controls for CCP activities. To address these issues, the HKCC should consider establishing its own dedicated governance structure with a standalone board that includes non-executive board members and decentralized key functionalities.

- The HKEX may consider implementing a more effective governance structure by consolidating the three central counterparties (CCPs) (i.e. HKCC, Hong Kong Securities Clearing Company Limited (HKSCC) and the SEHK Options Clearing House Limited (SEOCH)) into a single CCP within the HKEX Group, duly considering the cost and benefit, with an appropriate governance structure, an independent board, key functionalities and decision-making process. A consolidation would also improve the HKEX's position in the increasingly competitive international environment.

- The HKCC should have its own independent risk management committee for clearing activities, chaired by an independent person and comprising independent members. Furthermore, the shared critical functionalities, such as IT, could be a potential barrier for successful recovery/resolution of the HKCC and it may need to be addressed for its resolvability. Moreover, the HKCC has a comprehensive recovery plan, while it may have to rely on HKEX financial support in extreme but plausible circumstances.

[1] This detailed assessment report was prepared by Elias Kazarian (IMF/MCM). The FSAP mission took place in September 2019.

- The HKCC should consolidate its risk management framework in a comprehensive and overarching document, leveraging the risk appetite statement and other relevant documents. This would enhance transparency and ensure consistency of a holistic approach to manage all associated risks with the HKCC's activities.

- The HKCC should further strengthen its liquidity risk management by having resources to cover the default of the two largest clearing members (liquidity Cover-2).

- As systemic risk is more likely to appear in the HKCC's activities, due to high value and significant concentration of transactions, the HKCC should initiate discussions with the HKMA to settle cash of the HKCC's transactions in the Real Time Gross Settlement (RTGS) system.

- Due to its critical function for the Hong Kong derivatives market, the HKCC should strengthen its ability to ensure business continuity with appropriate staffing arrangements, sufficient resources, capabilities and functionalities, which would allow swaps of operations between the primary and secondary sites on a business-as-usual basis. The HKCC should further strengthen its Cyber resilience by enhancing its procedures and testing methodologies.

The mission is of the view that the Hong Kong Monetary Authority (HKMA) should oversee the HKCC to ensure that its interests as the monetary authority are duly considered, in line with international best practices. The HKMA has interests in the well-functioning of the CCPs due to their systemic implication for financial stability, and the consequent need to act as a lender of the last resort, liquidity provider to the CCP, in a financial distress situation. The current legislation does not mandate the HKMA to oversee CCPs in order to avoid regulatory overlap between the HKMA and the Securities and Futures Commission (SFC). However, central bank's oversight function differs from that of the securities regulation by focusing on the well-functioning of the national payment systems, including interdependency between payment system, securities settlement system and central counterparty and their connected participants. In the majority of countries, the role of the central bank/monetary authority, as an overseer of financial market infrastructures (FMI), is seen as a crucial function to maintain systemic risk and as a complementary to that of the securities regulators and supervisors. A formal cooperation agreement between the HKMA and the SFC could be established, defining each authority's responsibilities and tasks, hence, reducing overlap and promoting cooperation.

OVERVIEW

A. Information and Methodology Used for Assessment

1. The assessment of the HKCC against the PFMI was undertaken in the context of the IMF's Financial Sector Assessment Program (FSAP) for the Hong Kong Special Administrative Region (HKSAR), September 2019.[2] Prior to the mission, the HKCC conducted

[2] Elias Kazarian (IMF) carried out the assessment.

a comprehensive self-assessment reviewed by the SFC. The assessment against the PFMI was mainly based on the PFMI assessment methodology and the Further Guidance on the PFMI,[3] as well as publicly available information, such as the HKCC rules and procedures.[4] Moreover, the assessor benefited from discussions with several stakeholders, including the SFC and the HKMA, as well as the HKEX management and its staff, and market participants. The mission would like to thank the Hong Kong authorities, the HKEX and other stakeholders for their cooperation and hospitality.

B. Market Structure and Setting

2. **Hong Kong is ranked among the largest international financial centers with very active and liquid securities and derivatives markets and sophisticated FMI**. Hong Kong's securities and futures markets respectively ranked tenth and seventh in the world in terms of value of share trading (US$2.1 trillion) and notional turnover (US$14.2 trillion) in 2018, and first globally in equity funds raised through initial public offerings (HK$288 billion) in 2018.

3. **Hong Kong has 11 sophisticated and multicurrency FMI that support its well-developed interbank and retail payments, securities and derivatives markets:**

- Four RTGS large-value payment systems, namely Hong Kong dollar CHATS, U.S. dollar CHATS, euro CHATS, and renminbi CHATS which settle interbank payments denominated in Hong Kong dollar, U.S. dollar, euro and renminbi respectively. The HKMA has developed payment versus payment links between the four RTGS systems to facilitate foreign exchange transactions, including USD/HKD, EUR/HKD, RMB/HKD, USD/RMB, EUR/RMB, and EUR/USD.

- A new Faster Payment System (FPS) was launched by the HKMA in 2018. The FPS enables instant payments across different banks and provides consumers with a widely accessible retail payment service on a 24/7 basis.

- Two Securities Settlement Systems for equities and bonds / fixed-income products, namely the Central Moneymarkets Unit (CMU) operated by the HKMA for the clearing and settlement of Over-the-Counter (OTC) transactions in government-issued and private sector debt securities; and the Central Clearing and Settlement System operated by the Hong Kong Securities Clearing Company Limited (HKSCC) for the clearing and settlement of securities traded on the Stock Exchange of Hong Kong Limited (SEHK). Both the CMU and the HKSCC act as central securities depositories (CSDs) and the HKSCC is also a CCP for exchange traded transactions on the cash market.

- Two clearing and settlement systems for exchange-traded derivatives, namely the HKCC which acts as a CCP for the derivatives contracts traded on the Hong Kong Futures Exchange (HKFE); and the SEOCH which acts as a CCP for stock options contracts traded on the SEHK.

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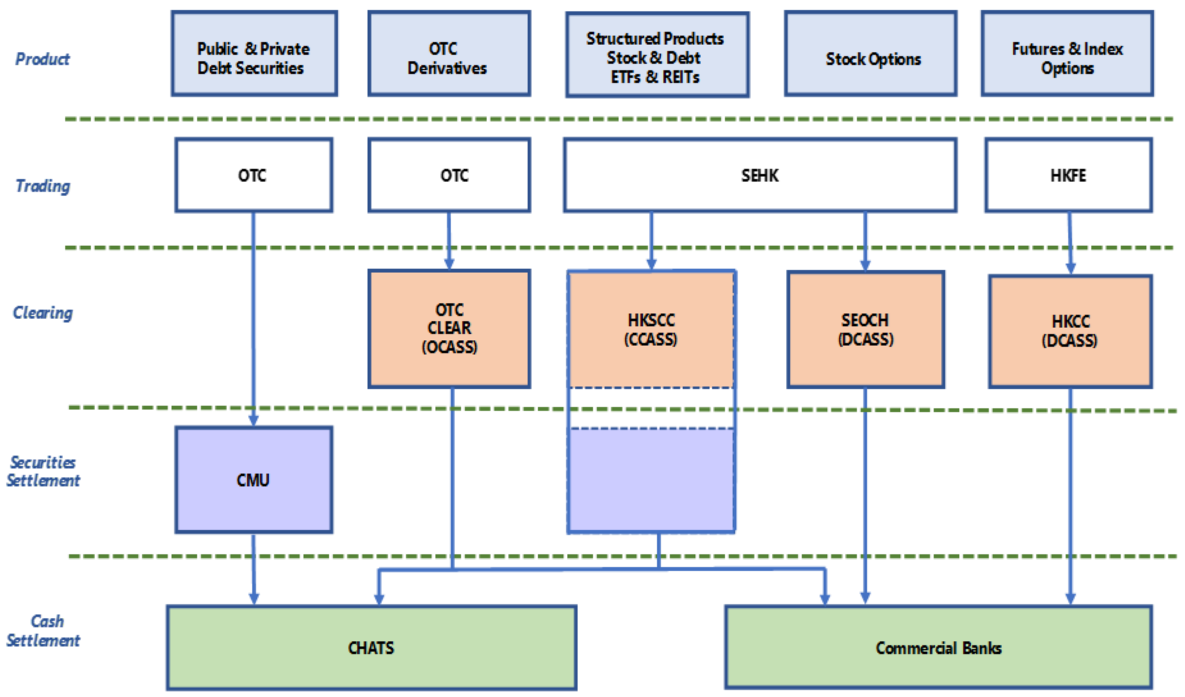
[3] See the CPSS-IOSCO report on "Disclosure framework and assessment methodology", December 2012, and the report on "Resilience of central counterparties – Further guidance on the PFMI", July 2017.

[4] See https://www.hkex.com.hk/Services/Rules-and-Forms-and-Fees/Rules/HKCC?sc_lang=en

- Two services for OTC derivatives, namely the OTC Clearing Hong Kong Limited (OTC Clear) which acts as CCP for clearing interest rate swaps, non-deliverable currency forwards, cross currency swaps and deliverable FX forwards and swaps; and the Hong Kong Trade Repository which is a centralized registry maintaining an electronic database of records of OTC derivatives transactions.

Figure 1. Hong Kong SAR: Overview of Hong Kong Securities and Derivatives Markets Transaction Value Chain

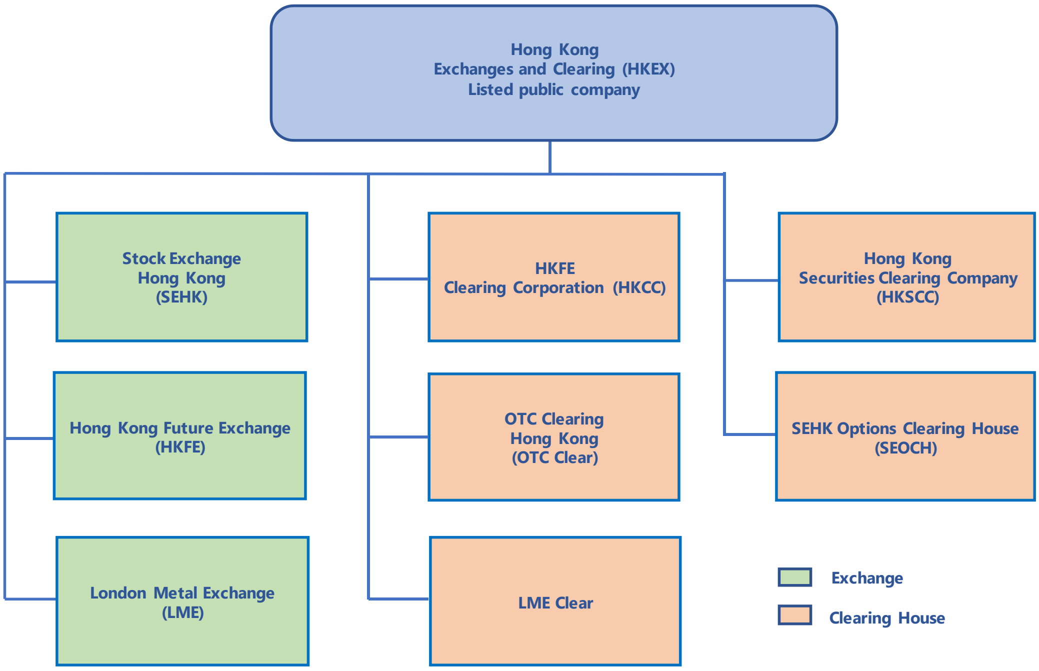


Source: The HKCC.

4. Hong Kong's securities and futures markets are operated by the HKEX Group. The HKEX was created as a merger of the SEHK, HKFE (which included also the HKCC which was then the wholly-owned subsidiary of the HKFE) and the HKSCC, in March 2000 and listed itself on the stock exchange later the same year.

- *Three Exchanges:* The SEHK; HKFE; and London Metal Exchange (LME) (acquired in 2012).
- *Five Clearing Houses:* HKSCC; HKCC; SEOCH; OTC Clear; and LME Clear.
- *Several Asset Classes:* equities; fixed income; currencies; commodities; and derivative products related to the asset classes.

Figure 2. The HKEX Holding Structure



Source: The HKCC.

C. Description of the HKCC

5. The HKCC is a recognized clearing house (RCH). Incorporated in 1984, the HKCC has been the clearing house of the HKFE since 1989, and is a wholly-owned subsidiary of the HKEX. The HKCC provides clearing and settlement services for the contracts traded on the HKFE. It clears a broad range of derivatives products, including equity index products, currency products, interest rate products, and commodity products. The main product cleared by the HKCC is equity index, contributing to 98 percent of total volume.

The HKCC acts in the interest of its participants and the public in discharging its statutory duties. According to its stated objectives, the HKCC aims at maintaining financial stability and promoting transparency by offering expeditious clearing and robust risk management services to market participants. The HKCC uses the Derivatives Clearing and Settlement System (DCASS) and the Common Collateral Management System (CCMS) to support its function as a CCP in providing clearing, settlement and collateral management services for the contracts traded on the HKFE.

Table 1. Hong Kong SAR: Key Statistics of the HKCC, 2015-2019

	2015	2016	2017	2018	2019
1. Number of transactions (millions)	97.36	114.57	109.01	168.90	154.07
1.1 Equities	0.73	0.23	0.12	0.86	0.92
1.2 equity index	96.31	113.77	107.93	165.87	150.49
1.3 interest rate products	0.00010	0.00005	0.00913	0.00076	0.00027
1.4 Currencies	0.26	0.54	0.76	1.81	2.00
1.5 Metals	0.06	0.03	0.19	0.36	0.66
2. Value of transactions (HKD billions)	66,105	72,366	86,459	146,024	127,877
3. Average daily value of transactions (HKD billions)	268	293	350	594	520
4. Peak daily value of transactions (HKD billions) [1]	387	341	472	664	607
5. Percentage of initial margin posted by the largest 5 clearing members	56.7	49.4	47.4	47.7	48.9
6. Percentage of initial margin posted by the largest 10 clearing members	82.6	76.8	78.6	78.4	80.5
7. Number of clearing members of which:	160	161	164	171	169
7.1 Foreign clearing members	0	0	0	0	0
8. Clearing house fund (HKD millions)	1,622	1,986	3,124	1,354	1,910

Source: The HKCC.

[1] Peak daily value of transactions is calculated by dividing the highest monthly value of transactions of that particular year by the number of trading days of that particular month based on figures extracted from the statistics section of World Federation of Exchanges' website: https://www.world-exchanges.org/our-work/statistics

6. **The HKCC offers two types of memberships, and granted exclusively to financial institutions, brokers and dealers, that are the HKFE participants**:

- Clearing Participant (CP) that clears and settles its own and its clients' trades executed on the HKFE; and
- General Clearing Participant (GCP) that clears and settles its own and its clients' trades executed on the HKFE, and/or provides third party clearing services to other participants that decide to outsource their clearing and settlement functions.

7. **At the end of 31 December 2019, the HKCC had 169 participants, of which 160 were CPs and nine were GCPs.** With effect from 28 October 2019, the HKCC has admitted banking entities (i.e. registered institutions (RIs) under the Securities and Futures Ordinance (SFO)) as GCPs.

D. Governance Structure of the HKCC

8. **The HKCC was incorporated in 1984 and is now a wholly-owned subsidiary of the HKEX.** At present, the HKEX is the only exchange controller recognized by the SFC in the HKSAR. It is also a company listed on the SEHK. Under the Hong Kong legal framework, a recognized exchange controller is given the specific role of ensuring that any RCH controlled by it performs its duties properly. Hence, the HKEX is legally obliged to take on an active role in overseeing and ensuring the proper functioning of the HKCC.

9. **The HKCC Board consists of four members, who are senior executives of the HKEX.**[5] The HKEX's Chief Executive is the Chairman of the HKCC. The HKCC relies on the HKEX Board to provide leadership and guidance. The HKEX Board has the overall responsibility for managing the business of the HKCC. The HKCC Board oversees the HKCC's activities and the execution of its business strategies. The HKCC's board members are the same as the other two CCPs, namely the HKSCC and the SEOCH.

10. **While established as an independent company within the HKEX Group, the HKCC does not have its own dedicated governance structure.** The key functionalities of the HKCC are centrally integrated and coordinated as part of the HKEX Group, using and sharing the resources, arrangements and infrastructures provided and made available within the HKEX Group (see Diagram 3 below). Key functions are carried out horizontally for all HKEX subsidiaries in Hong Kong, i.e. the HKCC, HKSCC, SEOCH, OTC Clear, etc., by employees of the HKEX, including clearing and settlement operations, risk management, IT, treasury, legal, finance, internal audit, administration and human resources functions. The relevant facilities, systems and equipment that the HKCC uses for the provision of its clearing and settlement services are housed under the premises procured by the HKEX. In particular, the head of the clearing operations is responsible for all Hong Kong clearing operations of the HKEX Group. Similarly, the risk management function, collateral management, and treasury are centralized for all Hong Kong CCPs. Furthermore, major committees are set up at the level of the HKEX Group, including the Board Risk Committee (BRC), statutory Risk Management Committee (RMC), Audit Committee, Nomination and Governance Committee, Remuneration Committee and Investment Committee, Disciplinary Committee and Disciplinary Appeals Committee. However, the HKCC has its dedicated Participants Admission Appeals Committee.

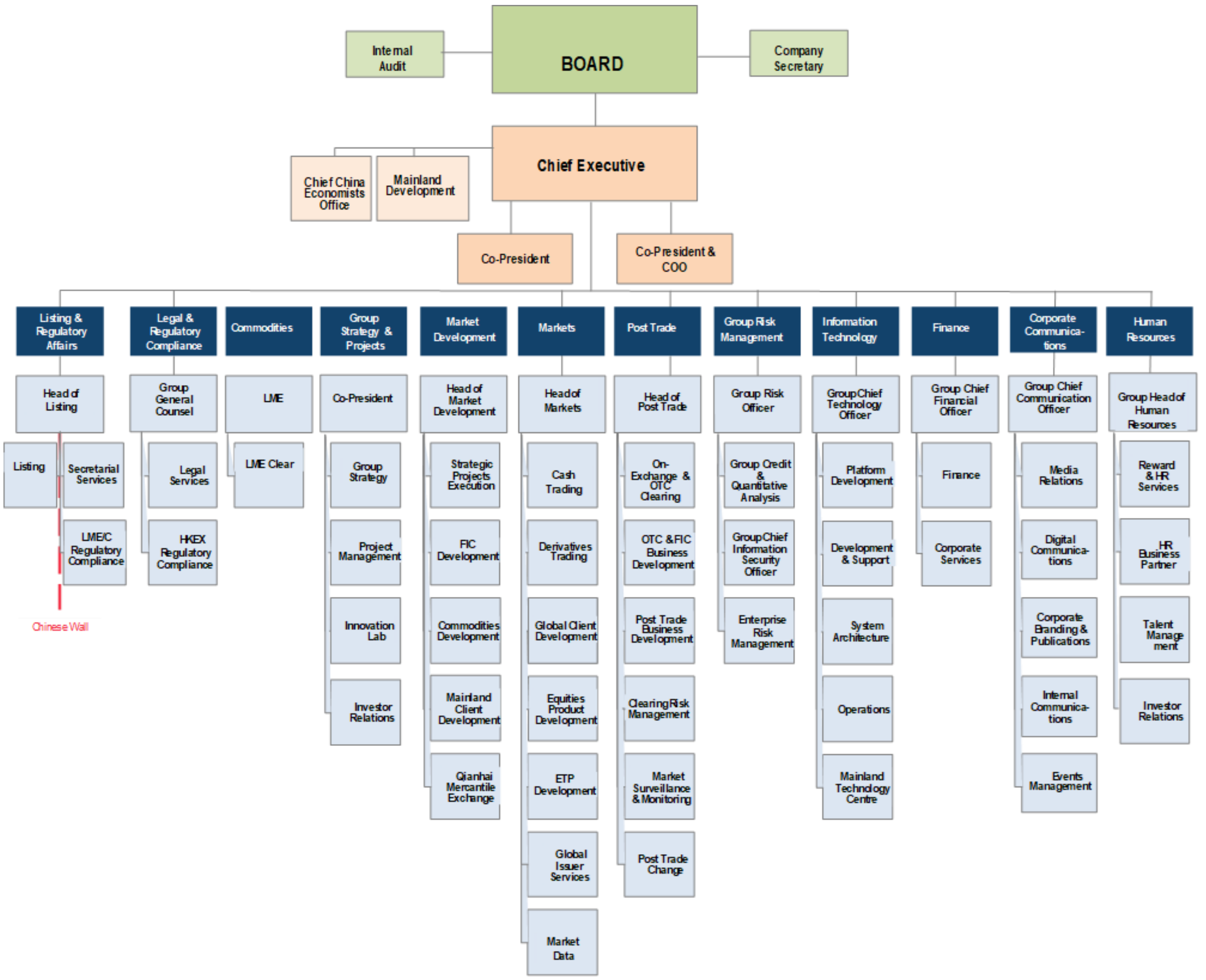
11. **The overall risk management framework of the HKCC is formulated by the HKEX's RMC.** It may advise on risk management matters of the entire HKEX Group for consideration by the HKEX. It provides an added layer of oversight and supervision over the safety and soundness of the HKCC's own risk management safeguards. The RMC was established in accordance with section 65 of the SFO. Pursuant to the SFO, the Financial Secretary (FS) shall appoint three to five members to the RMC, while the Board shall appoint not more than two members. The RMC has eight members, which include the HKEX Board Chairman, five members appointed by the FS, and two of the HKEX Board's Independent Non-executive Directors (INEDs) as appointed by the HKEX Board.

12. **The HKCC also has a Clearing Consultative Panel comprising selected representatives of market participants and industry experts in the clearing business.** The

[5] The directors of the HKCC are the same for Directors of HKSCC and SEOCH, while OTC Clear board has external director since OTC Clear is not wholly owned by HKEX. Please refer to HKEX Group's website https://www.hkexgroup.com/About-HKEX/Organisation/Principal-Subsidiaries/List-of-Directors?sc_lang=en

panel, which is appointed by the HKEX Board, currently consists of 12 members. Two of them are the HKEX Independent Non-Executive Directors and ten other members are appointed from among representatives of market participants and industry experts. This panel acts as an advisory body to the HKEX Board and its management to provide market expertise and advice relating to the HKEX's clearing businesses including the HKCC.

Figure 3. Hong Kong SAR: The HKEX Group Organization Structure



Source: The HKCC.

F. Regulatory, Supervisory, and Oversight Framework

13. As an RCH, the HKCC is regulated and supervised by the SFC. The HKCC is also classified as a systemically important FMI. The SFO, Hong Kong's principal securities and futures legislation, defines the regulatory framework for the HKCC in its capacity as an RCH. Under section 38 of the SFO, the HKCC has the duty to ensure that there are orderly, fair and expeditious clearing and settlement arrangements for transactions cleared or settled through its facilities and that risks associated with its business and operations are managed prudently. Furthermore, the SFO empowers the HKCC to make rules that are necessary and desirable for the proper and efficient operation of its clearing or settlement facilities as well as for the proper regulation of its participants. New rules, or amendment of existing ones, by the HKCC have to be approved by the SFC before entering into force.

14. The HKCC must operate its infrastructures and business in accordance with the rules approved by the SFC and implement appropriate procedures to ensure that the HKCC Participants comply with the rules. Additionally, the HKCC must always provide and maintain:

- Adequate and properly equipped premises;
- Competent personnel;
- Automated systems with adequate capacity and facilities;
- Contingencies or emergencies, security arrangements; and
- Adequate technical support for conducting its business.

15. The HKCC is under a statutory obligation to act in the interest of the public. Under section 38(2) of the SFO, it is required to ensure that the interest of the public prevails where it conflicts with the interest of the HKCC. The SFC, as the regulator, has the power to require the HKCC to comply with its directions, orders and requirements.

16. The HKCC is not subject to the oversight of the HKMA. While the Payment Systems and Stored Value Facilities Ordinance empowers the HKMA to designate and oversee clearing and settlement systems that are material to the monetary and financial stability of the HKSAR, it stipulates that the HKMA's power does not cover clearing and settlement systems that are recognized as clearing houses under the SFO so to avoid regulatory overlap between the HKMA and the SFC.

17. In March 2013, the SFC and the HKMA jointly issued a policy statement on the adoption of the PFMI for systematically important FMI in Hong Kong. As a result, in addition to the statutory duties under the SFO, the HKCC is required to comply with the PFMI to the extent that they apply to a CCP. The SFC supervises the HKCC under its purview on an on-going basis through off-site reviews, continuous monitoring, on-site examinations and meetings with senior management. Certain other FMI such as payment system (PS) and trade repository (TR) are subject to the regulation and oversight of the HKMA.

H. Major Changes and Reforms

18. The major changes, including technological and operational issues, and new regulatory reform covering various aspects of CCP's activities are described below:

May 2019	The HKCC and HKFE upgraded their derivatives platforms, namely Hong Kong Futures Automatic Trading System (HKATS) and DCASS. A new browser-based frontend application, i.e. HKATS Online, is available for block trade facilities and serves as a contingency access to the HKATS. Similarly, a new browser-based frontend application, namely DCASS Online, replacing DCASS Servers and DCASS Terminals is provided to the HKCC Participants.
October 2018	The HKCC enhanced its recovery regime and introduced voluntary recapitalization and loss distribution process to address uncovered credit losses, caused by participant default. Contract termination process was also introduced to re-establish a matched book following a participant default.
June 2018	The HKCC changed the reserve fund (RF) contribution mechanism by: (a) adopting a risk-based approach to size its contribution to the RF (skin-in-the-game); (b) removing the contingent advance capital arrangement; and (c) imposing an RF threshold.
June 2018	The HKCC enhanced the settlement banks admission and on-going assessment criteria by replacing the credit rating requirement with a minimum capital requirement.
January 2018	The HKCC enhanced the credit risk assessment framework by introducing the Counterparty Risk Exposure Scoring Toolkit to provide a dynamic and holistic risk management tool to monitor the HKCC's participant's exposure and credit risk.
September 2017	The HKCC enhanced the RF triggering and collection mechanism including the ad-hoc triggering criterion, collection buffer, look-back period and collection period.
September 2017	The HKEX established the Risk Working Group which convenes quarterly meetings with clearing participants to discuss and solicit feedback on risk management topics concerning the HKSCC, the HKCC and the SEOCH.
March 2017	The HKCC set up regular meeting with Intermediaries Supervision Division of the SFC to enhance communication on the HKCC Participants' credit risk management.
March 2017	The HKCC started to offer margin offset between selected contracts with different underlying.
January 2016	The HKCC, previously held by the HKFE, became a direct wholly-owned subsidiary of the HKEX.
December 2015	The HKCC started publishing quantitative disclosure documents in accordance with the guidelines set out in the "Public quantitative disclosure standards for central counterparties".

September 2015	The HKCC enhanced its risk management regime by tightening the concentration risk policy to require higher margin collateral from the HKCC's participants with concentration risk exposures.
July 2015	The HKCC enhanced its risk management regime by tightening the thresholds for triggering an ad-hoc demand of RF contribution from its participants; and raising the buffer in determining the required size of the RF in monthly and ad hoc reviews.
April 2015	The HKCC was recognized by the Supervisors of European Securities and Markets Authority as a "Third country CCP".
March 2015	The HKEX established a new Risk Committee to oversee the overall risk management framework and advise the HKEX Board on the HKEX Group's risk-related matters, including that of the HKCC.
January 2015	The HKEX enhanced its risk governance structure by the appointment of a Group Risk Officer to oversee all risk functions of the HKEX and its subsidiaries including the HKCC.

DETAILED ASSESSMENT

A. Summary Assessment of Observance of the Principles

Table 2. Hong Kong SAR: Rating Summary for Principles

Assessment Category	Principle
Observed	P1, P3, P4, P5, P6, P7, P8, P9, P10, P12, P13, P14, P15, P16, p17, P18, P19, P20, P21, P22, P23
Broadly observed	P2
Partly observed	
Not observed	
Not applicable	P11 and P24

B. Main Findings

General Organization (Principle 1 to 3)

19. **The HKCC has a well-founded, clear, transparent and enforceable legal basis for each material aspect of its activities in all relevant jurisdictions.** The HKCC rules, procedures, and contracts are consistent with relevant laws and regulations in relation to novation and open offer, collateral managements, netting and setting-off arrangements, and protecting the rights and interest of the HKCC and its participants in the event of a default. This legal basis provides a high degree of certainty that actions and measures taken by the HKCC, under its rules and procedures, will not be voided, reversed, or subject to stays. Furthermore, the HKCC has obtained a Luxembourg legal opinion on potential conflict of law. While the settlement of transactions cannot be revoked or unwound, the legal environment in Hong Kong would benefit from clearly specifying, the timing of finality from a legal perspective. This should be defined operationally at the level of the system and supported by legal provisions in the SFO or other legislation.

20. **The HKCC's governance structure is part of that of the HKEX holding company.** The HKCC has a hybrid governance structure encompassing an independent legal entity with its own capital and board, while all key functionalities, including risk management and internal audit, are set up at the level of the HKEX Group and cover the entire Group's activities, including trading, clearing, settlement, central depository, data gathering, etc. The HKCC does not have an independent risk management committee but rather overseen the BRC of the HKEX in which the Chair and members are all INEDs of the HKEX. The HKEX has transparent governance arrangements for the entire Group, which comply with the regulatory requirements to act in the interest of the public and to support the stability of the financial system in Hong Kong. The roles and responsibilities of the HKEX Board and management are documented and publicly available on the HKEX Group website.

21. **While the current governance structure may be considered efficient, it is associated with some issues.** While the HKCC is an independent entity within the HKEX holding, it does not have independent board members and its critical functions are centralized at the HKEX level. It

creates potential uncertainty with regard to the roles, responsibilities and accountability of the HKCC's board. Furthermore, it may give rise to a perceived conflict of interest between balancing considerations of business development and appropriate risk controls. Moreover, it may dilute the effectiveness of the HKCC's risk control mechanisms for clearing activities as important decisions are taken at the HKEX Group level. To address these issues, the HKCC should consider establishing its own dedicated governance structure with a standalone board that includes non-executive board members and decentralized key functionalities for clearing activities, including a risk management committee, chaired by an independent person and comprising independent members. However, it would be more effective to consolidate the three CCPs (the HKCC, HKSCC and SEOCH) into a single CCP with an appropriate governance structure, an independent board, key functionalities and decision-making process. A consolidation would also improve HKEX's position in the increasingly competitive international environment. The HKCC should have its own independent risk management committee for clearing activities, chaired by an independent person and comprising independent members.

22. **The HKCC risk management framework is defined at the level of the HKEX holding company structure.** However, a sub-structure exists for the clearing activities. The HKEX has a sound and robust risk-management framework to identify, monitor, and mitigates its risks associated with trading clearing and settlement and to ensure that appropriate measures are taken to avoid and reduce of its risks without delay. This framework is validated continuously by its executive board. However, the HKCC should consolidate its risk management framework in a comprehensive and overarching document, leveraging from the risk appetite statement and other relevant documents. This would enhance transparency and ensure consistency of a wholistic approach to manage all associated risks with HKCC's activities. Furthermore, the shared critical functionalities, such as IT, could be a potential barrier for successful recovery/resolution of the HKCC and it needs to be addressed for its resolvability. Moreover, the HKCC has a comprehensive recovery plan, while it may rely on HKEX financial support in extreme but plausible circumstances.

Credit and Liquidity Risk Management: (Principle 4 to 7)

23. **The HKCC has a robust risk management framework to manage credit risk exposures, although further enhancement is warranted.** Based on a rigorous stress testing methodology, the HKCC determines the amount and regularly tests the sufficiency of its total financial resources available to cover the losses arising from the default of the single largest and the fifth largest participants under extreme but plausible market conditions via stress-testing. The HKCC conducts an annual independent validation of its risk management model. The HKCC should further enhance its credit risk management by reviewing the need for strengthening resources to cover the two largest participants. It should also improve its stress-testing framework by excluding participants' excess collateral from stress testing results and incorporating more stress-testing scenarios where appropriate. The HKCC, in cooperation with the SFC, should assess the impact of the Capital Based Position Limit on the growth of the derivatives markets and explore whether other effective tools with less adverse impact could be used.

24. **The HKCC accepts assets with low credit, liquidity and market risks as collateral.** The major part of the HKCC collateral is cash (over 90 percent) and deposited in several banks under its own accounts. The HKCC has prudent practices to valuate collateral at least once daily and applies conservative haircuts and monitors them continuously. Furthermore, it has risk

management procedures to reduce the impact of procyclicality and wrong way risk. The HKCC uses a dedicated collateral management system with advanced functionalities such as checking eligibility, monitoring, validation rules, etc. In line with the CPMI-IOSCO Further Guidance on the PFMI of 2017, the HKCC should further enhance the collateral haircut methodology by identifying all sources of risk related to collateral, including transaction costs, and bid-ask spreads associated with liquidating, in extreme but plausible market conditions, and incorporating the stressed value of collateral into its stress testing. Furthermore, the HKCC should assume that no excess collateral posted by a participant will be available to meet losses or to make payment obligations when conducting stress testing for both credit and liquidity exposures.

25. The HKCC has a robust margining model to manage its current and future credit exposures to its participants. The margining process is a multifaceted and time critical process that considers a variety of factors in order to accurately calculate margins. The HKCC also has the authority and operational capacity to make intra-day and end-of-day margin calls. It conducts daily backtesting and performs monthly sensitivity analysis of the margin model to monitor model performance and overall margin coverage.

26. The liquidity risks management framework is defined at the HKEX on-exchange CCP level. In particular, it covers the liquidity needs of the HKCC and the two other on-exchange CCPs (the HKSCC and SEOCH). However, the liquidity needs are calculated separately for each CCP but consolidated in a single management framework, which to satisfy the liquidity needs of the three CCPs. The methodology to identify, monitor and manage the liquidity risk, including stress testing, seems to be appropriate at the aggregate level aimed at covering payment obligations. The HKCC has several sources of qualifying liquid resources available, including cash deposited at authorized credit institutions and committed lines of credit. The HKCC should further enhance its liquidity risk management in line with CPMI-IOSCO Further Guidance of 2017, by excluding participants' excess collateral from stress testing and maintaining sufficient liquid resources in each currency for which it has an obligation. Furthermore, the HKCC may review the need for strengthening its liquidity risk management by having resources to cover the default of the two largest clearing participants (liquidity Cover-2) rather than the first largest participants and its affiliates. Furthermore, it would advisable for the HKCC to have a dedicated committee to manage its liquidity.

Settlement (Principles 8–10)

27. The HKCC rules and procedures provide for final settlement no later than the end of the settlement day. The HKCC provides intraday finality for the scheduled and ad-hoc money settlement processes. Money settlement is considered final and conclusive when the HKCC receives payment confirmations from the Settlement Banks that the funds in the required currency have been received and credited to the HKCC's bank accounts.

28. The HKCC settles in commercial bank money. It has appointed several Hong Kong licensed banks to conduct money settlement through intrabank transfers. The HKCC has relevant rules and procedures to assess, monitor and minimize the credit and liquidity risks arising from the use of these settlement banks. As regards central bank money, the HKEX intends initially to open an HKD RTGS account for the HKSCC and when sufficient experience is gained, it will consider extending the use of RTGS account to the HKCC. As systemic risk is more likely to present in the HKCC's activities due to high value and significant concentration of transactions, the HKCC should initiate discussions with the HKMA to settle the cash of the HKCC's transactions in the RTGS system.

29. The HKCC clearly defines its obligations with respect to the delivery of physical instruments. As stipulated in the HKCC rules, its role is purely administrative in nature in relation to the delivery of physical settled contracts. Hence, it does not bear any risk nor cost in relation to storage and delivery of physical instruments such as gold. The number of deliveries has been very few over the years.

CSD and Exchange of Value Settlement System (Principles 11–12)

30. The HKCC settles USD vs CNH currency futures and options contracts, which involves the settlement of two linked obligations upon final settlement. It eliminates principal risk arising from the final settlement of CNH currency futures and options contracts by requiring its participants to settle their money obligations in a currency leg before allowing them to withdraw money obligations in another currency leg.

Default Management (Principles 13–14)

31. The HKCC rules clearly define the events of default and the actions that can be taken when a default of a participant is declared. The HKCC has developed internal operating procedures, which clearly articulate the roles and responsibilities of various stakeholders and the procedures to handle the participant default. The default management procedures are reviewed and tested with relevant stakeholders regularly and on a need basis. These rules and procedures are properly in place to ensure that the HKCC can take timely action to deal with losses and liquidity requirements that may arise under default.

32. The HKCC has rules and procedures to enable the segregation and portability of the positions and collaterals of a participant's clients. The SFO lays out various requirements for recording client trades and segregating and safeguarding of client positions and collateral by all licensed corporations, including the HKCC's participants. Compliance with these requirements is assessed as part of the routine market intermediaries' supervision programme conducted by the SFC. Accordingly, the HKCC has segregation and portability arrangements for participants to properly identify and segregate their clients' positions and collateral from their own by making use of different types of Clearing Accounts and CCMS Collateral Accounts.

General Business and Operational Risk Management (Principles 15–17)

33. The HKCC has adequate risk management framework for general business risk. This risk framework identifies internal and external factors that could impair the HKCC's financial position and evaluates their impacts and the likelihood of occurrence. It establishes and implements key financial and internal controls and plans to mitigate, monitor, and manage the risks. The HKCC maintains at all times liquid net assets funded by equity in an amount sufficient to cover its projected total operating expenditure. Furthermore, should the HKCC's equity fall close to or below the amount needed, the HKEX Group would inject additional capital into the HKCC and potentially raise capital via the capital markets if needed.

34. The HKCC has a robust framework to manage its custody and investment risks. The HKCC safeguards its own and its participants' assets in supervised and regulated financial institutions with low credit risk. The HKCC's investment strategy is consistent with its overall risk-management strategy and fully disclosed to its participants. Furthermore, the HKCC has effective and sound procedures in place that can allow the HKCC to withdraw these deposits promptly and with same-day availability. The HKCC may consider depositing its cash collateral at the HKMA as a measure to eliminate custody risk, as the case for several developed market.

35. The HKCC, as part of the HKEX Group, has a well-established operational risk management framework, under which both internal and external plausible risk sources are identified and addressed by appropriate mitigation through the use of appropriate systems, policies, procedures, and controls. Moreover, the business continuity management of the HKCC also addresses events posing significant risk of operational disruption with an aim for timely recovery of operations and fulfilment of its obligations. Due to its critical function for the Hong Kong derivatives market, the HKCC should consider strengthening its ability to ensure business continuity with appropriate staffing arrangements, sufficient resources, capabilities and functionalities, which would allow swaps of operations between the primary and secondary sites on a business-as-usual basis. While the HKCC has an adequate policy to address cyber risk it is recommended to further strengthen its cyber resilience by enhancing its procedures and testing methodologies.

Access (Principles 18–20)

36. The HKCC has a set of objectives, risk-based and transparent criteria for participation, and allows for fair and open access to its services. The HKCC monitors on-going compliance of its participants with its requirements. Furthermore, it has clearly defined and publicly disclosed the HKCC Rules and the HKCC Procedures for facilitating the suspension and orderly exit of a participant that breaches or no longer meets the participation requirements.

37. The HKCC supports tiered participation arrangements through offering the third-party clearing service. A GCP can clear on behalf of a non-clearing participant (NCP). The HKCC has robust risk management framework to identify, monitor, and manage the material risks to the HKCC arising from NCP. An important tool to monitor the risks in relation to undisclosed clients of clearing members is the obligation to record transactions related to undisclosed clients on a dedicated account.

38. The HKCC does not have any link to other CCPs. It has put in place appropriate measures to manage link-related risks in the established link with the CMU of the HKMA for the settlement of OTC transactions in government-issued debt securities. The HKCC has entered into an agreement with the CMU to clearly define the rights, obligations, and liabilities of each party.

Efficiency (Principles 21–22)

39. The HKCC has in place adequate processes to meet the needs of its participants and the markets it serves. It provides efficient and effective services, which serve the needs of its participants and the derivatives market of Hong Kong. The HKCC has implemented mechanisms to seek input and feedback from relevant stakeholders to assess the efficiency and effectiveness of its services, operations and arrangements.

40. The HKCC uses internationally accepted communication procedures and standards to communicate with its settlement banks, the CMU and Clearstream for efficient payment, clearing, settlement, and recording.

Transparency (Principles 23–24)

41. The HKCC has clear and comprehensive rules and procedures which provide sufficient information to enable participants to have an accurate understanding of the risks and fees and other material costs. All relevant rules and key procedures are publicly disclosed. To ensure the relevance of its documentation, the HKCC has procedures in place to update its **disclosure** document following any material change and, at a minimum, at least every two years in accordance with the PFMI Disclosure Framework.

C. Recommendations for the HKCC

Table 3. Hong Kong SAR: Prioritized List of Recommendations for the HKCC				
Principles	**Issue of Concern**	**Recommended Action**	**Relevant Parties**	**Timeframe for Recommended Action**
P1: Legal basis	Enhancing transparency and reducing uncertainty for the timing of finality.	Specify clearly the timing of finality from a legal perspective.	HKCC/SFC	18 months
P2: Governance	Current Governance structure creates uncertainty, potential conflict of interest, and diluting risk management framework for clearing activities.	Strengthen the current governance of the HKCC by setting up a proper HKCC board, including non-executive board members and decentralized key functions and decision-making process. Alternatively, consider consolidation of the HKCC, HKSCC and SEOCH into a single entity with full-fledged and independent governance structure within the HKEX Group.	HKEX	18 months
	Strengthening the risk management framework.	The HKCC should set up an independent Risk Management Committee chaired by independent chairperson and comprising independent members.		18 months
P3: Risk management framework	Enhancing transparency and consistency of the HKCC's risk management framework.	Consolidate the HKCC's risk management framework in an overarching document.	HKCC	6 months
P4: Credit risk	Strengthening the credit risk management framework.	Review the need for strengthening resources to cover the losses arising from the defaults of the two largest participants.	HKCC	12 months
	Adverse impact of Capital Based Position Limit (CBPL) on the derivatives activities in Hong Kong.	In coordination with the SFC, assess the impact of CBPL and explore whether other effective tools with less adverse impact could be used.		
P5: Collateral	Strengthening collateral framework.	Exclude excess collateral posted by a participant from being used to meet losses or to make payment obligations when conducting stress testing for both credit and liquidity exposures.	HKCC	12 months

Table 3. Hong Kong SAR: Prioritized List of Recommendations for the HKCC (concluded)

Principles	Issue of Concern	Recommended Action	Relevant Parties	Timeframe for Recommended Action
P6: Margin	Strengthening margin model.	Enhance the back-testing and sensitivity analysis methodology. Exclude participants' excess collateral from stress testing results.	HKCC	12 months
P7: Liquidity risk	Strengthening liquidity risk management.	Exclude participants' excess collateral from stress testing results. Review the need for strengthening resources to cover the default of the two largest clearing members (liquidity Cover-2). Set up a dedicated committee to manage its liquidity While the HKCC has enough liquidity resources, it is crucial to maintain sufficient liquid resources in each currency for which it has obligations.	HKCC	12 months
	Uncertainty in due consideration of the interests of the HKMA as central bank.	The HKMA should oversee the HKCC to ensure that its interest as central bank of issue and overseer of FMI are met.	HKMA/SFC	
P9: Money settlement	Reduce money settlement risk.	Initiate discussions with the HKMA to settle the cash of the HKCC's transactions in the RTGS system.	HKCC/HKMA	6 months
P17: Operational risks	The HKCC's business continuity arrangement will benefit from a modern and effective secondary site to ensure business continuity.	Strengthen the secondary site with appropriate staffing arrangements, sufficient resources, capabilities, and functionalities, which would allow swaps of operations between the primary and secondary sites during business-as-usual. The HKCC should further strengthen its cyber resilience by enhancing its procedures and testing methodologies.	HKCC	12 months

AUTHORITIES' RESPONSE

43. **The Hong Kong authorities appreciate the IMF's comprehensive and positive assessment and welcome the IMF's conclusion that the HKCC observes the PFMI.** The assessment contains recommendations which could further contribute to the soundness and efficiency of the HKCC. The authorities will review these recommendations in conjunction with HKEX and the HKCC and give due consideration to their adoption.

44. **The authorities concur with the IMF that the HKCC has a well-founded, clear, transparent and enforceable legal basis for each material aspect of its activities in all relevant jurisdictions.** In relation to Principle 1, the authorities agree with the recommendation on further enhancing transparency and reducing uncertainty for the timing of finality of settlement over the medium to long term. Given the need to thoroughly consult the market on any applicable proposals and to prepare for the legislative amendments if so required, the authorities note that implementation may take longer than 18 months.

45. **In relation to Principle 2, the authorities note that governance at HKEX is integrated across the group (including clearing houses such as the HKCC) in order to better coordinate risk management and address potential financial stability issues.** A decentralized approach has been applied in the past in Hong Kong and proved to be deficient for the Hong Kong market. For example, during the 1997 Asian Financial Crisis when Hong Kong stocks were subject to significant short selling, the operations and management of the exchanges and CCPs in the stock market and futures market were independent, making it less effective for the early identification of large positions established. Nevertheless, the SFC will follow up with the HKCC to consider how the HKCC's governance structure may be further enhanced to enable it to deal with risks specific to the HKCC more effectively and independently. With respect to the consolidation of the clearing houses, the authorities consider that it should be a separate issue from governance and, depending on the approach, such consolidation may adversely affect financial stability. Careful consideration should therefore be given to any consolidation proposals. In any case, the authorities are of the view that the governance issue and consolidation of clearing houses should be considered separately.

46. **The authorities concur with the IMF that the HKCC has a robust risk management framework.** In relation to Principle 3, the authorities agree with the recommendation regarding improved documentation of the risk management framework. Taking into account the governance process involved, the HKCC will strive to implement the recommendation in 12 months the earliest.

47. **The authorities agree with the IMF that the HKCC has the tools to manage its credit and liquidity risks.** In relation to Principle 4, the authorities agree with the recommendation to further enhance the existing framework by increasing default resources to cover the losses arising from the default of the two largest participants ("cover 2"), but note that implementation will take longer than 12 months, given that the HKCC would need to consult the market on the impact of the proposals. With respect to the impact of CBPL on the growth of the derivatives market, the authorities emphasize that the CBPL is an essential tool to manage systemic risk by ensuring that the total positions held by each clearing participant are commensurate with the participant's financial strength. CBPL has been in place for more than two decades. The strong

growth of the derivatives market in Hong Kong over that timeframe suggests that CBPL does not impede market development. Nevertheless, the authorities will explore potential enhancements to the current CBPL framework.

48. In relation to Principle 7, the authorities agree with the recommendation to increase liquid resources to "cover 2" level but note that implementation will take longer than 12 months, given that the HKCC would need to consult the market on the impact of the proposals. With respect to setting up a dedicated committee to manage liquidity risk, the authorities reiterate the points regarding integrated governance in relation to Principle 2 above. Nevertheless, as mentioned above, the SFC will follow up with the HKCC to consider whether a dedicated committee will help HKCC manage liquidity risk more effectively.

49. With respect to central bank oversight, the authorities note that the HKMA is already closely involved in the oversight of HKCC in collaboration with the SFC. The HKMA and the SFC have entered into a Memorandum of Understanding (MoU) setting out the mutually understood framework for the exchange of information and cooperation. The MoU facilitates the discharge of the HKMA's and SFC's respective responsibilities in relation to the supervision or oversight of financial market infrastructures in Hong Kong, including the clearing houses under the HKEX, and helps maintain the financial and/or monetary stability of Hong Kong. The MoU was last updated in September 2019 taking into account latest developments to further strengthen the cooperative oversight arrangements. Besides, it should be noted that representatives of the SFC and the HKMA serve on the HKEX's statutory Risk Management Committee, which oversees risk management matters of HKEX including the HKCC. The SFC also regularly shares information about liquidity positions of HKEX's CCPs, including HKCC, with the HKMA to facilitate monitoring. The HKMA and the SFC will continue to work closely together in the oversight of financial market infrastructures in Hong Kong, including the HKCC, and will make the necessary enhancements taking into account the latest market development and international standards.

Table 4. Hong Kong SAR: Detailed Self-Assessment of the HKCC Observance of the Principles[1]

<table>
<tr><td colspan="2">Principle 1. Legal Basis
An FMI should have a well-founded, clear, transparent, and enforceable legal basis for each material aspect of its activities in all relevant jurisdictions.</td></tr>
<tr><td rowspan="2">Key Consideration 1
The legal basis should provide a high degree of certainty for each material aspect of an FMI's activities in all relevant jurisdictions.</td><td>Material aspects and relevant jurisdictions
The material aspects of the HKCC's activities that require legal certainty are:
(a) Membership in the HKCC;
(b) the rights and obligations of the HKCC and its participants in respect of the HKCC's services, including clearing, settlement and collateral management;
(c) the formation by novation, enforceability of netting arrangements and settlement finality;
(d) the rights and interests of the HKCC and its participants to financial provisions such as margin, collateral and RF;
(e) the HKCC Rules and Procedures concerning its HKCC Participant default;
(f) the recovery and wind-down of the HKCC; and
(g) the implications of the insolvency of the HKCC or its participants.
The HKCC Rules and Procedures are published on HKXE website:
https://www.hkex.com.hk/Services/Rules-and-Forms-and-Fees/Rules/HKCC?sc_lang=en</td></tr>
<tr><td>The legal basis for each material aspect
The HKCC is incorporated and conducts business in Hong Kong and all its participants are domiciled in Hong Kong and are subject to the relevant laws of Hong Kong.

The Hong Kong legal framework allows the HKCC to conduct all material aspects of its activities as a CCP. The legal basis supporting the material aspects of the HKCC's activities includes the Bankruptcy Ordinance (Chapter 6 of the Laws of Hong Kong); Companies Ordinance (Chapter 622 of the Laws of Hong Kong); the SFO; common law in relation to contracts, tort and property; and the rules binding the HKCC and the HKCC Participants.

The HKCC is an RCH regulated by the SFC, Hong Kong's statutory regulator for the securities and futures markets, under section 37(1) of the SFO. The SFO is Hong Kong's principal securities and futures legislation, which sets out the regulatory framework for the HKCC in its capacity as an RCH.

[1] For principles that are not relevant for the HKCC, please indicate "Not Applicable".</td></tr>
</table>

	Novation Futures and options contracts, traded by HKFE participants, are matched by HKATS and recorded in its transaction register. Once the registration is executed, the contract is automatically accepted for clearing by HKCC and novated. This novation is supported by HKCC Rule 309. Furthermore, Rule 313 specifies that if a HKCC Participant wishes to subsequently transfer a contract to a second HKCC Participant the transfer will take place by means of novation. These novations are valid and enforceable as a matter of HKSAR contract law – all of the HKCC Participants and HKCC are party to the HKCC Rules and the rules constitute a contract between them. *Netting* Rule 515(b) of the HKCC Rules permits the HKCC, upon a default of a HKCC Participant, to close out all open Contracts and calculate a net sum payable by or to the HKCC Participant to or from the HKCC (a so-called "close out net amount"). This provision is enforceable and not capable of being voided, reversed or subject to stays under Hong Kong law as these provisions are part of the "default proceedings" under the SFO. An explanation of why Rule 515(b) of the HKCC Rules constitutes "default proceedings" is set out below. "default proceedings" is defined in section 18(1) of the SFO as "any proceedings or other action taken by a recognized clearing house under its default rules". "default rules" is defined in section 18(1) of the SFO as "in relation to a recognized exchange clearing house, ... the rules of the clearing house required by section 40(2)" Section 40(2) of the SFO states that a recognized clearing house must make rules that "provide for the taking of proceedings or other action if a clearing participant appears to be unable or is unlikely to meet its obligations in respect of all unsettled or open market contracts to which it is a party; and that comply with Part 5 of Schedule 3 of the SFO". Please see https://www.elegislation.gov.hk/hk/cap571?xpid=ID_1438403473038_002 The significance of the netting provisions being part of the "default proceedings" and "default rules" is that section 45 of the SFO expressly protects "the default rules of a recognized clearing house or any default proceedings" from being held invalid on the grounds of inconsistency with the law relating to distribution of assets of a person on insolvency, bankruptcy or winding up, or on the appointment of a receiver over any assets of a person. Please refer to: https://www.elegislation.gov.hk/hk/cap571?xpid=ID_1438403465816_001 *HKCC Participant default* The protection afforded to "default proceedings and default rules" goes beyond just calculating the net amount and also includes any provisions in the HKCC Rules which deal with a HKCC Participant default and which comply with Part 5 of Schedule 3 of the SFO.

	Finality Division 3 of Part III of the SFO sets out the regulatory framework for RCHs including provisions for recognition of an RCH and the duties of an RCH as well as the statutory protections for an RCH. The Proceedings of recognized clearing house take precedence over law of insolvency (Section 45): (1) None of the following shall be regarded as to any extent invalid at law on the ground of inconsistency with the law relating to distribution of the assets of a person on insolvency, bankruptcy or winding up, or on the appointment of a receiver over any of the assets of a person: (a) "market contracts"[2] with an RCH and the disposal of property pursuant to "market contracts"; (b) the provision of "market collateral"[3] to an RCH; contracts effected by an RCH for the purpose of realizing property provided as "market collateral"; disposals of property pursuant to such contracts; or disposals of property in accordance with the rules of an RCH as to the application of property provided as "market collateral"; (c) a "market charge"[4] taken by an RCH; a disposal of property as a result of which the property becomes subject to a "market charge"; any transaction pursuant to which that disposal was made; or a disposal of property made in enforcing a "market charge"; and (d) "default proceedings"[5] of an RCH. The finality conferred as mentioned above means that actions taken by an RCH upon a default of its CP and GCP in respect of market contracts and the dispositions of market collateral or assets subject to a market charge are not vulnerable to insolvency avoidance and clawback laws otherwise applicable upon the insolvency of a CP and GCP in Hong Kong. The SFO under Part III that provide the protection to the HKCC can be found in sections 45, 49 and 50 within the following: https://www.elegislation.gov.hk/hk/cap571?xpid=ID_1438403465613_003 [2] "Market contract" means a contract subject to the rules of an RCH entered into by the RCH with its clearing participant whether or not pursuant to a novation. [3] "Market collateral" means any property which is held by or deposited with an RCH for the purpose of securing liabilities arising directly in connection with the RCH's ensuring the settlement of a market contract. [4] "Market charge" means a charge (whether fixed or floating) in favor of an RCH over any property which is held by or deposited with the RCH and for the purpose of securing liabilities arising directly in connection with the RCH's ensuring the settlement of a market contract. [5] "Default proceedings" means any proceedings or other action taken by an RCH under its default rules.

	Collateral All margin is transferred by HKCC Participants to the HKCC by way of outright transfer regardless of whether it is cash or non-cash collateral (see Rule 404(d) of the HKCC Rules). https://www.hkex.com.hk/-/media/HKEX-Market/Services/Rules-and-Forms-and-Fees/Rules/HKCC/Rules/CC_IV.pdf?la=en Guarantee/ reserve fund contributions and margin will qualify as "market collateral" under the SFO (see definitions in section 18(1) and 18(7) in the link https://www.elegislation.gov.hk/hk/cap571?xpid=ID_1438403465410_003 "Market collateral" benefits from the protections afforded by sections 52, 53 and 56 of the SFO, which prevent third parties from attempting to seize the property deposited with the clearing house or apply it otherwise than in accordance with the rules of the clearing house. As contributions to the Guarantee/Reserve Fund (by both the HKCC and HKCC Participants) and margin provided by HKCC Participants constitute "market collateral" they will benefit from the protection of these provisions.
Key Consideration 2 An FMI should have rules, procedures, and contracts that are clear, understandable, and consistent with relevant laws and regulations.	The HKCC Rules and Procedures govern the contractual relationship between the HKCC and its participants. The HKCC ensures that its rules and procedures are clear, understandable and consistent with relevant laws and regulations by: (a) ensuring they are drafted and scrutinized by in-house lawyers and, on occasion, external counsel; (b) ensuring they are subject to standard internal governance and approved by the board; and (c) seeking SFC's approval for any amendment to the existing HKCC Rules and HKCC Procedures. Under section 41 of the SFO, no rule or amendment of any rule will have effect without written approval of the SFC.
Key consideration 3 An FMI should be able to articulate the legal basis for its activities to relevant authorities, participants, and, where relevant, participants' customers, in a clear and understandable way.	The HKCC Rules and Procedures are governed by the laws of Hong Kong. Amendments to the HKCC Rules and HKCC Procedures are drafted and/or reviewed by in-house lawyers of the HKEX Group and where considered appropriate/necessary external legal opinions are sought. No rule or amendment of any rule will have effect unless the SFC has given its approval in writing. The HKCC outlines and (as needed) evidences the legal basis for its activities to the SFC upon request. Where appropriate, the HKCC shares the existence of relevant legal opinions with appropriate recipients, such as members of the HKEX's Clearing Consultative Panel, etc. in an effort to promote confidence and transparency among the HKCC Participants.
Key Consideration 4 An FMI should have rules, procedures, and contracts that	**Enforceability of rules, procedures and contracts** There is a high degree of certainty that actions taken under the HKCC Rules and the HKCC Procedures are enforceable and cannot be voided, reversed or subject

are enforceable in all relevant jurisdictions. There should be a high degree of certainty that actions taken by the FMI under such rules and procedures will not be voided, reversed, or subject to stays.	to stays. This is especially so in the light of the SFO provisions that expressly override various insolvency laws in relation to the HKCC. Regarding the clearing services used, the HKCC's participants submit themselves to the Hong Kong law once they sign the clearing agreements.
	Degree of certainty for rules and procedures The HKCC has engaged independent law firms to issue Hong Kong legal opinions which provide a high level of confidence that the HKCC Rules (including the default procedures and the contract re-novation and delivery arrangements for physically settled contracts) are enforceable under the laws of Hong Kong and a high degree of certainty on the finality of actions taken under the HKCC Rules. The HKCC is not aware of any court of any relevant jurisdiction that has held its activities or arrangements to be unenforceable.
Key Consideration 5 An FMI conducting business in multiple jurisdictions should identify and mitigate the risks arising from any potential conflict of laws across jurisdictions.	The HKCC does not conduct business as such across multiple jurisdictions (currently all HKCC Participants are incorporated in Hong Kong). The HKCC does accept and hold US Treasuries delivered by the HKCC's participants at its account opened with Clearstream Banking S.A., an international central securities depositories (ICSDs), incorporated in Luxembourg. The HKCC has obtained a Luxembourg legal opinion, which provides a high level of confidence that the outright transfer of ownership of US Treasuries pursuant to the HKCC Rules is recognized as being legal, valid, binding and enforceable under Luxembourg law once the book entry is made on the HKCC's account at Clearstream. In addition, the legal opinion confirms that the Luxembourg domestic rules of conflict will give effect to the choice of Hong Kong law by the HKCC and each HKCC Participant as the governing law of the HKCC Rules and the HKCC Procedures. Furthermore, in any proceeding taken in Luxembourg for the enforcement of the provisions relating to the transfer of ownership in the collateral in the form of US Treasuries, the courts of Luxembourg should recognize and enforce such provisions in accordance with the Hong Kong law. The Board of Supervisors of the ESMA adopted a decision to recognize the HKCC as a third country CCP under Chapter 4 of Title III of the EMIR on 27 April 2015.
Key Conclusions for Principle 1	The HKCC has a well-founded, clear, transparent and enforceable legal basis for each material aspect of its activities in all relevant jurisdictions. The HKCC rules, procedures, and contracts are consistent with relevant laws and regulations in relation to novation and open offer, collateral managements, netting and setting-off arrangements, and protecting the rights and interest of the HKCC and its participants in the event of a default. This provides a high degree of certainty that actions and measures taken by the HKCC, under its rules and procedures, will not be voided, reversed, or subject to stays. Furthermore, the HKCC has obtained a Luxembourg legal opinion on potential conflict of law, which provides a high level of confidence that the outright transfer of ownership of US

	Treasuries pursuant to the HKCC Rules is recognized as being legal, valid, binding and enforceable under Luxembourg law once the book entry is made on the HKCC's account at Clearstream.
Assessment of Principle 1	Observed
Recommendations and comments	While the settlement of transactions cannot be revoked or unwound, the legal environment in Hong Kong would benefit from clearly specifying the timing of finality from a legal viewpoint. This should be defined operationally at the level of the system, supported by legislation.

Principle 2. Governance An FMI should have governance arrangements that are clear and transparent, promote the safety and efficiency of the FMI, and support the stability of the broader financial system, other relevant public interest considerations, and the objectives of relevant stakeholders.	
Key Consideration 1 An FMI should have objectives that place a high priority on the safety and efficiency of the FMI and explicitly support financial stability and other relevant public interest considerations.	As an RCH, HKCC's objectives are guided by its statutory duties under Section 38 of the SFO. The HKCC is required to: (a) ensure that there are orderly, fair and expeditious clearing and settlement arrangements for Hong Kong's derivatives market; (b) ensure that risks associated with HKCC's business and operations are managed prudently; and (c) act in the interest of the public in carrying out its duties. These objectives are also stated in the PFMI Disclosure which is available on the HKEX website. https://www.hkex.com.hk/Services/Clearing/Listed-Derivatives/PFMI?sc_lang=en The implementation of HKCC's objectives are overseen and supported by the HKEX Board which has duties, powers and functions, amongst others, to— (a) make rules for the proper regulation and efficient operation of the clearing and settlement facilities which the HKCC operates, for the regulation of its clearing participants as well for the establishment and maintenance of compensation arrangements for the investing public; (b) make rules which provide for the taking of proceedings or other action if a clearing participant appears to be unable, or likely to become unable, to meet its obligation in respect of all unsettled or open market contracts to which it is a party; and (c) formulate and implement appropriate procedures for ensuring that its clearing participants comply with the HKCC's rules.

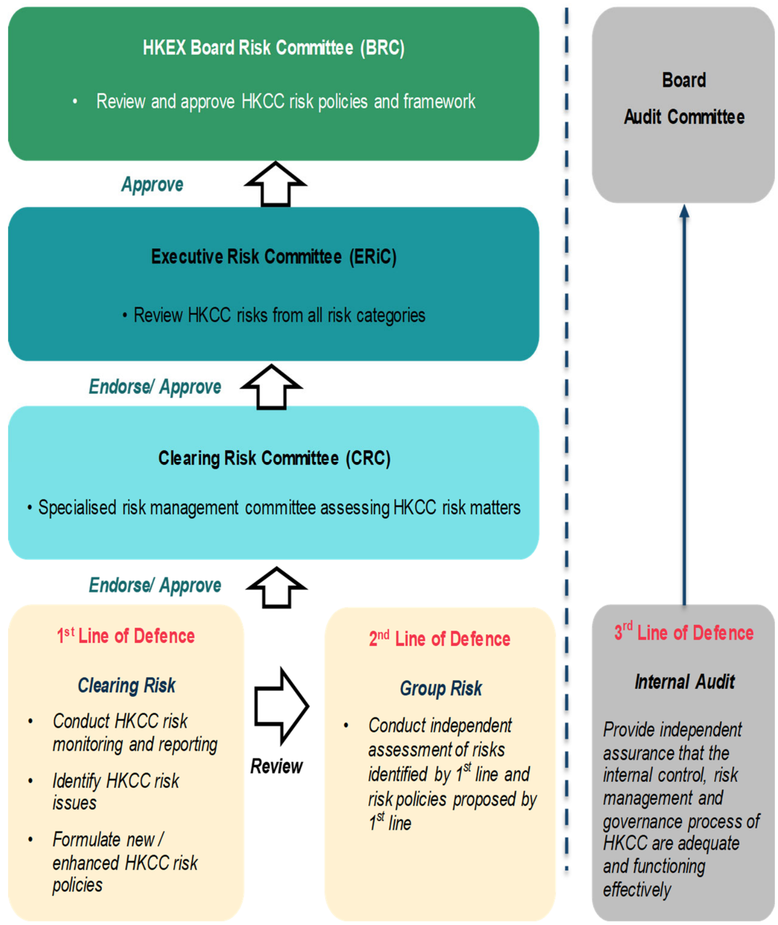
Key Consideration 2 An FMI should have documented governance arrangements that provide clear and direct lines of responsibility and accountability. These arrangements should be disclosed to owners, relevant authorities, participants, and, at a more general level, the public.	**Governance of the HKCC** The HKCC governance structure is imbedded in that of the HKEX Group, which is to adopt a group governance structure over its Hong Kong regulated exchanges and clearing houses, including the HKCC. Hence, The HKEX Board and management oversee and manage all the HKEX operations, including the HKCC. The HKCC Board currently consists of four directors, who are senior executives of the HKEX. The HKCC Board directs and manages the activities of the HKCC in accordance with the HKCC's Articles and Association, the HKCC Board's Terms of Reference, the HKCC Rules, the HKCC Procedures, the applicable law and the regulatory regime governing the HKCC. In addition, the HKCC Board has delegated its power to adjudicate disciplinary matters to the Disciplinary Committee and the Disciplinary Appeals Committee of the HKFE. The HKCC Board has multiple roles and responsibilities as set out in its Terms of Reference, which are publicly available on the HKEX Group website. https://www.hkexgroup.com/-/media/HKEX-Group-Site/ssd/Org/terms_ref/documents/hkcc_board.pdf The HKCC Board is responsible for: • Making rules for the proper regulation and efficient operation of HKCC and for the regulation of HKCC's clearing participants; • Ensuring that HKCC provides and maintains adequate and properly equipped premises, competent personnel and systems at all times. • Monitoring the company's strategic and annual operating plan; and • Overseeing and formulating internal controls and risk management policies. HKCC operates in accordance with its Articles of Association. The Articles of Association of HKCC constitute "rules" of an RCH under the SFO which were approved in writing by the SFC. The Articles of Association of HKCC set out provisions governing the appointment of HKCC's directors, the proceedings of HKCC's directors, including the operation of Board meetings and delegation of any powers of the HKCC Board to committees. The Articles of Association are filed with the Hong Kong Registrar of Companies. The operation and administration of the HKCC Board is supported by a centralized secretarial service function

	Disclosure of governance arrangements HKCC governance arrangements can be found on the website at the following links: Composition of HKCC Board: https://www.hkexgroup.com/About-HKEX/Organisation/Principal-Subsidiaries/List-of-Directors?sc_lang=en Committee of the HKCC: https://www.hkexgroup.com/About-HKEX/Organisation/Principal-Subsidiaries/Committees?sc_lang=en Terms of Reference of HKCC Board: https://www.hkexgroup.com/-/media/HKEX-Group-Site/ssd/Org/terms_ref/documents/hkcc_board.pdf
Key Consideration 3 The roles and responsibilities of an FMI's board of directors (or equivalent) should be clearly specified, and there should be documented procedures for its functioning, including procedures 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.	**Roles and responsibilities of the boards** The roles and responsibilities of the HKCC Board are clearly specified in its Terms of Reference. These roles and responsibilities include, amongst others, managing HKCC's business; ensuring HKCC's compliance with the laws, rules and regulations governing it; preparing HKCC's financial statements and reviewing HKCC's performance. For further information, please refer to Key Consideration 2 of Principle 2 above. The procedures for the functioning of the HKCC Board is part of the HKEX Articles of Association. In particular, all HKCC Directors are required to avoid conflicts of interest and fully disclose any interest in transactions, arrangements, contracts or potential contracts with HKCC and shall abstain from discussion and voting if there is an actual or potential conflict of interest. Similar conflicts of interest requirements, in relation to conflicts between HKEX Group, its subsidiaries and its directors, are also set out in a HKEX handbook which is applicable to HKCC directors and other directors of the HKEX Group. https://www.hkexgroup.com/-/media/HKEX-Group-Site/ssd/Corporate-Governance/Documents/Handbook_website.pdf. The HKEX Board plays a central supporting and supervisory role in the HKEX corporate governance structure, provides leadership and guidance for all the HKEX Group's activities, including the HKCC's activities, and oversees the execution of the HKEX Group's business

	strategies. The HKEX Board has the overall responsibility for ensuring that appropriate systems of risk management and internal control are in place. The roles and responsibilities of the HKEX Board and its committees are clearly specified and publicly available on the HKEX Group website.
	Review of performance The HKCC does not review its own performance, nor that of individual directors of HKCC, it is a wholly owned subsidiary of HKEX and in accordance with the integrated approach that has been adopted. The HKCC is subject to the oversight and scrutiny of the HKEX Board committees on specific matters. These matters include the statutory Risk Management Committee (RMC), Board Risk Committee (BRC), Audit Committee (AC), Remuneration Committee (RC), Investment Committee (IC) and Executive Committee.
Key Consideration 4 The board 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).	In accordance with the HKCC's Terms of Reference, the HKCC Board is comprised of four members with a mix of appropriate skills including operational, financial and risk management. As of 1 September 2019, the members of the HKCC Board are: the Chief Executive of HKEX (who also serves as the HKCC Board Chairman), the HKEX Head of Post Trade, the HKEX Group Chief Financial Officer and the HKEX Co-President & COO. The HKCC Board does not have any Independent Non-Executive Directors. The SFC is notified of appointments to the HKCC Board. Under Section 38(5)(b) of the SFO, HKCC has a duty to provide and maintain competent personnel at all times (this duty is also reflected in HKCC's Terms of Reference). Under Section 43 of the SFO, the SFC may withdraw HKCC's recognition as an RCH should they consider that, amongst other things, an RCH has failed to comply with any requirement of the SFO including Section 38(5)(b).
Key Consideration 5 The roles and responsibilities of 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.	**Roles and responsibilities of management** As a wholly owned subsidiary of HKEX Group, an integrated approach is taken to the appointment, roles and responsibilities of the HKCC's management. HKCC's management consists of HKEX employees, executives and staff within the HKEX Group, who design, implement and administer the HKCC Rules and the HKCC Procedures and manage the HKCC operations and its clearing, settlement, and collateral management services. The HKCC's senior management team is comprised of the Head of Post Trade and his direct reports including the Head of Clearing Risk Management. The senior management team is responsible for, among others, making recommendations to, and implementing decisions of, the HKCC Board, managing the operation of the company's business, ensuring

	the HKCC's activities are consistent with its objectives and risk tolerance, and that internal control and risk management procedures are properly designed, documented and executed. As mentioned above, HKCC is an RCH and has a duty to provide and maintain competent personnel at all times, in accordance with Section 38(5)(b) of the SFO and HKCC's Terms of Reference. Under Section 43 of the SFO, the SFC may withdraw HKCC's recognition as an RCH should they consider that, amongst other things, a RCH has failed to comply with any requirement of the SFO including Section 38(5)(b).
	Experience, skills and integrity As the management of HKCC is an integral part of that of HKEX Group, the recruitment of management and employees is performed through HKEX. A summary of the policy in relation to recruitment is set out below: (a) recruit the best-qualified people, taking into account technical/academic qualifications, competencies and potential, past performance, communication and interpersonal skills, and professional and personal integrity; and (b) maintain a pool of human resources according to the manpower requirements and planning of HKEX. For the recruitment of HKCC senior management, as well as other HKEX Group senior management, the HKEX Board will, where appropriate, form various selection committees of different compositions to shortlist and interview the prospective candidates. More broadly, the HKEX Nomination and Governance Committee's duties include, giving full consideration and recommendations to the HKEX Board on succession planning for senior management, including HKCC senior management. This Committee considers factors such as the challenges and opportunities facing the HKEX Group and the skills and expertise required in the future. All HKEX employees, including those who support HKCC operations, are subject to a Code of Conduct as set out in the Human Resources Manual, which not only requires employees to maintain high ethical standards and strong personal integrity, but also imposes specific ethical obligations on employees in conducting business of HKCC and other HKEX Group companies. Compliance with the Code of Conduct is a condition of employment and those who are in breach of any provision of the Code of Conduct may be subject to summary dismissal.

Key Consideration 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.	**Risk management framework** The risk management framework of HKCC is part of HKEX Group's framework, including for HKCC, HKSCC, SEOCH and OTC Clear. The HKEX Board has overall responsibility for ensuring that appropriate systems of risk management and internal control are in place, consistent with the integrated approach set out in Section B of the Overview of this Self-Assessment. The adequacy and effectiveness of HKCC's risk management and internal control systems are subject to the supervision and review of the HKEX Board, through the BRC and the AC. The BRC and AC operate in accordance with their own Terms of Reference, which are publicly available on the HKEX website: BRC Terms of Reference: https://www.hkexgroup.com/-/media/HKEX-Group-Site/ssd/Org/terms_ref/documents/risk_tor.pdf. AC Terms of Reference: https://www.hkexgroup.com/-/media/HKEX-Group-Site/ssd/Org/terms_ref/documents/ac_tor.pdf. HKCC's risk governance structure is based on a "Three Line of Defence" model with oversight and direction from the HKEX Board and various committees. The BRC is delegated by the HKEX Board to oversee the overall Risk Management Framework and to advise the HKEX Board on risk-related matters. Details of the Group's risk governance structure are set out below and in the Risk Committee Report which is publicly available on the HKEX Group website: https://www.hkexgroup.com/Corporate-Governance/Corporate-Governance-Framework/Corporate-Governance-Practices/Board-Committees/Risk-Committee?sc_lang=en **First Line of Defense** (a) The management and individual Divisions/Departments/functions are responsible for the day-to-day management of operational risks and implementation of mitigation measures. All Division Heads are required to review quarterly and confirm annually that the risk management and internal control systems adopted by the Group are appropriate and effective. (b) Clearing Risk Management under the Post-Trade function of the HKEX is responsible for monitoring and ensuring risks faced by the clearing houses, as central counterparties, are managed prudently, and implementing and maintaining a comprehensive

	risk management framework. Details of the risk management framework are available in the HKEX website: https://www.hkex.com.hk/Services/Clearing/Listed-Derivatives/Risk-Management/The-Safeguards?sc_lang=en  **HKCC Clearing Risk – 3 Line of Defence Model** Clearing Risk Management has the following teams to manage the clearing risk functions: - On-Exchange Risk Control responsible for risk monitoring of HKCC and other Hong Kong on-exchange clearing houses

	- OTC & FIC Products & Risk Control responsible for risk monitoring of OTC Clear and implementation of OTC/Fixed Income and Currency (FIC) products/services initiatives - Market Infrastructure responsible for HKCC and other on-exchange clearing houses new projects/initiatives such as new products, trading and clearing initiatives, risk policies and regulatory related matters. - Market Risk responsible for margining and stress test frameworks, default fund, liquidity and general market risk analysis. - Credit Risk & Analytics responsible for clearing participant credit risk analysis, due diligence for new and existing clearing participants and programming support to the department **Second Line of Defense** (a) The Group Risk function is responsible for the development, implementation and maintenance of the HKEX Group Risk Management framework, policy and standards. It also ensures alignment, integration and consistency of risk management across the HKEX Group companies. (b) The Group Risk Management Framework mandates a consistent and effective approach applied across the HKEX clearing entities, including HKCC to manage risks associated with its business and operations. The framework is based on the International Standard ISO (International Organization for Standardization) 31000 Risk Management – Principles and Guidelines, and requires the risks specific to HKCC's clearing activities to be identified, assessed, reported and monitored. Please see the Risk Committee Report for more details of the Group Risk Management Framework: https://www.hkexgroup.com/-/media/HKEX-Group-Site/ssd/Corporate-Governance/Documents/riskreport_e.pdf HKCC's second line of defence is the Group Risk function which is responsible for conducting independent assessment of (i) risks identified and (ii) risk policies proposed by the first line of defence. The Clearing Risk Committee, comprised of members from the first and second line of defence, is a specialized risk management committee that assesses clearing risk matters related to HKCC as well as the other on-exchange CCPs of the HKEX Group in Hong Kong. The Clearing Risk Committee reports into the Executive Risk Committee which reviews HKCC risks from all risk categories. The Executive Risk Committee reports to the Board Risk Committee which

is responsible for overseeing the risk management framework and reviewing and approving HKCC's risk policies.

(c) Responsibilities of the BRC include:
   - (i) advising the HKEX Board on the HKEX Group's risk appetite, profile and tolerance;
   - (ii) overseeing the risk management framework to identify and deal with financial, operational, legal, regulatory, technology, reputational, information security and cyber risks, and strategic risks faced by the HKEX Group;
   - (iii) reviewing the HKEX Group's risk policies, risk reports and breaches of risk tolerances and policies;
   - (iv) considering current and emerging risks and risk exposures relating to the HKEX Group's business and strategies to ensure that appropriate arrangements are in place to control and mitigate the risks effectively; and
   - (v) reviewing the effectiveness of the HKEX Group's risk control/mitigation tools and risk management functions.

Risk Management Committee (RMC)

The RMC, established by the HKEX Board pursuant to section 65 of the SFO, has the responsibility to oversee the HKEX's duty to act in the public interest. The key responsibilities of RMC are formulating policies on risk management matters relating to the activities of HKEX including stock exchange and clearing houses and to submit such policies to the HKEX Board for consideration, reviewing policies employed by HKEX pertaining to significant risk areas and advising on matters raised by the HKEX Board of Directors and the management that may have an impact on the stability and integrity of the securities and derivatives markets of Hong Kong. In particular to clearing risk, the internal Clearing Risk Management under the Post-Trade function meets on a quarterly basis with the RMC to provide an update on the clearing houses (i.e. HKCC's, HKSCC, SEOCH) risk exposures and on the effectiveness of its risk management framework. In addition, the RMC will be consulted in relation to any proposed material changes to the risk management framework before submitting to the HKEX Board for approval.

The RMC is chaired by the chairperson of HKEX Board and three members appointed by the Financial Secretary (FS), and two HKEX executive members. The Terms of Reference of the RMC is published on the HKEX website:

https://www.hkexgroup.com/-/media/HKEX-Group-Site/ssd/Org/terms_ref/documents/rmc_tor.pdf

Third Line of Defense

	(a) The Internal Audit (IA), with its function independent of the HKEX Group's business operations and complementary to that of the external auditor, provides objective assurance to the HKEX Board through the AC that sound internal control systems are maintained and operated by the organization. Furthermore, the IA should actively support the HKEX Group including HKCC in achieving its business objectives, safeguarding its assets and reputation, and raising its control culture awareness. Using a risk-based approach, the IA schedules its internal audits annually based on a 3-year plan approved annually by the AC. The 3-year audit plan is formulated to ensure a systematic coverage of all the Group's key operations and internal controls, including the clearing activities of HKCC. The Group Head of the Internal Audit reports directly to the AC on audit matters and is authorized to communicate directly with the Chairman of the HKEX and the HKEX Board. The Internal Audit Methodology and Process are available in the HKEX website: https://www.hkexgroup.com/Corporate-Governance/Corporate-Governance-Framework/Corporate-Governance-Practices/Accountability-and-Audit/Internal-audit/Internal-Audit-Methodology-and-Process?sc_lang=en. (b) The external audit provides the HKEX Board with objective assurance on whether the HKEX Group's financial statements give a true and fair view of the financial position and performance of the HKEX in all material aspects. The HKEX Board, through the AC, considers the recommendations of the external auditor on the operational and financial risks identified during their annual audit of the HKEX (c) The AC, as a sub-committee of the HKEX Board, is tasked: (i) To serve as a focal point for communication between the Directors, external auditor and the IA; (ii) To assist the HKEX Board in fulfilling its responsibility by providing an independent review and supervision of financial reporting, and monitoring and reviewing the effectiveness of the HKEX Group's internal controls and the adequacy of the external and internal audits; (iii) To review the appointment of external auditor on an annual basis as well as to oversee the relationship with the external auditor to ensure continuing auditor independence; (iv) To review the HKEX Group's assessment of corruption risks and related mitigating controls and to oversee compliance with the HKEX Group's anti-bribery and anti-corruption policy; and (v) To review whistleblowing arrangements for the HKEX Group's employees and third parties and to ensure that proper arrangements are in place for fair and independent

	investigation of the concerns raised and for appropriate follow-up action.
	Authority and independence of risk management and audit functions Please see the description in the previous section
Key Consideration 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.	**Identification and consideration of stakeholder interests** The HKEX has four consultative panels, namely (a) Cash Market Consultative Panel; (b) Derivatives Market Consultative Panel; and (c) Clearing Consultative Panel, and (d) the Risk Working Group (RWG) to identify and solicit external stakeholders' interest in relation to clearing and risk management matters. The Cash Market and Derivatives Market Consultative Panels are respectively chaired by a member of the HKEX Board and comprised of a cross-section of experienced market participants from the cash and derivatives markets. The Consultative Panels acts as an advisory body to HKEX Board and provides market expertise and advice relating to the cash and derivatives markets such as the needs of intermediaries, issuers, investors and other market participants, technology challenges and new product opportunities. The Clearing Consultative Panel is chaired by a member of the HKEX Board and comprised of a cross-section of experienced market participants of the on-exchange CCPs of the HKEX Group in Hong Kong, including representatives from HKCC Participants. The Clearing Consultative Panel acts as an advisory body to HKEX Board and provides market expertise and advice relating to the clearing related matters such as international trends and the needs of intermediaries. The RWG is chaired by the Head of Post Trade with representatives from prominent general and direct clearing members of HKCC and other on-exchange CCPs of the HKEX Group in Hong Kong with active clearing activities covering major asset classes. The Risk Working Group provides an open forum to facilitate discussions with market participants on topics relating to risk matters of HKCC and the on-exchange CCPs.
	Disclosure In determining its operational arrangements, the HKCC takes into account: (a) the needs of the local market and environment; (b) the needs of overseas users of the derivatives market in Hong Kong; and (c) the requirements of international standards and practices. The HKCC conducts soft consultations with relevant market participants

	and industry groups in addition to soliciting the views of the Clearing Consultative Panel and RWG on the HKCC's proposals before they are finalized. For major changes to the policies, clearing and settlement arrangement, operating structure, and regime that would affect the HKCC and the HKCC Participants, the HKCC also conducts public consultations to seek views directly from the stakeholders.
Key conclusions for Principle 2	The HKCC governance structure is imbedded in the HKEX Group, which cover its regulated exchanges and clearing houses. Hence, The HKEX Board and management oversee and manage all the HKEX operations, including those of the HKCC. The members of HKCC board are the same of other two CCPs boards, i.e. HKSCC and SEOCH. The key functions of HKCC are centrally integrated and coordinated as part of HKEX Group, using and sharing the resources, arrangements and infrastructures provided and made available within the HKEX Group. Key functions such as clearing, collateral management, treasury, risk management and internal audit are centralized at the HKEX Group level. Furthermore, major committees are set up at the level of HKEX Group, including the RMC, AC, Nomination and Governance Committee, RC and Investment Committee, Disciplinary Committee and Disciplinary Appeals Committee. The HKEX Group has clear and transparent governance arrangements, which comply with the regulatory requirements to act in the interest of the public and to support the stability of the financial system in Hong Kong. The HKEX has established the RMC and the BRC and implemented a GRM framework to identify, monitor and manage material risks for all its CCPs activities. It also established a specialized risk management committee, namely Clearing Risk Committee (CRC), which focuses on reviewing and assessing risk matters concerning HKCC and other Hong Kong's clearing houses, The HKEX has dedicated risk management and internal control functions in place to execute risk management framework and conduct independent reviews. The RMC is chaired by Chairperson of HKEX board and comprises 7 other members (pursuant to the SFO, the FS shall appoint 3 to 5 members, while the HKEX shall appoint not more than 2 members. The roles and responsibilities of the HKCC Board and management are defined in the terms of reference, which is publicly available on the HKEX website

Assessment of Principle 2	Broadly observed
Recommendations and comments	The HKCC has a hybrid governance structure; an independent legal entity with own capital and board, while key functionalities are set up at the level of the HKEX Group. These centralized functionalities cover the entire group's activities including trading, clearing, settlement, custody, data gathering, etc. The HKCC does not have an independent Risk Management Committee for clearing comprises independent members. While the current governance structure of HKEX may be considered effective, it creates potential uncertainty with regards the roles, responsibilities and accountability of its board to maintain sound and efficient clearing activities. Furthermore, the current governance structure may give rise to a perceived conflict of interest between balancing considerations of business development and adhering to appropriate risk controls. It may also dilute the effectiveness of HKCC's risk control mechanisms for clearing activities as important decisions are taken at the HKEX Group level. To address this issues, the HKCC consider establishing its own dedicated governance structure with standalone board that includes non-executive board members and decentralized key functionalities, including management framework of all risks related to clearing activities. Preferably, it would be more effective to consolidate HKCC, HKSCC and SEOCH into a single CCP with an appropriate governance structure, in terms of a dedicated board that includes independent members, and dedicated key functionalities and decision-making process. The CRC and the Executive Risk Committee (ERiC), acting as risk management committees to reviewing and assessing risks related to HKEX's clearing houses, (HKCC, HKSCC, SEOCH and OTC Clear), are composed exclusively of managers and senior of managers of HKEX Group. The ERiC reports to the Board Risk Committee (BRC) that is reviewing and the overall risk policy and framework of the HKEX Group. The BRC is chaired by the Chairperson of HKEX Group. In line with international best practice, the RMC, which is supposed to act as an advisory committee to the HKEX board, should be chaired by an independent member. The HKCC should set up its own independent risk management committee for clearing activities, chaired by an independent person and comprising independent members. According to the PFMI, the risk management function should have sufficient independence and the CCP's risk committee should be chaired by a sufficiently knowledgeable individual who is independent of the FMI's executive

<table>
<tr><td></td><td>management to have the ability to exercise objective, independent judgment without undue influence from executives.</td></tr>
<tr><td colspan="2">Principle 3. Framework for the Comprehensive Management of Risks
An FMI should have a sound risk-management framework for comprehensively managing legal, credit, liquidity, operational, and other risks.</td></tr>
<tr><td rowspan="2">Key Consideration 1
An FMI should have risk-management policies, procedures, and systems 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 periodic review.</td><td>Risks that arise in or are borne by the FMI

The HKCC's activities give rise to the following key risks:
• legal risk
• liquidity risk
• credit risk
• market risk
• settlement risk
• general business risk
• custody and investment risk
• operational risk; and
• cyber risk.</td></tr>
<tr><td>Risk management policies, procedures and systems
The Risk Management Framework of HKCC is an integral part of that of the HKEX Group, approved by the BRC. It mandates a consistent and effective approach, applied across the Group to manage the risks and is based on the international standard ISO (International Organization for Standardization) 31000- Risk Management. The risks specific to HKCC's clearing activities are identified, assessed, reported and monitored. Please see the Risk Committee Report for more details of the Group Risk Management Framework:

https://www.hkexgroup.com/-/media/HKEX-Group-Site/ssd/Corporate-Governance/Documents/riskreport_e.pdf

Risk Statement
Effective risk management is important to the Group's achievement of its strategic goals. The Group manages risk across multiple risk domains, including but not limited to financial, business and strategic, operational (including IT and cyber security) and legal and regulatory risks. Business operations are managed in line with risk appetite tolerances set by the Board.

The HKCC adopts this framework and employs a holistic information and risk-control system to provide it with timely information to identify, monitor, and manage its risks.

Several procedures and controls are used by HKCC to identify and measure and manage the risk borne by its activities. For instance. It</td></tr>
</table>

	receives real-time price data from the HKFE for the accurate and timely measurement and aggregation of risk exposures. Furthermore, it uses various price data inputs to determine the daily settlement price for each contract, which is used in the margining and mark-to-market processes. The HKCC monitors its current exposure and potential future exposure to each HKCC Participant's Market Contracts during each business day. It uses the DCASS, together with the CCMS, to aggregate and centrally manage its exposures and calculate the amount of Margin or other collateral to be collected from each HKCC Participant. Please refer to the description under Principle 6 on Margin. The HKCC monitors various metrics on a daily basis as part of its risk monitoring framework, including but not limited to: (a) the adequacy of coverage of margin against the HKCC's exposures, at current market prices; and (b) stress test data relative to historic exposures compared across the HKCC Participants and under extreme but plausible market conditions.
	Review of risk management policies, procedures and systems The Clearing Risk Management under the Post-Trade Division meets on a quarterly basis with the RMC to provide an update on the HKCC's risk exposures and on the effectiveness of its risk management framework. The RMC will be consulted in relation to any proposed material changes to the risk management framework before they are submitted to the HKEX Board for approval. In drafting new policies or making material changes to existing policies, the Clearing Risk Management would seek market participants' feedback in the RWG which is a quarterly forum to facilitate discussion with and solicit feedback from market participants. There is also a BRC which meets at least four times a year. Its main function is to oversee the overall risk management framework and advise the HKEX Board on the HKEX Group's risk-related matters. Reporting to the BRC, the Executive Risk Committee ("ERiC") is responsible for reviewing and endorsing risk management policy and frameworks, and identifying and reviewing risks from all risk themes. In addition, the Clearing Risk Committee (CRC) of the HKEX Group is acting as a specialized risk management committee focuses on

<table>
<tr><td></td><td>reviewing and assessing risk matters concerning the HKEX's clearing houses, including the HKCC, HKSCC, SEOCH and OTC Clear, and reports to both the ERiC and the BRC. The composition of the CRC includes:

• Head of Post Trade;
• Group Risk Officer;
• Deputy Group Risk Officer
• Head of Clearing Risk Management;
• Representative from Legal Services Department, as required.</td></tr>
<tr><td>Key Consideration 2
An FMI should provide incentives to participants and, where relevant, their customers to manage and contain the risks they pose to the FMI.</td><td>Incentives to manage risks

Incentives for HKCC's participants to manage their risks are made via capital requirements, margin requirements, etc. and applying penalties for non-compliance with HKCC rules. The HKCC Participants may be required to seek alternative clearing arrangements if they are unable to manage their risks to a level acceptable to the HKCC.

The HKCC operates transparently, and provides sufficient information for the HKCC's participants and other interested parties to identify and evaluate the risks associated with using the HKCC's services and facilities. The HKCC provides its participants with relevant information such as open positions, collateral balance and valuation etc. via the DCASS and the CCMS in a timely manner to facilitate their risk monitoring and management. Furthermore, details of the risk management tools such as margining guide, client margining methodology, margin table etc. are publicly available on the HKEX website.
The HKCC organizes regular training classes to help the HKCC's participants and potential applicants understand the DCASS/CCMS operations and risk management arrangements.</td></tr>
<tr><td>Key Consideration 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.</td><td>Review of material risks

In line with the HKEX GRM Framework, the HKCC is required to monitor its internal and external risk profile to ensure risks remain within the HKEX Board approved risk appetite. The Group Risk function undertakes frequent reviews of risks and liaises with the HKCC to ensure risks are accurately recorded and mitigation plans are implemented. Material risks include:
• legal risk
• liquidity risk
• credit risk
• market risk</td></tr>
</table>

	• settlement risk • general business risk • custody and investment risk • operational risk, incl. cyber risk. The Group Risk function consists of Group Credit & Quantitative Analysis Department, Group Chief Information Security Officer and Enterprise Risk Management Department. The Group Credit & Quantitative Analysis Department has the following teams to oversee the clearing risks: - Group Credit Risk Management team is responsible for the monitoring of all credit risks faced by the Group, including the clearing houses. - Group Quantitative Risk Model Development team is responsible for evaluating and modelling risk exposure to HKEX's clearing houses. - Group Regulatory Analytics, Risk Policy & FMI Strategy team is responsible for leading efforts across HKEX clearing houses in new risk management initiatives such as policy alignment reviews, risk reporting implementation and other clearing risk management related projects. - The Default Management team is responsible for ensuring an appropriate and consistent default management process to handle the default of clearing counterparties for Hong Kong clearing houses Details of the composition and tasks of the Group Risk Division are available in the HKEX website: https://www.hkexgroup.com/About-HKEX/Organisation/Management/Management-Functions/Group-Risk-Management?sc_lang=en
	Risk management tools The HKEX has put in place a GRM framework to identify, assess, monitor and manage the entire range of risks inherent in its business and operations arising from both internal and external sources on an ongoing basis. The HKEX and the HKCC risk management framework includes a range of tools and frameworks, covering the following risks: (a) legal risk – the Hong Kong legal framework supports and allows the HKCC to conduct all material aspects of its activities as a CCP. (b) liquidity risk – the HKCC assesses its liquidity needs daily, including using stress testing and maintains sufficient liquid

	resources to ensure that it is able to meet its payment and delivery obligations in a timely manner including under default scenarios in extreme but plausible market conditions. (c) credit risk – to minimize the risk that the HKCC Participants would be unable to meet their payment and delivery obligations under Market Contracts, and the requirements for Margin, RF contribution (RF Contribution) and collateral, in a timely manner, the HKCC applies risk-related participantship requirements. These include the imposition of minimum liquid capital requirements and daily credit risk monitoring of the HKCC Participants through a set of risk metrics to determine and set the Margin and collateral required. The HKCC maintains financial resources sufficient to cover a wide range of potential stress scenarios including default scenarios in extreme but plausible market conditions. (d) market risk – the HKCC imposes margin requirements to cover current and potential future market fluctuations. All outstanding positions resulting from Market Contracts are marked to market and subject to Margin calculation on daily basis. Furthermore, the HKCC collects holiday margin to mitigate the potential market risk on the reopening of Hong Kong markets after a holiday break. (e) settlement risk – payments between the HKCC and the HKCC Participants are made via intra-bank transfers to and from the HKCC's bank accounts with the Settlement Banks. The HKCC minimizes settlement risk by imposing stringent appointment criteria on its Settlement Banks, ongoing monitoring on concentration of exposures and regular assessment of their performance. (f) general business risk – the HKCC follows the HKEX's GRM framework to identify, monitor and manage all risks including general business risk. External and internal factors including but not limited to regulatory developments, market conditions, business strategy and control procedures on spending are evaluated and reviewed regularly. (g) custody and investment risks – the HKCC adopts stringent selection criteria when appointing settlement and custodian banks to safe-keep its own investments and the HKCC Participants' assets. The HKCC's investment strategy follows the primary principles of the HKEX Group Investment Policy – Internally Managed Funds ("Investment Policy"), which is set by the IC and approved by the HKEX Board, with an aim to preserve capital, remain sufficiently liquid and minimize risk while optimizing return on investments.

	(h) operational risk – the HKCC follows the HKEX's GRM framework to identify, monitor and manage all risks including operational risks. Risk policies and frameworks are in place to address specific operational risks that may affect its critical operations and services, including cyber security risk, physical security risk and business continuity risk. (i) cyber risk – the HKCC operates within the HKEX Group's cyber security framework to identify, monitor and manage cyber risks. Key security mitigants, include IT network perimeter controls; cyber-attack drills; cyber threat prevention and detection systems; real time data loss monitoring; and cyber incident forensics and breach response procedures.
Key Consideration 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-down. An FMI should prepare appropriate plans for its recovery or orderly wind-down 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.	**Scenarios that may prevent an FMI from providing critical operations and services** The HKCC conducts regular business impact analysis of its critical business processes and systems. The HKCC identifies scenarios that could impair its operations and maintains appropriate contingency arrangements to minimize possible damage to the HKCC, its markets, participants and investors. The HKEX, together with the HKCC, maintains an up-to-date Market Contingency Plan ("MCP") and participates in the regular Market Contingency Rehearsal Exercise (Market Wide Rehearsal) led by the HKSAR Government. The HKEX's Business Continuity function provides coordinating support for the Market Wide Rehearsal with financial regulators and has a responsibility to develop, implement and support the HKEX's market contingency planning, policies, procedures and activities across the organization. The HKEX runs system recovery and business continuity drills regularly with relevant stakeholders where applicable.
	Recovery and orderly wind-down plans The HKCC maintains a recovery plan that is intended to be used in the event that the HKCC experiences a threat to its viability and financial stability which may prevent the continued provision of critical services. Consistent with the guidance in the CPMI-IOSCO recovery of FMI report, the recovery plan outlines the recovery planning process of the HKCC, including identification of critical services, stress scenarios, triggers to implement the plan, as well as the recovery tools available and the scenarios that the recovery tools should be applied to. In the extreme situation that the HKCC has decided it does not have the necessary resources to continue the clearing and settlement services, it will maintain its operations until it has

	wound down its clearing and settlement services in relation to futures and options contracts in an orderly manner ("Clearing Service Termination Event") with the remaining financial resources, as described under Principle 15: General Business Risk. Moreover, the HKCC has a comprehensive recovery plan, while it may have to rely on HKEX financial support in extreme but plausible circumstances. The HKCC will terminate every open contract between the HKCC and the HKCC Participants and all prevailing obligations in respect of each such contract between them shall cease and be replaced with the obligations to pay or receive the termination amounts in accordance with the HKCC Rules and the HKCC Procedures. In the event of an HKCC failure to pay event or an HKCC insolvency event as referred to in the HKCC Rules 545 to 551, the HKCC Participants have the right to terminate all their open contracts with the HKCC. At the time of termination, all obligations of the HKCC Participants will be closed-out, netted and set-off in accordance with the HKCC Rules and the HKCC Procedures.
Key Conclusions for Principle 3	The Risk Management Framework of HKCC is defined at the level of the HKEX Group with a sub-structure to cover the risks related to clearing activities. The framework aims to identify, assess, monitor and manage the entire range of risks inherent in its business and operations arising from both internal and external sources on an ongoing basis. The HKEX and the HKCC risk management framework includes a range of tools and frameworks, covering legal, liquidity, credit, operational, settlement, custody and investment, operational and cyber risks. This framework is validated continuously by its executive board. The HKCC maintains a recovery consistent with the guidance in the CPMI-IOSCO recovery of FMI report. The recovery plan outlines the recovery planning process of the HKCC, including identification of critical services, stress scenarios, triggers to implement the plan, as well as the recovery tools available and the scenarios that the recovery tools should be applied to.
Assessment of Principle 3	Observed
Recommendations and comments	The HKCC should consolidate its risk management framework in a comprehensive and overarching document, leveraging from the risk appetite statement and other relevant documents. This would enhance transparency and ensure consistency of a holistic approach to manage all associated risks with HKCC's activities. Furthermore, the shared critical functionalities, such as IT, could be a potential barrier for successful

	recovery/resolution of the HKCC and need to be addressed for its resolvability.
Principle 4. Credit Risk An FMI should effectively measure, monitor, and manage its credit exposures to participants and those arising from its payment, clearing, and settlement processes. An FMI should maintain sufficient financial resources to cover its credit exposure to each participant fully with a high degree of confidence. In addition, a CCP that is involved in activities with a more-complex risk profile or that is systemically important in multiple jurisdictions should maintain additional financial resources sufficient 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 to 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 that should include, but not be limited to, the default of the participant and its affiliates that would potentially cause the largest aggregate credit exposure to the CCP in extreme but plausible market conditions.	
Key Consideration 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.	**Credit Exposure to the HKCC Participants** The HKCC has a comprehensive Risk Management Framework to monitor and manage its credit exposure, based on several key components: (a) Participant admission requirements and regular risk scoring analysis for identifying and monitoring risks posed by the HKCC Participants; (b) Processes for mark-to-market, margining, collection of concentration risk margin, holiday margin and RF additional margin; (c) Capital Based Position Limit ("CBPL") imposed to ensure that risk exposure is commensurate with the financial strength of the HKCC Participants; (d) RF and other financial resources to cover default losses exceeding the collateral collected from the defaulting HKCC Participants; (e) Clear and enforceable default rules and procedures; and (f) Adequate collateral policy to those asset types with low credit, market and liquidity risks. The risk management framework is reviewed on a regular basis, including ad-hoc reviews conducted in response to changing regulatory requirements, business needs or developments in the financial markets. HKCC also seeks market feedback via RWG, consultative panels, industry associations and bilateral meetings with HKCC Participants. Any change to the framework will be subject to the established internal and external approval processes. The HKCC Participants will be informed of any changes where appropriate via circulars, which are publicly available on the HKEX website.

	Credit Exposure to Settlement Banks The HKCC has a robust framework to manage its credit exposure to its Settlement Banks. The framework covers financial and operational criteria for the appointment and ongoing monitoring of Settlement Banks. Please refer to the description under Principle 9 on Money Settlements.
Key Consideration 2 An FMI should identify sources of credit risk, routinely measure and monitor credit exposures, and use appropriate risk-management tools to control these risks.	**The HKCC Participant Admission Requirements and Regular Risk Scoring Analysis** Only entities regulated and supervised by the SFC can be admitted as HKCC Participants. They are obliged to submit financial returns to the SFC monthly. While the SFC regulates and supervises the HKCC Participants, the HKCC is responsible for monitoring its participants' clearing and settlement activities and the compliance with the HKCC Rules and procedures. In addition, the HKCC requires CPs and GCPs to have minimum liquid capital of HK$5 million and HK$20 million, respectively, which is higher than the minimum liquid capital required under the The Securities and Futures (Financial Resources) Rules (FRR). For a historical reason, banks were not admitted as clearing participants but the HKCC will admit banks as GCPs, starting from October 2019. The banks as GCP will be subject to a higher capital requirement. During its participant admission review process, the HKCC considers the key operational and internal control aspects of the applicant, including the experience of its key personnel and reviews its compliance and risk management policies and systems. All admitted HKCC Participants must comply with the continuing obligations as set out in the HKCC Rules. The HKCC routinely measures and monitors its current and potential future credit exposures to the HKCC Participants that are licensed corporations with reference to their monthly financial returns obtained through the SFC. Daily risk scoring analysis is also conducted based on the Counterparty Risk Exposure Scoring Toolkit in which each HKCC Participant is assessed and assigned a risk score based on five key risk measures, including expected uncollateralized loss, open settlement positions, operational weaknesses such as settlement delays, counterparty leverage and credit rating of the HKCC Participant. The methodology provides a dynamic and holistic risk management tool to monitor the HKCC Participant's exposure and credit risk more effectively and enhance decision-making on applying additional risk management measures.

	Mark-to-Market and Margining To cover its current credit exposure, the HKCC marks all open positions to market based on their respective settlement prices to calculate the variation adjustment (VA) for each Clearing Account. The VA calculation is conducted twice daily after the end of the normal trading session and the AHT session. To cover its future credit exposure, the HKCC calculates the Clearing House Margin (CH Margin) requirements of the HKCC Participants twice daily using HKEX's Portfolio Risk Management System (PRiME)[6] based on its assessment of the maximum potential losses of a futures or an options contract or a portfolio of futures and options contracts over the margin period of risk (currently one-day) under 16 simulated market scenarios and a defined confidence level. Ad hoc intra-day margin (IDM) will also be triggered when there is a CH Margin erosion of 25% in any HKCC product during normal trading sessions. Prior to the final settlement day of the physically settled contracts, the HKCC will impose a spot month charge / physical delivery contract charge on spot month physical delivery contracts to mitigate the potential risks arising from physical delivery. The HKCC also imposes Concentration Risk Margin on an HKCC Participant if the projected aggregate loss (less any CH Margin) of that HKCC Participant in any product group based on the RF stress assumptions (Net Projected Loss) is greater than 30% of the total Net Projected Loss of all HKCC Participants and the total Net projected Loss of the product group concerned is in excess of HK$500 million. Prior to a holiday period, the HKCC collects Holiday Margin based on the adjusted CH Margin levels from HKCC Participants. The HKCC performs daily back-testing and monthly sensitivity analyses to assess its Margin model performance and Margin coverage. The back-testing results show that the model performance and Margin coverage are satisfactory. For further details regarding the Margin methodology, please refer to the description under Principle 6: Margin. [6] PRiME is a Standard Portfolio Analysis of Risk (SPAN) compatible margining algorithm

	Capital Based Position Limit (CBPL) The HKCC imposes CBPL on each participant, based on its latest apportioned Liquid Capital (LC) plus the cash reserve fund contribution to ensure the risk exposure of each participant is commensurate with its financial strength. A participant in breach of its CBPL must take remedial action to observe compliance within the timeline set by the HKCC and an additional margin equivalent to 25% of its exposure in excess of its position limits will be imposed on the participant until the breach is rectified. In addition, during the AHT session where banking service is not available, the HKCC performs monitoring of its Participants' CBPL based on the latest market prices and positions on an hourly basis (plus ad-hoc if necessary) to ensure the HKCC Participants' exposures are within the limits. **Reserve/Default Fund (RF)** The HKCC maintains an RF to meet its obligations and liabilities, as a CCP, if losses arising from one or more HKCC Participant defaults cannot be fully covered by the Margin (including all aforementioned additional collateral such as concentration margin) collected from the defaulting HKCC Participants. The RF can also be used as a source of liquid funds to meet any immediate payment obligations of the HKCC in relation to a participant default. The RF comprises participants' contributions, the HKCC's appropriations to the RF (equals to 10% of the RF size), and interest income of the RF. A participant's RF contribution comprises a fixed component ("Fixed Contribution") and a variable component ("Variable Contribution"). A review of the size of RF and corresponding determination of the participants' contribution is conducted monthly and more frequently if deemed appropriate. A maximum threshold (RF Threshold) is imposed on the RF size with reference to the highest RF size in the past 10 years. The HKCC informs its participants of any change in the size of the RF after a review via circular and reports. The Fixed Contribution for each CP and GCP is HK$1.5 million and HK$7.5 million, respectively. The total Variable Contribution to be collected from all HKCC Participants is determined with reference to stress testing results, and each participant is required to contribute according to its allocated share, which is based on net margin liabilities. In arriving at each participant's Variable Contribution requirement, a Variable Contribution Credit of up to HK$1 million is granted to every participant. As a result, a

	participant will only be required to provide Variable Contribution for the amount in excess of the Variable Contribution Credit. **Credit Exposure to Settlement Banks** The HKCC is also exposed to credit risk of its Settlement Banks and has in place a Settlement Bank policy approved by the HKEX Board to manage such exposures. Please refer to the description under Principle 9: Money Settlements for details.
Key Consideration 3 A payment system or SSS should cover its current and, where they exist, potential future exposures to each participant fully with a high degree of confidence using collateral and other equivalent financial resources (see Principle 5 on collateral). In the case of a DNS payment system or DNS SSS in which there is no settlement guarantee but where its participants face credit exposures arising from its payment, clearing, and settlement processes, such an FMI should maintain, at a minimum, sufficient resources to cover the exposures of the two participants and their affiliates that would create the largest aggregate credit exposure in the system.	**Coverage of exposures to each participant** Not applicable as the HKCC is not an SSS. **For DNS payment systems and DNS SSSs in which there is no settlement guarantee** Not applicable as the HKCC is not an SSS.
Key consideration 4 A CCP should cover its current and potential future exposures to each participant fully with a high degree of confidence using margin and other prefunded financial resources (see Principle 5 on collateral and Principle 6 on margin). In addition, a CCP that is involved in activities with a more-	**Coverage of current and potential future exposures to each participant** To cover its current and future exposures, HKCC has developed multi-layers of defense or default waterfall. As mentioned in Key Consideration 2 above, the HKCC has established processes for the collections of VA, CH Margin, Concentration Risk Margin, Holiday Margin and Additional Margin. These processes provide the HKCC with a high degree of confidence in covering its current and potential future exposures to the HKCC Participants. Please refer to the description under Principle 6: Margin for further details.

complex risk profile or that is systemically 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 that should include, but not be limited to, the default of the participant and its affiliates that would potentially cause the largest aggregate credit exposure for the CCP in extreme but plausible 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.	**Risk profile and systemic importance in multiple jurisdictions** The HKCC's RF is sized by stress testing to cover the residual losses from the defaults of the single largest HKCC's participant and the fifth largest HKCC's participant in extreme but plausible market conditions. This default loss coverage is considered adequate as the HKCC is not involved in activities with a more complex risk profile, such as "exotics", barrier, path dependent, or jump to default risk products such as credit derivatives swaps (CDS). Furthermore, it is not considered to be systemically important in multiple jurisdictions as: (a) The HKCC's participants are currently incorporated in Hong Kong. (b) the HKCC clears trades in equity index products, equity products, currency products, interest rates products and commodity products concluded on the HKFE. These asset classes are not considered to be instruments of complex risk profile and the respective trades are all executed in Hong Kong. (c) the HKCC cleared contracts are settled in HKD, USD and CNH, which are local RTGS currencies. (d) the HKCC does not clear any products that are subject to mandatory clearing obligations in multiple jurisdictions. (e) the HKCC does not establish FMI link located in other jurisdictions.
	Additional financial resources As mentioned in Key Consideration 2 above, the HKCC maintains an RF to meet its obligations and liabilities as a CCP if losses arising from one or more HKCC Participant defaults cannot be fully covered by the margin collected from the defaulting HKCC Participants. The RF size is reviewed at least once a month and more frequently if appropriate, and a maximum threshold is imposed on the RF size with reference to the highest RF size in the past ten years. When the size of the RF has reached the RF threshold, the HKCC will collect the RF Additional Margin from an HKCC Participant if its Net Projected Loss is in excess of 50% of the RF threshold in order to cover the risk exposure in excess of the RF. The amount of RF Additional Margin is equal to the Net Projected Loss of the HKCC Participant less 50% of the RF Threshold. The HKEX currently sets aside HK$4 billion of shareholders' funds as the HKEX Risk Management Capital ("RM Capital") for strengthening the risk management regime of the clearing houses and supporting their roles as CCPs. The RM Capital also supports,

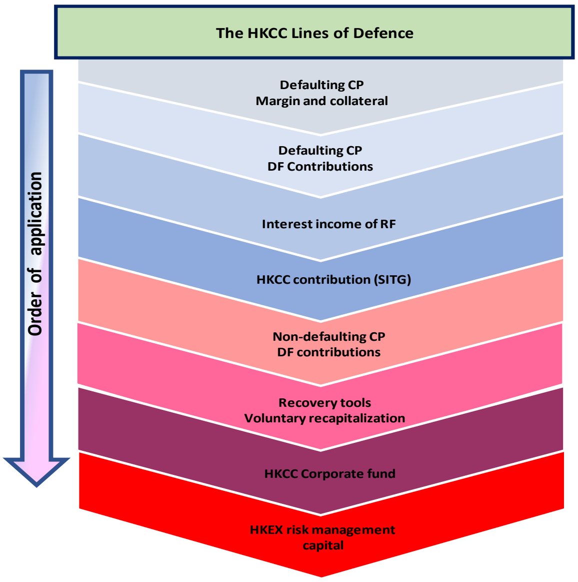
	among other things, the HKCC's appropriations to the RF and Variable Contribution Credits provided to the HKCC Participants.
	Supporting rationale and governance arrangements In determining the appropriate counterparty default assumption, the HKCC considers that it should exceed the minimum standard and include an additional "reasonably large CP" in the stress testing calculation. Therefore, the HKCC adopts the defaults of the single largest and the fifth largest HKCC Participants as the counterparty default assumption. Currently, the HKCC imposes a cap on the RF size based on the largest RF size of the HKCC in the past ten years. A ten-year period is reasonable and long enough to cover a full economic cycle, including periods of high market volatility and activities. Nevertheless, if the RF cap is reached, additional margin will be collected directly from those HKCC Participants who bring the additional risk to cover the residual projected loss. The stress-testing framework is subject to internal (the HKEX Board and its designated risk committees as appropriate) and external (the SFC) approval processes to ensure that the model, scenarios, parameters and assumptions are appropriate to the CCPs' risk profile and risk tolerance. HKCC also seeks market feedback via RWG, consultative panels, industry associations and bilateral meetings with HKCC Participants. The framework is reviewed and validated by an external consultant company on an annual basis. The results and recommendations are reported to the Group Risk Officer, RMC, BRC, ERiC and CRC. The advice and comments provided by these committees will be considered by the BRC, which is the HKEX Board delegated committee. Any change to the stress testing framework will be reviewed/endorsed by the CRC and ERiC, and has to be approved by the BRC.
Key Consideration 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** The HKCC has a comprehensive set of stress tests in place to test the sufficiency of the RF and other financial. It conducts daily stress testing against the HKCC Participants' open positions taking into consideration the projected risk exposure of the RF and prevailing market conditions. The risk exposure of the RF is assessed with reference to two key assumptions:

stress testing. A CCP should have clear procedures to report the results of its stress tests to appropriate decision makers at the CCP and to use these results to evaluate the adequacy of and adjust its total financial resources. Stress tests should be performed daily using standard and predetermined parameters and assumptions. On at least a monthly basis, a CCP should perform a comprehensive and thorough analysis of stress testing scenarios, models, and underlying parameters and assumptions used 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 perform this analysis of stress testing more frequently when the products cleared or markets served display high 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 performed at least annually.	(a) price movements (±20% for key markets);[7] and (b) defaults of the single largest HKCC's participant and the fifth largest HKCC' participant. In determining the appropriate level of price movement assumptions, the HKCC has considered various factors such as potential market impact and unique market structure to adopt the price movement assumption for the HKCC key markets at 20%. In addition, the HKCC also evaluates stress testing of the Hang Seng Index (HSI") futures market at the highest historical price movement of ±25%[8] on a daily basis to monitor the adequacy of the RF together with other financial resources. The HKEX and the SFC will continue to discuss and review the appropriateness of the stress testing framework, including the price movement assumptions. Stress testing results are reported to the HKEX's senior management on a daily basis, to the SFC on a weekly basis, to the CRC on a monthly basis, and to the ERiC, BRC and RMC on a quarterly basis. Based on the daily stress testing results, the HKCC will demand additional Variable Contributions from the HKCC Participants if the risk exposure of the RF exceeds 90% of the sum of the existing RF size and the aggregate Variable Contribution Credit utilized by all HKCC Participants. The HKCC also re-calculates the required RF size on the first business day of every month based on the maximum daily stress testing results in the most recent 60 business days. In both ad hoc and monthly reviews, a buffer equivalent to around 10% of the maximum risk exposure calculated in the most recent 60 business days is incorporated in determining the required RF size. The size of the RF cannot exceed the RF Threshold. The RF Additional Margin will be collected from the relevant HKCC Participants when the RF Threshold is reached. [7] The price movement assumptions for the HKCC products: (a) Equity and Equity Index products: ±13 to ±56%; (b) Currency products: ±4 to ±9%; (c) Interest Rate products: ±30%; and (d) commodity products: ±12 to ±23%. [8] The movement during the market crash in 1987 which was exacerbated by the four-day closure of the Hong Kong markets has been excluded. It is believed that such market closure will not recur in the foreseeable future.

	The share of Variable Contribution of each HKCC's participant is determined with reference to the participants' share of average net Margin liabilities in the most recent 60 business days. The HKCC provides reports to its participants of their required RF Contributions following each monthly and ad hoc review. The HKCC informs them of the total HKCC Participants' required Variable Contributions resulting from stress testing via circulars after each review. The required Variable Contributions are collected from the HKCC's participants on the first business day following the date of the notification.
	Review and validation The HKCC reviews its stress testing model monthly to assess the appropriateness of the adopted assumptions, parameters and scenarios, taking into consideration the latest market dynamics such as local and international market conditions, participant default events and new HKFE products and/or trading arrangements. This review will be conducted more frequently when the market is unusually volatile, less liquid or when the concentration of positions held by the HKCC's participants increases significantly. The HKCC performs an annual independent validation of the model by external expert. The HKCC also conducts monthly reverse stress testing to identify the extreme scenarios and market conditions in which the RF and other financial resources would not provide sufficient coverage of tail risk. The HKCC conducts the testing by applying a combination of different extreme price movements and counterparty default scenarios against both hypothetical and actual portfolios of the HKCC Participants.
Key Consideration 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, shifts in other market factors such as price determinants and yield curves, multiple defaults over various time horizons, simultaneous pressures in	The HKCC has considered different stress scenarios and consulted the regulator in developing the adopted stress testing model and key assumptions. As mentioned in Key Consideration 5 above, the HKCC has reviewed the historical peak price movements of the relevant markets to determine the most appropriate price movement assumptions for the stress testing model. Also, the HKCC has benchmarked the adopted default assumptions against the arrangements of major overseas markets.

funding and asset markets, and a spectrum of forward-looking stress scenarios in a variety of extreme but plausible market conditions.	
Key Consideration 7 An FMI should establish explicit rules and procedures that address fully any credit losses it may face as a result of any individual or combined default among its participants with respect to any of their obligations to the FMI. These rules and procedures should address how potentially uncovered credit losses would be allocated, including the repayment of any funds an FMI may borrow from liquidity providers. These rules and procedures should also indicate the FMI's process to replenish any financial resources that the FMI may employ during a stress event, so that the FMI can continue to operate in a safe and sound manner.	**Allocation of credit losses** In the event of an HKCC Participant default, the HKCC will first use the available non-pooled resources, such as various margins (Margin (initial margin), Variation Margin, Holiday Margin and Concentration Risk Margin) collected from the defaulting participant. Thereafter, the HKCC will apply other financial resources in accordance with the HKCC Rule 706(c). Please refer to the description under Principle 13: Participant-default Rules and Procedures. In the event of an HKCC' participant default where non-defaulting participants' contributions to the RF are used to cover a default loss under the HKCC Rules, the contributions will be applied to share the default loss on a pro-rata basis by reference to the participants' respective contributions to the RF on the business day immediately prior to the date of default declaration. **Auction process** In general, auction is an important component of the default management procedures by a CCP. An auction enables the CCP to rapidly transfer risk in bulk to willing absorbers establishing a fair market price for the particular portfolio. HKCC can conduct auctions for the concentrated and illiquid positions that are not able to close-out in the open market within one business day. For such positions, HKCC will instruct the liquidating agent to conduct hedging to minimize the market risk of the defaulter's portfolio, as HKCC believes that the chances of a successful auction will be higher if the defaulter's portfolio is hedged. However, HKCC has never used auctions to liquidate the defaulter's portfolio therefore auctions are deemed a tool for additional contingency. Please note the auction process is routinely tested and included in default management drills. **Recovery Plan** The recovery plan would be triggered when the defaulting HKCC Participant's collateral is insufficient or total pre-funded financial resources are anticipated to be insufficient. The recovery tools available to the HKCC to allocate its uncovered credit losses arising from the HKCC Participant default are described below.

	(a) Assessment Whenever the whole or part of the RF is applied to cover a closing-out loss of a default or the total pre-funded financial resources are anticipated to be insufficient, the HKCC will issue a notice of assessment demanding each non-defaulting HKCC Participant to provide such additional contributions to the RF. The non-defaulting HKCC Participants must provide Assessments within one business day after the date of the Notice of Assessment or within such other period as specified by the HKCC. The HKCC may call for assessments over a period of five business days from the date on which the HKCC declares a participant to be a defaulter (referred to as the "Capped Liability Period"). It would be extended by five business days (starting from the date of another HKCC Participant being declared as a defaulter) each time should there be a subsequent default(s) within a Capped Liability Period. The aggregate liability of an HKCC Participant to provide assessment in respect of any default that occurs during the Capped Liability Period shall be limited to an amount which is equal to the participant's Fixed Contribution and Variable Contribution, calculated on the business day immediately preceding the start of the Capped Liability Period, plus one time such amount. Assessments shall not be required from the HKCC Participants whose participation has been effectively terminated by the HKCC at or prior to the start of the Capped Liability Period. The HKCC Participants can limit their liabilities to any subsequent event of default that may occur following the expiry of the Capped Liability Period if they submit the notice of resignation and satisfy the termination requirements before the expiration of the Capped Liability Period. The HKCC also provides the resigning participant with five additional business days following the expiry of such Capped Liability Period to close out / transfer its clients' positions in which such HKCC Participant is required to post additional collateral to cover its full stress loss.



(b) Voluntary Recapitalization

In the event that financial resources made available through Assessments are insufficient to cover the remaining credit losses, the HKCC may issue a notice ("Voluntary Recap Request Notice") requesting each non-defaulting participant to make a payment of funds to the HKCC. There is no binding obligation on non-defaulting participants to provide such additional resources to the HKCC. If the total amount collected from non-defaulting HKCC Participants is not sufficient, any amounts received will be refunded to relevant non-defaulting HKCC Participants on the next business day.

(c) Loss Distribution Process

Loss Distribution Process (at times referred to as "Variation Margin Gains Haircut") allocates credit losses caused by an HKCC Participant default by haircutting variation adjustment to profit-making non-defaulting participants on a pro-rata basis. It may be applied if the defaulting HKCC Participant's collateral, RF, Assessments and Voluntary Recapitalization have been utilized and losses remain. The HKCC will consult the SFC for activation of the Loss Distribution Process.

Contract Termination

If the HKCC is unable to re-establish a matched book, the HKCC may consider terminating specific contracts, a subset of contracts or all contracts in a particular product or market ("Contract Termination"). The HKCC will consult the SFC for activation of Contract Termination. In the event of Contract Termination, the relevant contracts identified for termination shall be cash-settled based on the latest available closing prices.

	Replenishment of financial resources - skin in the game (SITG) If there is a shortfall in participants' RF contributions following the expiration of the Capped Liability Period, the participants will be required to replenish their RF contributions upon notification. RF replenishments will not be applied to any remaining uncovered credit losses related to a participant default during such Capped Liability Period. The RF replenishments must be funded within one business day or as otherwise communicated by the HKCC. The HKCC will monitor and assess the sufficiency of pre-funded financial resources. If there is a shortfall in HKCC's SITG contribution following the expiration of the Capped Liability Period, HKCC will seek replenishment of SITG. SITG replenishment is subject to the approval of the HKCC Board and an assessment of prevailing conditions and regulatory capital requirements applicable to HKCC. SITG replenishments will not be applied to any remaining uncovered credit losses related to a CP default during such Capped Liability Period.
Key Conclusions for Principle 4	The HKCC has a robust risk management framework to manage credit exposures, both current and potential future exposures, arising from its clearing activities. The HKCC covers its current and potential future exposures using VA and prefunded financial resources, which include participants' initial margin, contribution to a prefunded default arrangement, HKCC's own capital (SITG) and a portion of HKEX's own funds. The HKCC determines the amount and regularly tests the sufficiency of its total financial resources available to cover the losses arising from the defaults of the single largest participant and the fifth largest participant under extreme but plausible market conditions via stress-testing. The HKCC conducts an annual independent validation of the risk management model.
Assessment of Principle 4	Observed
Recommendations and Comments	The HKCC should enhanced it credit risk management framework by reviewing the need for strengthening resources to cover the losses arising from the defaults of the single largest participant and the second largest participant under extreme but plausible market conditions via stress-testing. While the imposed Capital Based Position Limit is an effective risk management tool to handle credit risk, it has the adverse impact on the growth of the derivatives markets in Hong Kong. The HKCC, in coordination with the SFC, may wish to assess the impact of this policy and explore whether other effective tools with less adverse impact could be used.

<table>
<tr><th colspan="2">Principle 5. Collateral
An FMI that requires collateral to manage its or its participants' credit exposure should accept collateral with low credit, liquidity, and market risks. An FMI should also set and enforce appropriately conservative haircuts and concentration limits.</th></tr>
<tr><td>Key Consideration 1

An FMI should generally limit the assets it (routinely) accepts as collateral to those with low credit, liquidity, and market risks.</td><td>The HKCC accepts a wide range of eligible assets as collateral with low credit, liquidity and market risks. The HKCC has defined standards for eligible collateral, approved by the HKEX Board and consults the SFC to determine which assets could be accepted as collateral, including:
a. sufficient liquidity in Hong Kong or international markets;
b. high quality with low credit risk;
c. low wrong way risk; and
d. sufficient business/market demand.

Currently, the HKCC accepts the following types of collateral from its participants to meet their Margin requirement:
a. cash (HKD, USD, RMB, EUR and JPY);
b. Hong Kong Exchange Fund Bills and Notes (EFBN); and
c. US Treasuries.

The major part of the asset accepted as collateral is cash and 50% of the collateral should be the same as the settlement currency of the contracts. In practice, most HKCC Participants pledge cash collateral with the HKCC.

In order to avoid wrong-way risk, HKCC does not, in principle, allow participants to deposit own issues (or issues of closely linked entities) as collateral. Currently, there is no such collateral issued by HKCC's participants.</td></tr>
<tr><td rowspan="2">Key Consideration 2

An FMI should establish prudent valuation practices and develop haircuts that are regularly tested and take into account stressed market conditions.</td><td>Valuation practices
The HKCC evaluates its collateral by marking to market at least once daily. The HKCC uses market data from information vendors for the valuation of non-HKD cash collateral and US Treasuries and market prices published by the HKMA for the valuation of EFBN. The HKCC has the discretion to use other values if it reasonably believes that market prices do not represent the fair values of the collateral concerned.</td></tr>
<tr><td>Haircut practices
The HKCC applies a haircut methodology, distinguishing the collateral type of the deposited collateral (cash, EFBN, bond). Furthermore, where the currency of the collateral is different from the settlement currency of the contracts (currently the HKCC contracts are traded and settled in HKD, USD or RMB), haircuts are</td></tr>
</table>

	applied. The HKCC also applies haircuts on US Treasuries and EFBN in accordance with their remaining time to maturities. In determining the haircut rates, the HKCC calculates the projected volatility of the collateral at a two-tailed confidence interval of 99.73% based on historical price movements of different time intervals (ranging from seven days to one year depending on the collateral type) and incorporates a buffer to minimize the need to adjust the rates frequently. For cash collateral, the sufficiency of haircuts is further validated by comparing with the value-at-risk calculation based on historical and hypothetical stress scenarios. The HKCC also takes into consideration those extreme price movements in assessing the adequacy of the haircut rate of each collateral type. The HKCC continuously monitors the volatility of the collateral. The HKCC performs monthly review of the haircut rates to ensure their adequacy. In exceptional situations that may affect the volatility of the collateral, ad hoc reviews will be conducted to assess the adequacy of the haircut rate. The HKCC performs independent validation on the haircut methodology on an annual basis.
Key Consideration 3 In order to reduce the need for pro-cyclical adjustments, an FMI should establish stable and conservative haircuts that are calibrated to include periods of stressed market conditions, to the extent practicable and prudent.	To reduce the need for procyclical adjustments, the HKCC establishes stable and conservative haircuts with a buffer incorporated as mentioned in Key Consideration 2 above. For cash collateral, the HKCC also validates the sufficiency of haircuts by comparing with the value-at-risk calculation based on historical and hypothetical stress scenarios. Furthermore, haircuts are calibrated to ensure sufficient coverage over the liquidation period even in stressed market conditions. The configurable parameters of the collateral haircut determination formulas are to be validated regularly and adjusted, if necessary.
Key Consideration 4 An FMI should avoid concentrated holdings of certain assets where this would significantly impair the ability to liquidate such assets quickly without significant adverse price effects.	There are different caps imposed on collateral to ensure the HKCC has sufficient liquid resources to fulfil its payment obligations in the event of an HKCC's participant default. For RMB-denominated products, each HKCC's participant is allowed to satisfy its RMB CH Margin requirements by any acceptable cash collateral (e.g. HKD or USD) and/or non-cash collateral (where non-cash collateral could satisfy up to 50% of the RMB Margin requirements only) up to a limit prescribed by the HKCC (currently RMB 1 billion). Any RMB CH Margin requirements beyond such limit shall be satisfied by cash in RMB.

	For products denominated in non-RMB currencies (e.g. HKD or USD), participants are required to satisfy at least 50% of the CH Margin requirements by cash collateral in the settlement currency of the product. Not more than 50% of a participant's CH Margin requirement could be covered by non-cash collateral and/or cash collateral in currency other than the settlement currency of the product.
Key Consideration 5 An FMI that accepts cross-border collateral should mitigate the risks associated with its use and ensure that the collateral can be used in a timely manner.	The HKCC accepts cash collateral in foreign currencies (i.e. USD, RMB, EUR and JPY) deposited in banks in Hong Kong, which are selected in accordance with the approved HKCC policy, to ensure that the HKCC can use the foreign currencies cash collateral in a timely manner. In accepting US Treasuries as collateral, the HKCC has assessed and mitigated the legal risks relating to the enforceability of the HKCC's rights to such collateral. The HKCC has entered into an agreement with its overseas-incorporated custodian bank, Clearstream, to ensure the collateral can be accessed and used in a timely manner.
Key Consideration 6 An FMI should use a collateral management system that is well-designed and operationally flexible.	**Collateral management system design** The HKCC uses an integrated collateral management system, CCMS, to manage collateral holdings and obligations of HKCC Participants and related money settlement between HKCC and the HKCC Participants in accordance with the HKCC Rules, the HKCC Procedures and internal procedures. The CCMS performs collateralization to determine the collateral requirements of the HKCC Participants, tracks collateral movements, performs valuations and handle money settlement in respect of settlement of day end margin, intra-day variation adjustment and margin, final settlement and other money obligations.
	Operational flexibility The CCMS facilitates the HKCC and HKCC's participants to perform their daily and ad-hoc reporting and monitoring of collateral balances in the CCMS Collateral Accounts. It ensures that only acceptable collateral is included in the evaluation of sufficiency of collateral posted. The CCMS also offers flexibility to accept different collateral types and to adjust concentration limits and haircuts to accommodate changes in the on-going monitoring and management of collateral.
Key Conclusions for Principle 5	The HKCC accepts assets with low credit, liquidity and market risks as collateral. It has prudent practices to valuate collateral at least once daily. It applies conservative haircuts and monitors them continuously. Furthermore, it has risk management procedures to

	reduce the impact of procyclicality and wrong way risk. The HKCC uses the CCMS for collateral management and money settlement purposes. Validation rules are built into the CCMS to ensure that only acceptable collateral is included in the evaluation of sufficiency of collateral placed with the HKCC by each HKCC Participant.
Assessment of Principle 5	Observed
Recommendations and Comments	In line with the CPMI-IOSCO Further Guidance on the PFMI of 2017, the HKCC should further enhance the collateral haircut methodology by identifying all sources of risk related to collateral and other financial resources held to cover credit exposures and incorporating the stressed value of collateral (including cash collateral that has been invested by the CCP) into its stress testing. Furthermore, the HKCC should assume that no excess collateral posted by a participant will be available to meet losses or to make payment obligations when conducting stress testing for both credit and liquidity exposures.
Principle 6. Margin A CCP should cover its exposure to its participants for all products through an effective margin system that is risk-based and regularly reviewed.	
Key Consideration 1 A CCP should have a margin system that establishes margin levels commensurate with the risks and particular attributes of each product, portfolio, and market it serves.	**Description of margin methodology** The HKCC uses VA and CH Margin as the main tools to mitigate its current and future credit exposures to the HKCC Participants. In addition, the HKCC imposes Holiday Margin, Concentration Risk Margin, Additional Margin and/or RF Additional Margin on the participants. The margin requirements of each HKCC Participant are calculated intraday. If the potential future price risks of an HKCC Participant increase above the amount of collateral that is provided, then HKCC issues an intraday margin call towards that HKCC Participant that must be covered. When the size of the RF has reached the RF Threshold, the HKCC will collect RF Additional Margin from an HKCC Participant if its net projected loss is in excess of 50% of the RF Threshold.
	Credit exposures *VA* To cover its current credit exposure, the HKCC marks all open positions to market based on their respective prices to calculate the VA for each Clearing Account. This is done routinely twice a

	day, after the end of the normal trading session and the AHT session. *CH Margin* To cover its future credit exposure, the HKCC calculates the CH Margin requirements of the HKCC Participants twice daily using PRiME. Please refer to Key Consideration 3 below for more details *Holiday Margin* The Holiday Margin arrangement of the HKCC is an established risk management measure designed to mitigate potential market risk on the reopening of the Hong Kong markets after a holiday break that could arise from significant overseas market movements or the occurrence of certain geo-political events during the Hong Kong holidays. Prior to the holiday period, the HKCC will determine the appropriate levels of Margin Rates and collect Holiday Margin based on the adjusted CH Margin levels from HKCC Participants. A mandatory IDM call will also be made in the afternoon on the trading day prior to the holiday period and, same as the normal IDM call, it has to be settled by the HKCC Participants within one hour after notification. *Concentration Risk Margin* The HKCC imposes Concentration Risk Margin on its participant if the Net Projected Loss of that participant in any product group is greater than 30% of the total Net Projected Loss of all HKCC Participants and the total Net Projected Loss of the product group concerned is in excess of HK$500 million. The Concentration Risk Margin ranges from 20% to 50% of the CH Margin on the concentrated positions depending on the HKCC Participant's concentration level in that particular product group. The HKCC informs the HKCC Participant the required Concentration Risk Margin via report (available daily at 11pm) and followed by a telephone call on the next business day. The HKCC Participant has to settle the Concentration Risk Margin by 11:00 am that day.
	Operational components The HKCC has in place the operational capacity to enforce, and does enforce, the timely calculation and collection of VA and Margin. Please refer to Key Consideration 4 below for details.
Key Consideration 2 A CCP should have a reliable source of timely price data for its	**Sources of price data** The HKCC receives real-time price data from the HKATS (trading system).

margin system. A CCP should also have procedures and sound valuation models for addressing circumstances in which pricing data are not readily available or reliable.	**Estimation of prices** The HKCC determines the daily settlement prices for all futures and options contracts for VA and Margin calculations. The HKCC primarily uses price data near market close, including quotes from market makers, to determine the daily settlement price for each contract. If it is not available, the HKCC will calculate theoretical prices, with reference to other relevant information such as price data of other contracts in the same underlying instrument. The HKCC may, in its discretion, adjust or otherwise determine the price to be used if necessary.
Key consideration 3 A CCP should adopt initial margin models and parameters that are risk-based 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. 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 subportfolio 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	**Initial margin model** The HKCC calculates the CH Margin requirements on the basis of the total risk exposure of all accounts of the HKCC Participants twice daily using PRiME based on its assessment of the maximum potential losses of a futures or an options contract or a portfolio of futures and options contracts over the margin period of risk (currently one day) under 16 simulated market scenarios and a defined confidence level. Furthermore, prior to the final settlement day of the physically settled contracts, the HKCC will impose a spot month charge / physical delivery contract charge on spot month physical delivery contracts to mitigate the potential risks arising from physical delivery. **Benchmark Margin Rates** The HKCC determines the Benchmark Rates for each product over the margin period of risk (currently one day) by using an exponentially weighted moving average model (a model used to project volatility based on historical data with more weight being placed on more recent data). A one-tailed confidence interval of 99.73% is adopted for global derivatives products such as commodity products (e.g. USD Gold Futures) and currency products (e.g. USD vs CNH Currency Futures), while a two-tailed confidence interval of 99.73% is adopted for other products, such as Equity index products, equity products, fixed income products and money market products. Historical data periods of 90 days are typically used with the model for a majority of the HKCC products although a shorter data period is also used to better reflect risk characteristics of selected product. For new products, the HKCC determines the Benchmark Rates with reference to the potential volatility simulated using historical data from their underlying instruments or other highly correlated products. **Margin Rates**

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 destabilising, procyclical changes.	For global derivatives products, the HKCC determines the final Margin Rates based on 75% of Benchmark Rates and 25% of stress margin, where stress margin is the highest Benchmark Rate in the past five-year rolling data period, with a cushion of 10% and subject to a minimum rate of the notional value of the relevant contract. It is subject to annual review. Other than the global derivatives products, the HKCC determines the final Margin Rate based on the Benchmark Rate with a cushion of 10% and subject to a minimum rate of 5% of the notional value of the relevant contract. For a few selected products, minimum rates other than 5% are adopted[9] to better reflect their risk characteristics. The HKCC reviews the Margin Rates monthly to keep track of changes in market volatility. In addition to monthly reviews, the HKCC conducts daily monitoring and will increase the Margin Rates if they are found to be less than that calculated based on the latest market data. A cushion in excess of 10% may be applied if the product concerned has already experienced CH Margin inadequacy during the month. The HKCC also considers other market factors that might lead to unusual volatility such as unstable political or financial situations in the determination of the relevant parameters for the calculation of the Margin Rates. The HKCC informs its participants of any change to the Margin Rates via circulars which are published on the HKEX website. **Margin Position** Positions maintained in the House Account and Market Maker Account are margined on a net basis. Client positions maintained in an Omnibus Client Account are margined on a gross basis while those maintained in Individual Client Accounts[10] are margined on a net basis. Only positions owned by the same client are eligible to be maintained in an Individual Client Account. Margin netting is currently provided for positions in products with the same or specified products with different underlying instruments in net margined Clearing Accounts. [9] The minimum rate ranged between 1% and 23% of the notional value. [10] There is another net margined client account called client offset claim account. This account is used by an HKCC Participant to record positions which are of an offset nature of the same beneficial owner whose positions would otherwise be recorded in an Omnibus Client Account.

<table>
<tr><td></td><td>Closeout and sample periods

As mentioned above, the HKCC determines the Benchmark Rates for each product assuming a one-day close-out Period. Historical data periods of 90-days are used for a majority of the HKCC products although a shorter data period is also used to better reflect risk characteristics of the selected products.</td></tr>
<tr><td></td><td>Procyclicality and specific wrong-way risk

The HKCC has the following arrangements to address procyclicality:
1. incorporate a buffer of 10% in determining the final margin rate;
2. adopt a minimum margin rate of 5%. Minimum rates other than 5% are adopted for some selected products; and
3. a stress component is incorporated to determine margin rates for global derivatives products.

The HKCC monitors on a daily basis the specific wrong-way risk arising from the HKCC Participants' portfolios (e.g. clear a product that references its own name or its affiliates) and impose additional risk management measures if considered necessary.</td></tr>
<tr><td>Key consideration 4

A CCP should mark participant positions to market and collect variation margin at least daily 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.</td><td>The VA and Margin requirements of each Clearing Account are assessed twice daily, i.e. after the end of the normal trading session and the AHT session. The HKCC Participants assessed with VA and/or Margin requirements are required to meet such obligations (Margin requirements and VA net of lodged collateral) by 9:15 am and noon on the following business day for the normal trading and the AHT sessions respectively. For the assessment after the AHT session, HKCC Participants are only required to meet such obligations when their assessment amount exceeds the tolerance limit of HK$2 million.

In addition, an IDM call will be triggered when there is a CH Margin erosion of 25% in any HKCC product during normal trading sessions. The call is conducted based on the intra-day VA calculated using HKCC Participants' real-time open positions and prevailing market prices.

Apart from the ad hoc IDM call which is triggered by market volatility, the HKCC conducts a routine intra-day assessment on each HKCC Participant's CBPL (please refer to the description under Principle 4: Credit Risk for details of CBPL monitoring) after the close of the morning trading session and issues IDM calls to the HKCC Participants who are in breach of their CBPL. HKCC</td></tr>
</table>

	Participants with VA shortfalls (net of lodged collateral) exceeding HK$1 million in each IDM call must settle the amount within one hour after notification.
Key consideration 5 In calculating margin requirements, a CCP may allow offsets or reductions in required margin 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 authorised to offer cross-margining, they must have appropriate safeguards and harmonised overall risk-management systems.	**Portfolio margining** Currently, portfolio margining is offered to products with a strong economic rationale where correlation exists (i.e. with same underlying or same product type). Some examples include: - HSI Futures vs HHI Futures (Index Futures products) - CNH Gold Futures vs USD Gold Futures (same underlying with different currencies) - TSI Iron Ore Fines 62% Fe CFR China Futures monthly vs quarterly contracts (same underlying with different contract period). The HKCC offers portfolio margining for products with significant and reliable correlation (e.g. correlation of not less than 80% and coefficient of variation of 0.1) based on a long-term relationship (typically five years). Margin reduction is offered to eligible positions belonging to the same beneficial owner residing in net margined clearing accounts.
	Cross-margining Currently, there is no cross-margining arrangement between the HKCC and other CCPs.
	Robustness of methodologies The HKCC offers portfolio margining only for those products with significant and reliable correlation based on a long-term relationship. To ensure that the significance and reliability of the relationship between the product pair be maintained, the HKCC monitors the margin reduction parameters daily and has in place a suspension mechanism to temporarily suspend the portfolio margining arrangement for a product pair if their correlation drops below a threshold in the monthly / ad hoc reviews. The HKCC continuously reviews and monitors the performance of portfolio margining to ensure the margin coverage is sufficient.
Key consideration 6	**Backtesting and sensitivity analysis** The HKCC conducts daily Margin back-testing to test:

A CCP should analyse and monitor its model performance and overall margin coverage by conducting rigorous daily backtesting – and at least monthly, and more-frequent where appropriate, sensitivity analysis. A CCP should regularly conduct an assessment of the theoretical and empirical properties of its margin model for all products it clears. In conducting sensitivity analysis of 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.	a. margin coverage by comparing the Margin Rates with the actual daily price movements; and b. sufficiency of Margin on all HKCC Participants' Clearing Accounts by comparing the simulated closing-out losses with the Margin. The HKCC also performs sensitivity analysis of the margining model on a monthly basis to test how the level of Margin coverage and risk exposures are affected by different market conditions with different assumptions and model parameters such as lookback periods of different duration. This analysis will be conducted more frequently when the market is unusually volatile, less liquid or when the concentration of positions held by an individual HKCC Participant increases significantly. **Margin model performance** The HKCC discloses margin coverage results in PFMI quantitative disclosure on a quarterly basis. The latest results as of April 2019 reveal that the model performance is satisfactory. The margin coverage for major products and all Clearing Participants' portfolios can achieve single-tailed confidence level of at least 99%.
Key consideration 7 A CCP should regularly review and validate its margin system.	The HKCC performs an annual independent validation of the margining model. The validation includes the assessment of the robustness and effectiveness of the model as well as the back-testing methodology. The latest results as of April 2019 reveal that the model performance is satisfactory. The margin coverage for major products and all Clearing Participants' portfolios can achieve single-tailed confidence level of at least 99%.
Key Conclusions for Principle 6	The HKCC has a robust margining model to manage its current and future credit exposures to its participants. The margining process is a multifaceted and time critical process that considers a variety of factors in order to accurately calculate margins. Its margin calculation is based on reliable source of timely price data. The HKCC also has the authority and operational capacity to make intra-day and day-end margin calls to HKCC Participants. The HKCC currently conducts daily Backtesting and performs monthly sensitivity analysis of the margin model to monitor model performance and overall margin coverage. The HKCC also

	performs an annual independent validation of the margining model.
Assessment of Principle 6	Observed
Recommendations and Comments	In line with the CPMI-IOSCO Further Guidance to the PFMI of 2017, the HKCC has identified areas where further risk management framework enhancements could be implemented. For example, the HKCC plans to further strengthen its margin model by applying stress component other than global derivatives products and enhancing its back-testing and sensitivity analysis methodology.
Principle 7. Liquidity Risk An FMI should effectively measure, monitor, and manage its liquidity risk. An FMI should maintain sufficient liquid resources in all relevant currencies to effect same-day and, where appropriate, intraday and multiday settlement of payment obligations 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 generate the largest aggregate liquidity obligation for the FMI in extreme but plausible market conditions.	
Key Consideration 1 An FMI should have a robust framework to manage its liquidity risks from its participants, settlement banks, nostro agents, custodian banks, liquidity providers, and other entities.	The liquidity risk management framework of HKCC is an integral part of the risk management of the 3 CCPs (HKSCC, HKCC and SEOCH) within HKEX group, including the measurement, monitoring and management of liquidity risk. The liquidity is management by the HKEX Treasury Department (HKEX Treasury), which is responsible for all HKEX Group's liquidity needs. The major sources of the HKCC's liquidity risks are as follows: (a) default of participants – as a CCP, the HKCC is exposed to liquidity risk primarily in relation to the funding of the defaulting HKCC Participant's closing-out loss; (b) default of liquidity providers – the HKEX has arranged committed credit facilities with selected liquidity providers to meet the liquidity needs at the HKEX Group level; hence the HKCC faces the risk of default of one or more liquidity providers; (c) operational or financial failure of settlement bank and custodian bank – the HKCC also faces liquidity risks related to the inability to meet the release of surplus Margin and RF collateral of the HKCC Participants due to failure of Settlement Bank and custodian bank. The HKCC also considers the liquidity risk associated with the default of any entity that takes on multiple roles, e.g. where a Settlement Bank is also a liquidity provider and/or an affiliate of an HKCC Participant; and

	(d) illiquidity of investments or collateral – the HKEX's Investment Policy aims to ensure that investment portfolios are sufficiently liquid at all times. Please refer to the description under Principle 16: Custody and Investment Risks. The liquidity requirement of the HKCC is managed together with those of the HKSCC and the SEOCH at the HKEX Group level, although each CCP's liquidity needs are initially assessed individually. The assessment also considers the liquidity requirement associated with the default of settlement bank, custodian bank and liquidity provider at the HKEX Group level. The framework covers the following aspects of liquidity management: (a) Processes for measurement and monitoring of liquidity risks – the liquidity risks of the HKCC are grouped into three categories, including the HKCC's participant default, routine operations and multiple roles entity failure. The liquidity assessment methodologies on each category and corresponding monitoring are described in detail under Key Consideration 2 below; (b) Available liquid resources – there are five sources of funds available to meet HKCC's liquidity needs. They are i) the defaulting HKCC Participants' margin, ii) the HKCC RF, iii) HKCC corporate fund, iv) the HKEX corporate funds and v) committed bank facilities. Please refer to Key Consideration 5 for further details; and (c) Contingency funding arrangement – the HKCC will consider activating contingency mitigating measures to cover liquidity needs under exceptional circumstances. Please refer to Key Consideration 7 for further details. The liquidity management framework is reviewed on an ongoing basis. Dedicated reviews will be conducted in response to changing regulatory requirements, business needs or developments in the financial markets. Any change to the framework will be subject to the established internal and external approval processes.
Key Consideration 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.	The HKEX's Clearing Risk Management and HKEX's Treasury jointly measure and monitor the liquidity need/exposure of each category, mentioned above, by the corresponding liquidity assessment methodologies as follows: (a) Measurement and monitoring for the HKCC's participant default:

	• In the assessment of the HKCC Participant default, the HKCC's participant and its affiliates that generate the largest aggregate payment obligations across the HKSCC, the HKCC and the SEOCH are assumed to default; • For the HKCC and the SEOCH, liquidity needs are determined based on the closing-out losses of defaulting participants. For HKSCC, liquidity needs are predominately driven by HKSCC's obligations to settle the outstanding long positions of the defaulting participants; • Liquidity needs of the HKSCC/HKCC/SEOCH are compared against the funds available as whether a liquidity surplus/shortfall on a daily basis; and • The HKSCC, the HKCC and the SEOCH maintain sufficient liquid resources to achieve the target coverage for participant default. Target funding coverage for participant default is set at a confidence level of at least 99% based on rolling data over the recent two years. The HKSCC, the HKCC and the SEOCH will consider, where appropriate, taking necessary remedial actions should the liquidity status fail to achieve the target funding coverage; (b) Measurement and monitoring for routine operations; business as usual: • The HKCC needs to fulfil its obligations in relation to the HKCC Participants' withdrawal of surplus Margin and the refund of surplus RF to the HKCC Participants. Such liquidity needs are normally funded by the liquid portions of Margin funds and RF under management of the HKEX Treasury. The HKEX Treasury uses historical data of cash withdrawal and refund of surplus Margin to assess the liquidity needs of routine operations and manage the liquidity of Margin fund and RF of the HKCC. Target funding coverage for routine operations is set at 100% as the HKCC intends to maintain sufficient funds to cover cash outflow arising from routine operations at all times; and (c) Measurement and monitoring for multiple roles provided by an entity (participant) failure: • Liquidity risk arises as the defaulting settlement bank fails to transfer/pay any amount to the HKCC or an HKCC Participant for settlement purposes. The liquidity requirement under the default of a settlement bank is measured by the maximum amount of settlement money

	maintained in the bank under relevant timings, where the funds deposited in the bank will be excluded from the funds available. If the defaulting settlement bank is also an HKCC Participant, the HKCC is exposed to liquidity risk in relation to the funding of the defaulting HKCC Participant's money settlement obligations. If the defaulting settlement bank is also a liquidity provider, committed bank facilities provided by such a bank and available liquid resources provided or kept by the defaulting settlement bank will be excluded from the funds available. The HKCC faces similar liquidity risk when a custodian bank fails to meet the clearing house's withdrawal demand for non-cash collateral. The liquidity requirement under the default of a custodian bank is measured by the replacement cost (i.e. market value) of the total amount of HKCC Participants' non-cash collateral deposited with such custodian bank; • Through stress testing on a daily basis, the HKCC has effective tools to identify, measure and monitor its liquidity requirement and sufficiency of liquid resources as a result of multiple role entity failure; and • The results of stress testing will be used to evaluate the adequacy of and adjust the liquidity management framework where appropriate. Should there be a need to evaluate the liquidity management framework, the HKCC will, amongst other things, take into account the prudential arrangements put in place by relevant regulator(s) in safeguarding the financial stability of the Settlement Bank, liquidity provider and custodian bank.
Key Consideration 3 A payment system or SSS, including one employing a DNS mechanism, should maintain sufficient liquid resources in all relevant currencies to effect same-day settlement, and where appropriate intraday or multiday settlement, of payment obligations 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	Not applicable as the HKCC is not an SSS.

generate the largest aggregate payment obligation in extreme but plausible market conditions.	
Key Consideration 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 generate the largest aggregate payment obligation to the CCP in extreme but plausible market conditions. In addition, a CCP that is involved in activities with a more-complex risk profile or that is systemically 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 the two participants and their affiliates that would generate the largest aggregate payment obligation to the CCP in extreme but plausible market conditions.	**Sufficient liquid resources** HKCC has a robust liquidity management framework with effective measurement, monitoring and management of liquidity risk. For daily liquidity assessment, HKCC does not only assume default of HKCC Participant and its affiliates in its own market but also default of such participant and its affiliates in other on-exchange markets of HKEX (i.e. HKSCC and SEOCH) so as to ensure HKCC, and other HKEX on-exchange CCPs would have sufficient liquid resources to cover their payment obligations with a high degree of confidence under extreme but plausible market condition. The liquidity requirement for each relevant currency in relation to the HKCC Participant default is measured daily in accordance with a predefined stress testing policy, assumptions and procedures. As the HKEX manages its liquidity funding at the HKEX Group level, the daily assessment covers a number of potential stress scenarios, including the default of the participant and its affiliates that generate the largest aggregate payment obligations across the HKSCC, the HKCC and the SEOCH under extreme but plausible market conditions on a combined basis (such assumption being the same as the price movement assumptions used for the sufficiency of financial resources stress testing as described under Principle 4 on Credit Risk). The daily assessment targets to cover the combined liquidity requirements of the HKSCC, the HKCC and the SEOCH at a confidence level of at least 99% in a two-year lookback period. The assessment also considers the liquidity requirement associated with the default of Settlement Bank, custodian bank and/or liquidity provider at the HKEX Group level and the results are monitored daily. **Risk profile and systemic importance in multiple jurisdictions** As discussed in Key Consideration 4 under Principle 4 on Credit Risk, the HKCC is not involved in activities with a more complex risk profile or considered to be of systemic importance in multiple jurisdictions. Please refer to the descriptions in Key Consideration 4 under Principle 4 Credit Risk for more details.

Key Consideration 5 For the purpose of meeting its minimum liquid resource requirement, an FMI's qualifying liquid resources in each currency include cash at the central bank of issue and at creditworthy commercial banks, committed lines of credit, committed foreign exchange 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 plausible market conditions. If an FMI has access to routine credit at the central bank of issue, 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.	**Size and composition of qualifying liquid resources** The current liquidity management plan (LMP) for HKCC is independent of other HKEX affiliated activities. In addition, such LMP does not only cover the liquidity requirement of the largest participant and its affiliates default in HKCC but also cover that of such participant and its affiliates default in HKSCC and SEOCH. In addition to the Margin, RF and the HKCC corporate funds which are dedicated resources of HKCC to cover the HKCC's liquidity needs, the HKCC may access the HKEX Group's corporate funds (including the RM Capital) and liquidity facilities to address the liquidity needs of the HKCC. The HKEX does not have access to central bank services. It has arranged a total of HK$10 billion unsecured committed credit facilities with options to draw down on the same day in three different currencies, namely HKD, USD and RMB from selected liquidity providers. In an HKCC Participant default situation, these facilities, together with the defaulting HKCC Participant's margin, the RF, and the HKCC and the HKEX corporate funds would be available to meet the liquidity needs over multiple days following the occurrence of the default. In addition, the HKEX and the HKCC have put in place a total of RMB 4.5 billion committed foreign exchange facilities with options to convert HKD and/or USD into RMB, or vice versa, with same day value. The HKCC discloses the size and composition of the qualifying liquid resources in the PFMI quantitative disclosure on a quarterly basis.
	Availability and coverage of qualifying liquid resources The HKCC's liquidity requirement is managed together with those of HKSCC and SEOCH by the HKEX at the HKEX Group level. The HKEX compares the availability of respective funds against the liquidity requirement of the HKCC, the HKSCC and the SEOCH on a daily basis when making investment decisions. Adjustments to the maturities of the funds invested will be made where necessary. The HKEX invests Margin fund, RF and the HKCC corporate fund only in assets with low credit, market and liquidity risks in accordance with the Investment Policy. The Investment Policy sets out minimum liquidity requirements on investments and the Group Credit Limit for Settlement and Investments Framework (Credit Framework) sets out a concentration limit for each settlement bank/custodian bank to ensure that the HKCC has sufficient liquid resources to meet projected and stressed funding requirements.

	To mitigate issues relating to counterparty concentration, a cap is set on the total amount of the margin funds, RF, guarantee fund and corporate funds of the HKEX Group, including the HKCC, that can be deposited with any one of its counterparties including the systemically important HKD note-issuing banks. The HKEX has established procedures in applying different types of liquid resources at the HKEX Group's disposal to complete its payment obligations. The cash on hand will first be utilized and if additional resources are needed, the HKEX may opt for early-termination of fixed-termed bank deposits, sales or repo of investment holdings and/or committed bank facility drawdowns based on the prevailing market conditions. Unannounced drawdown tests on liquidity providers are conducted on an annual basis to ensure that the committed credit facilities are readily available when needed. The daily assessment targets to cover the combined liquidity requirements of the HKSCC, the HKCC and the SEOCH at a confidence level of at least 99% in a two-year lookback period.
Key Consideration 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.	**Size and composition of supplemental liquid resources** In addition to the liquid resources described in Key Consideration 5 above, uncommitted repo facilities of HK$6.5 billion by major banks, are also available in case of need. **Availability of supplemental liquid resources** As the repo facilities are uncommitted, the HKCC does not count them as liquidity pursuant to the PFMI.

Key consideration 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 procedures for accessing its liquid resources at a liquidity provider.	**Use of liquidity providers** Committed facility providers are admitted based on the institutions' financial credentials including (but not limited to) the providers' deposit base in Hong Kong, market capitalizations as well as credit ratings of recognized rating agencies. Each committed facility is reviewed annually and facility providers have all been made aware of the purpose and significance of their commitments to provide liquidity to the HKEX when called upon. **Reliability of liquidity providers** Unannounced drawdown tests with actual fund movements take place yearly to assess the availability of liquid resources. The purpose of the drawdown exercises being "unannounced" is to simulate actual scenario with an element of surprise to the facility providers. Procedures on drawdown of the committed facilities are clearly documented in the HKEX Treasury Operating Procedures and results of the drawdowns, including responsiveness of the facility providers, are provided to senior management internally as well as the HKMA and the SFC externally.
Key consideration 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.	Currently, the HKCC does not have access to central bank account and central bank liquidity. However, the HKEX is in discussion with the HKMA and the SFC to open an HKD RTGS account HKSCC. For more details, please refer to the Principle 9 on Money Settlements.
Key Consideration 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 procedures 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	**Stress test program** The liquidity requirement for each relevant currency in relation to the HKCC Participant default is measured daily in accordance with a predefined stress testing policy, assumptions and procedures. As the HKEX manages its liquidity funding at the HKEX Group level, the daily assessment covers a number of potential stress scenarios, including the default of the participant and its affiliates that generate the largest aggregate payment obligations across the HKSCC, the HKCC and the SEOCH under extreme but plausible market conditions on a combined basis (such assumptions being the same as the price movement assumptions used for the sufficiency of financial resources stress testing as described under Principle 4: Credit Risk). The assessment also considers the liquidity requirement associated with the default of Settlement Bank(s), custodian bank(s) and/or liquidity provider(s) at the HKEX Group level and the results are monitored daily.

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 plausible 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, nostro 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.	
	Stress test scenarios For the description of scenarios, please refer to Principal 4, KC5. In developing the liquidity stress testing model and key assumptions, the HKCC considers various factors, including the historical price movements of the relevant market and liquidity needs over multiple time horizons in case of the HKCC Participant default. The HKCC has also benchmarked the default assumptions against the arrangements of major overseas markets and considered whether the HKCC is systemically important to multiple jurisdictions. Please refer to Key Consideration 4 above for details on the key assumptions in liquidity stress testing.
	Review and validation The Clearing Risk Management function of the HKEX reports the liquidity stress testing results to the HKEX's senior management and the SFC on a daily basis, to the CRC on a monthly basis and to the ERiC and BRC on a quarterly basis. On a monthly basis, the Clearing Risk Management function reviews the liquidity stress testing model to assess the appropriateness of the assumptions, parameters and scenarios by analyzing the latest local and international market dynamics, the HKCC Participant default events and new business initiatives. This monthly review will be conducted more frequently when the market is unusually volatile or less liquid or when the concentration of positions held by the HKCC Participants increases significantly. The HKCC performs an annual independent validation of the model by external experts. The HKCC also performs reverse stress testing on liquidity on a monthly basis to identify the extreme scenarios and market conditions in which liquid resources would not be sufficient.

Key consideration 10 An FMI should establish explicit rules and procedures that enable the FMI to effect 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 procedures should address unforeseen and potentially uncovered liquidity shortfalls and should aim to avoid unwinding, revoking, or delaying the same-day settlement of payment obligations. These rules and procedures 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.	**Same day settlement** Where the liquid resources set out in the above paragraphs are unavailable or otherwise insufficient or anticipated to be insufficient, the HKCC may utilize the recovery measures to address the liquidity shortfall. Under HKCC Rule 310, to the extent that the aggregate of funds or assets available to the HKCC are insufficient to meet its obligations to the HKCC Participants under Market Contracts, each HKCC Participant is only entitled to receive payment pro-rata to the amount due to it as compared to the amount due to all HKCC Participants. The HKCC remains liable for the Market Contracts but payment of the balance due is only made when and to the extent that funds or assets are subsequently available. In relation to the HKCC's obligations under Market Contracts to deliver underlying instruments or a particular currency to the HKCC Participants, HKCC Rules 409(c), 411(e) and 611 state that if the HKCC determines that it is not possible or reasonably practicable to deliver the underlying instruments or currency, it may make money compensation or pay in a different currency in whole or in part to the relevant HKCC Participants in such amounts as the HKCC may determine to be fair and reasonable.
	Replenishment of liquidity resources For the replenishment of the RF, please refer to Principle 4 on Credit Risk.
Key Conclusions for Principle 7	The liquidity risks management framework is defined at the HKEX group level covering the liquidity needs of the 3 CCPs (HKCC, HKSCC, SEOCH). The methodology to identify, monitor and managing the liquidity risk seems to be appropriate at the aggregate level aimed at covering payment obligations arising from participants default, liquidity provider default, settlement bank failure, or illiquidity of investments and collateral. The HKCC has several sources of qualifying liquid resources available, including cash deposited at authorized credit institutions and committed lines of credit.
Assessment of Principle 7	Observed
Recommendations and comments	The HKCC should further enhance its liquidity risk management in line with CPMI-IOSCO Further Guidance to the PFMI of 2017, including: - The liquidity stress-testing framework by excluding participants' excess collateral from stress testing results. - While the HKCC has enough resources, it is crucial to monitor and maintain sufficient liquid resources in each currency for which it has corresponding obligations. Again, this may result

	in a situation in which the CCP requires additional arrangements to convert promptly available prefunded financial resources denominated in one currency into the required currency. Furthermore, the HKCC may consider strengthening its liquidity risk management by having resources to cover the default of the two largest clearing members (liquidity Cover-2). Moreover, it would advisable for the HKCC to have a dedicated committee to manage its liquidity. The HKMA should be directly involved in the oversight of the HKCC to ensure that its interests as central bank of issue are duly considered.
Principle 8. Settlement Finality An FMI should provide clear and certain final settlement, at a minimum by the end of the value date. Where necessary or preferable, an FMI should provide final settlement intraday or in real time.	
Key Consideration 1 An FMI's rules and procedures should clearly define the point at which settlement is final.	**Point of settlement finality** The points at which settlement of obligations between the HKCC and the HKCC Participants become final are stipulated in the HKCC Rules and the HKCC Procedures, which are made pursuant to Section 40 of the SFO, after they are approved by the SFC under Section 41 of the SFO. The SFO together with the HKCC Rules and the HKCC Procedures protect the settlement processed by the HKCC from the proceedings related to insolvency or bankruptcy. Please refer to Principle 1 on Legal Basis. All derivatives contracts traded on HKFE are cash settled upon final settlement, except USD vs CNH currency futures and options contracts and physically settled CNH and USD gold futures contracts. USD vs CNH currency futures contracts are settled upon delivery of USD by the seller and payment of final settlement value in RMB by the buyer upon final settlement. USD vs CNH currency options contracts are settled upon delivery of USD by the writer of call options / holder of put options and payment of final settlement value in RMB by the holder of call options / writer of put options upon final settlement. Physically settled CNH and USD gold futures contracts are settled upon physical delivery of physical gold by the seller and payment of final settlement value in the settlement currency by the buyer upon final settlement. *Final settlement of cash settled contracts* The HKCC uses SWIFT to effect payments to and from HKCC Participants' bank accounts via intra-bank transfers, with

	scheduled and ad-hoc money settlement processes. For day-end settlement of payment obligations arising from the final settlement of cash settled contracts, the payment deadline is 9:15 am on the next business day. Under Section 2.11.1 and 2.12.1 of the HKCC Procedures, all cash settled derivatives contracts are cash settled at the Final Settlement Price or Official Settlement Price (where applicable) on the Last Trading Day or Expiry Day (where applicable) or other day as determined in accordance with the Contract Specifications. Any profits or losses on cash settlement or any proceeds from the exercise and assignment for the in-the-money Options (where applicable) will be credited to or debited from the relevant CCMS Collateral Account of the HKCC Participant. If there are excess funds as shown in the CCMS Collateral Account, after considering all other liabilities, a payment will be made to the HKCC Participant upon request. If there are insufficient funds as shown in the CCMS Collateral Account to cover the resulting losses, a call will be made. *Final settlement of RMB Currency Futures and Options – USD vs CNH Currency Futures and Options* Under Section 2A.2 and 2A.4 of the HKCC Procedures for futures contracts and options contracts respectively, money obligations arising from the final settlement of USD vs CNH currency futures and options contracts in RMB and USD are debited from or credited to the CCMS Collateral Accounts of the respective HKCC Participants. The CCMS provide settlement facility for the cash leg. The HKCC generates payment instructions to collect any money obligations which are settled by 9:15 am on the Final Settlement Day. The HKCC will only allow the HKCC Participants to withdraw the amount in one currency leg if and only if the money obligations in another currency leg have been settled. *Final settlement of physically settled CNH and USD gold futures contracts* Under Section 2A.3.2.3 of the HKCC Procedures, physical delivery obligations on the final settlement of the contracts are to be settled between selling HKCC Participants and buying HKCC Participants via transfer of physical gold within their respective depository accounts maintained in an Approved Depository. The buying HKCC Participant is to transfer the amount of its payment obligation to a settlement account specified by the HKCC no later than 9:15 am on the Final Settlement Day. The HKCC will release the final settlement value to the selling HKCC Participant later on the Final Settlement Day once it has received confirmation from the Approved Depository that the transfer of the physical gold

	from the selling HKCC Participant's account to the buying HKCC Participant's account has been effected.
	Finality in the case of links Not applicable.
Key Consideration 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.	**Final settlement on the value date** The HKCC Participants are required to settle any unrealized incremental losses, margin obligations and fees with the Clearing Houses every day until the contracts are closed out, given up, exercised or expired. The settlement processes mainly comprised of: (a) settlement of mandatory intra-day VA and margin; (b) settlement of ad-hoc intra-day VA; (c) settlement of day end margin and other money obligations; and (d) settlement of additional reserve fund contribution. The HKCC uses SWIFT to effect payments to and from HKCC Participants' bank accounts via intra-bank transfers, with the scheduled and ad hoc money settlement processes. The deadlines to settle the relevant payments of each money settlement process are summarized in the table below:

Types of Processes	**Payment Deadline**
Daily settlement of day-end VA, Margin and fees Day-end settlement of payment obligations arising from the final settlement of cash settled contracts	By 9:15 am on the next business day
Settlement of final settlement value arising from physically settled CNH and USD gold futures contracts and deliverable currency futures and option contracts	By 9:15 am on the second business day after expiry
Daily settlement of mandatory intra-day VA and clearing house Margin	Within two hours after notification
Ad hoc settlement of intra-day VA	Within one hour after notification

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<tr><td>Ad hoc settlement of additional contributions to the RF</td><td>By 4:00 p.m. on the first business day after the distribution of the notification report</td></tr>
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Money settlement is considered final and conclusive when the HKCC receives payment confirmations from the Settlement Banks that the funds in the required currency have been received and credited to the HKCC's bank accounts. The points at which settlement of both receiving and delivering payments become final and irrevocable are stipulated in the agreements signed between the HKCC and its Settlement Banks.
For USD & CNH Physically Settled Gold Futures, final settlement shall be effected by physical delivery of underlying gold by the Selling HKCC Participant and payment of cash in the Settlement Currency by the Buying HKCC Participant. For the payment of the Final Settlement Value, the CCMS Collateral Accounts of Buying HKCC Participants would be debited; any shortfall would be collected from the Buying HKCC Participants by 9:15 a.m. on Final Settlement Day. The HKCC will then release the full amount of the payment obligation the HKCC received from the Buying HKCC Participants to the Selling HKCC Participants after the underlying gold has been transferred to the Buying HKCC Participants' account with the Approved Depository.
Settlement is final when final settlement value has been transferred from the buying HKCC Participant to the selling HKCC Participant and the physical gold has been transferred from the selling HKCC Participant to the buying HKCC Participant.
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<td>Intraday or real-time final settlement

Payment deadline and process type as specified above.</td>
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<td>Key Consideration 3
An FMI should clearly define the point after which unsettled payments, transfer instructions, or other obligations may not be revoked by a participant.</td>
<td>The HKCC acts as the CCP to clear and settle derivatives contracts traded on the HKFE. Upon receiving trades from the HKFE, via the HKATS, the HKCC registers those trades in the DCASS. Once registered, such contracts shall be irrevocable. The HKCC will novate and replace the registered contracts with Market Contracts in accordance with the HKCC Rules and the HKCC Procedures.</td>
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<td>Key conclusions for Principle 8</td>
<td>The HKCC Rules and the HKCC Procedures provide for final settlement no later than the end of the settlement day. The HKCC provides intraday finality for the scheduled and ad-hoc settlement processes. Money settlement is considered final and</td>
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	conclusive when the HKCC receives payment confirmations from the Settlement Banks that the funds in the required currency have been received and credited to the HKCC's bank accounts.
Assessment of Principle 8	Observed
Recommendations and Comments	
Principle 9. Money Settlements An FMI should conduct its money settlements in central bank money where practical and available. If central bank money is not used, an FMI should minimize and strictly control the credit and liquidity risks arising from the use of commercial bank money.	
Key Consideration 1 An FMI should conduct its money settlements in central bank money, where practical and available, to avoid credit and liquidity risks.	The HKCC conducts money settlements in HKD, RMB, USD, EUR and JPY with the HKCC Participants through Commercial settlement banks. As the HKCC is not an HKMA licensed bank, it does not have direct access to the RTGS systems operated by the HKICL. The HKCC has therefore appointed seven Hong Kong licensed banks as its settlement banks. All the banks are obliged to offer settlement in the 3 currencies - USD, HKD and CNH to conduct money settlement with the HKCC Participants via intra-bank transfers on its behalf. However, the HKEX is currently in discussion with the HKMA and the SFC to open an HKD RTGS account for its clearing houses.
Key Consideration 2 If central bank money is not used, an FMI should conduct its money settlements using a settlement asset with little or no credit or liquidity risk.	To manage the credit and liquidity risk exposure to the funds held or processed by its settlement banks, the HKCC applies criteria in selecting its Settlement Banks. Each appointed settlement bank must be a licensed bank under the Banking Ordinance (Cap. 155), and with Tier 1 capital under the Banking (Capital) Rules (Chapter 155L of the Laws of Hong Kong) of not less than HKD390 million or such other level as prescribed by the HKCC from time to time, and with proven operational capability and reliability, such as the ability to meet the HKCC's payment cut-off schedules.
Key Consideration 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,	The HKCC conducts due diligence reviews of each of its settlement banks periodically, with ad-hoc reviews where necessary. The review includes validations of its status being an HKMA licensed bank, its financial strength and operational reliability. The HKCC also monitors and manages the concentration of exposures to settlement banks periodically.

and operational reliability. An FMI should also monitor and manage the concentration of credit and liquidity exposures to its commercial settlement banks.	
Key Consideration 4 If an FMI conducts money settlements on its own books, it should minimize and strictly control its credit and liquidity risks.	Not applicable. The HKCC conducts money settlement through intra-bank transfers.
Key Consideration 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.	Each of the appointed settlement banks is required to sign an agreement with the HKCC, which covers obligations of the settlement bank, irrevocability of transfers and immediate availability of inward payments. Pursuant to the agreements, all confirmations effected by each settlement bank in relation to credits to the HKCC's account are final and conclusive, and may not be revoked by the settlement bank without the prior agreement in writing by the HKCC. Funds credited to the HKCC's bank accounts are cleared and immediately available to the HKCC.
Key Conclusions for Principle 9	The HKCC settles in commercial bank money. It has appointed several Hong Kong licensed banks to conduct money settlement through intrabank transfers. The HKCC has relevant rules and procedures to assess, monitor and minimize the credit and liquidity risks arising from the use of these settlement banks. As regards central bank money, the HKEX intends initially to open an HKD RTGS account for HKSCC and when sufficient experience is gained, it will consider extending the use of RTGS account to the HKCC.
Assessment of Principle 9	Observed
Recommendations and Comments	As systemic risk is potentially more present in the HKCC's activities due to high value and significant concentration of transactions, the HKCC should initiate discussions with the HKMA to settle the cash of HKCC's transactions in the RTGS system.

Principle 10. Physical Deliveries
An FMI should clearly state its obligations with respect to the delivery of physical instruments or commodities and should identify, monitor, and manage the risks associated with such physical deliveries.

Key Consideration 1 An FMI's rules should clearly state its obligations with respect to the delivery of physical instruments or commodities.	The HKCC facilitates the physical delivery of gold for its physically settled CNH and USD gold futures contracts. The HKCC clearly states its obligations as well as the HKCC Participants' obligations with respect to settlement of physical delivery contracts as set out in Chapter 2A of the HKCC rules and procedures.
Key Consideration 2 An FMI should identify, monitor, and manage the risks and costs associated with the storage and delivery of physical instruments or commodities.	When the conditions as stated in the HKCC Rules and Procedures are met, a contract re-novation process will be triggered. This means that the Market Contracts previously created between: (i) the HKCC and the selling HKCC's participant; and (ii) the HKCC and the buying HKCC's participant will be re-novated and replaced by a re-novated contract between the selling HKCC's participant and its allocated buying HKCC's participant directly. The HKCC's role will change from a CCP to a facilitator (i.e. Settlement Agent) to facilitate the settlement of the Re-novated Contract between the selling HKCC's participant and its allocated buying HKCC 's participant by instructing the Approved Depository to effect the physical delivery of gold from the selling HKCC Participant's depository account to the buying HKCC Participant's depository account and releasing the full amount of the final settlement value received from the buying HKCC Participant to the selling HKCC Participant's designated bank account. The Re-novated Contract will discharge and replace all rights and obligations between the HKCC and the relevant buying and selling HKCC Participants under the physically settled CNH or USD gold futures contract, and the HKCC will be fully discharged and released from all its obligations as a CCP in respect of such contracts. Due to the re-novation arrangement, the HKCC does not bear the risk and cost associated with the storage, ownership, quality and delivery of the underlying gold. In its capacity as a Settlement Agent, the HKCC has put in place processes and controls to track, manage and facilitate key events in the delivery process. These include appointing an Approved Depository, instructing the Approved Depository to earmark the physical gold of the selling HKCC Participant, instructing the Approved Depository to transfer the physical gold from the account of the selling HKCC Participant to the account of the buying HKCC Participant, and receiving funds from the buying HKCC Participant. The activities in delivering physical gold are very small, only 14 of 140 participants are involved and the 14 participants and very few transactions are executed per year.

Key Conclusions for Principle 10	The HKCC clearly defines its obligations with respect to the delivery of physical instruments. As stipulated in the HKCC rules, its role is purely administrative in nature in relation to the delivery of physical settled contract, hence, it does not bear any risk nor cost in relation to storage and delivery of physical instruments such as gold. The number of deliveries has been very few over the years.
Assessment of Principle 10	Observed
Recommendations and comments	
Principle 11: Central Securities Depositories A CSD should have appropriate rules and procedures to help ensure the integrity of securities issues and minimize and manage the risks associated with the safekeeping and transfer of securities. A CSD should maintain securities in an immobilized or dematerialized form for their transfer by book entry.	
Key Consideration 1 A CSD should have appropriate rules, procedures, and controls, including robust accounting practices, to safeguard the rights of securities issuers and holders, prevent the unauthorized creation or deletion of securities, and conduct periodic and at least daily reconciliation of securities issues it maintains.	**Safeguarding the rights of securities issuers and holders** Not applicable as the HKCC is not a CSD. **Prevention of the unauthorized creation or deletion of securities** Not applicable as the HKCC is not a CSD **Periodic reconciliation of securities issues** Not applicable as the HKCC is not a CSD
Key Consideration 2 A CSD should prohibit overdrafts and debit balances in securities accounts.	Not applicable as the HKCC is not a CSD
Key consideration 3 A CSD should maintain securities in an immobilized or dematerialized form for their transfer by book entry. Where appropriate, a CSD should provide incentives to immobilize or dematerialize securities.	Not applicable as the HKCC is not a CSD

Key Consideration 4 A CSD should protect assets against custody risk through appropriate rules and procedures consistent with its legal framework.	Not applicable as the HKCC is not a CSD
Key Consideration 5 A CSD should employ a robust system that ensures segregation between the CSD's own assets and the securities of its participants and segregation among the securities of participants. Where supported by the legal framework, the CSD should also support operationally the segregation of securities belonging to a participant's customers on the participant's books and facilitate the transfer of customer holdings.	Not applicable as the HKCC is not a CSD
Key Consideration 6 A CSD should identify, measure, monitor, and manage its risks from other activities that it may perform; additional tools may be necessary in order to address these risks.	Not applicable as the HKCC is not a CSD
Key conclusions for Principle 11	Not applicable as the HKCC is not a CSD
Assessment of Principle 11	Not applicable
Recommendations and Comments	
Principle 12. Exchange-of-value Settlement Systems If an FMI settles transactions that involve the settlement of two linked obligations (for example securities or foreign exchange transactions) it should eliminate principal risk by conditioning the final settlement of one obligation upon the final settlement of the other.	
Key Consideration 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	The HKCC settles USD vs CNH currency futures and options contracts, which involves the settlement of two linked obligations upon final settlement. The HKCC rules and procedures set out the settlement mechanisms of the two linked obligations, including the timing of finality for settling Market Contracts and the delivery and payment obligations arising from their expiries. Upon the expiry of USD vs CNH currency futures and options contracts, the HKCC debits and credits the corresponding money

settles on a gross or net basis when finality occurs.	obligations, in both RMB and USD, to the CCMS Collateral Accounts of the respective HKCC's participants. Delivery in a currency leg and payment in another currency leg constitutes linked obligations. The HKCC Participants have to settle their money obligations by making good payments to the HKCC before 9:15 am on the Final Settlement Day. The HKCC only allows the HKCC's participants to withdraw from their CCMS Collateral Accounts on the Final Settlement Day the amount in RMB/USD arising from the final settlement of USD vs CNH currency futures and options contracts if instructions are given to the HKCC before 11:00 am on the Final Settlement Day. The HKCC would then effect payments to the HKCC's participants after 11:00 am on the Final Settlement Day, if and only if their money obligations in another currency leg have been settled.
Key conclusions for Principle 12	The HKCC eliminates principal risk arising from the final settlement of RMB currency futures and options contracts by requiring the HKCC Participants to settle their money obligations in a currency leg before allowing them to withdraw money obligations in another currency leg.
Assessment of Principle 12	Observed
Recommendations and Comments	
Principle 13. Participant-default Rules and Procedures An FMI should have effective and clearly defined rules and procedures to manage a participant default. These rules and procedures should be designed to ensure that the FMI can take timely action to contain losses and liquidity pressures and continue to meet its obligations.	
Key Consideration 1 An FMI should have default rules and procedures 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.	**Participant default rules and procedures** *Event of Default* The HKCC Rules define the default events and the actions that can be taken when an event of default ("Event of Default") occurs. As set out in HKCC Rule 509, an Event of Default includes, among other things: a) an HKCC Participant's failure to meet any payment obligations due to the HKCC or to its creditors; b) an HKCC Participant's failure to comply with any position limits imposed by the HKCC; c) an HKCC Participant is charged with or convicted of any offence relating to fraud or dishonesty or any act of bad faith; and d) insolvency proceedings involving an HKCC Participant.

	If an HKCC Participant commits an Event of Default, the HKCC may declare the defaulting HKCC Participant as a defaulter under HKCC Rule 510 and, in its absolute discretion, take certain remedial actions. *Default Procedures* The HKCC has appointed selected participants as authorized brokers (i.e. liquidation agent and auction participant) to facilitate the closing out, sale and hedging of certain open contracts of a defaulting participant. The detailed procedures are agreed with all authorized brokers when they are appointed, and are rehearsed on an annual basis. The HKCC validates the contact details, together with any material changes in the procedures, with the authorized brokers regularly to ensure all relevant information is up-to-date. The HKEX has established a Default Management Group ("DMG"), comprising senior executives including the HKEX Group Risk Officer, Head of Post Trade, Head of Markets, Group Chief Financial Officer, Group General Counsel, Head of Clearing Risk Management and Head of On-Exchange & OTC Clearing. In case of a major incident, the HKEX Chief Executive, the HKEX Chief Operating Officer, the HKEX Head of Regulatory Compliance, Group Head of Enterprise Risk Management and the manager of Contingency Management Team ("CMT") will also be included in the DMG. The DMG is a dedicated team tasked to manage the default management process. The HKCC has also established internal procedures which set out the roles and responsibilities of the key stakeholders in handling an Event of Default, as well as the communication procedures with internal and external parties such as the SFC and market participants. *Default management process* In the event of default for listed futures and options contracts, Liquidation Agent (LA) equipped with relevant product expertise and execution capabilities is selected and the selection criteria of a LA would mainly base on the trading infrastructure and performance which can contribute to an efficient default management process and be more cost effective on the close-out process. LA would advise on the liquidation strategy and run the pre-trade analysis to estimate the possibility to close-out the defaulter's portfolio within 1 business day (within minutes or hours in many cases) and the estimated transaction cost based on current market condition.

Different from the OTC market, listed derivatives products have a high degree of standardization and regulation, with required market makers/liquidity providers continuously quoting bid/ask prices on the central order book. Therefore, the liquidity for listed derivatives are mainly from the screen. When executing close-out on behalf of the CCPs via the open market, LA can access to deep liquidity and real-time prices supported by regulated market-making for timely liquidation under stressed conditions.

In addition, the HKCC can conduct auctions for the concentrated and illiquid positions that are not able to close-out in the open market within one business day. For such positions, the HKCC will instruct LA to conduct hedging to minimize the market risk of the defaulter's portfolio, as the HKCC believes that the chances of a successful auction will be higher if the defaulter's portfolio is hedged. However, the HKCC has never used auctions to liquidate the defaulter's portfolio therefore auctions are deemed a tool for additional contingency. The auction process is routinely tested and included default management drills.

Use of financial resources

Allocation of Default Losses and Replenishment Arrangements

In the process of closing out the open positions of the defaulting participant, the HKCC would have access to:

(a) Margin and other collateral from the defaulter and in the event that was insufficient;

(b) the waterfall of resources described below including the RF and the recovery tools; and

(c) various liquid resources maintained by the HKEX including committed credit facilities made available by the HKEX to the HKCC.

In the event of an HKCC participant default where the non-defaulting participants' contributions to the RF are used to cover a default loss, such contributions will be applied to share the default loss on a pro-rata basis by reference to the HKCC Participants' respective contributions to the RF on the business day immediately prior to the date of default declaration.

Where the defaulting HKCC Participant's collateral is insufficient or total pre-funded financial resources are anticipated to be insufficient, the recovery plan will be triggered. A number of recovery tools including Assessments, Voluntary Recapitalization and Loss Distribution Process can be applied by the HKCC to allocate its uncovered credit losses arising from the HKCC

	Participant in default. Please refer to the description under Principle 4: Credit Risk for further information. If there is a shortfall in the HKCC Participants' RF Contributions following the expiry of the Capped Liability Period, the HKCC Participants will be required to replenish their RF Contributions upon notification. At the same time, the HKCC will also make appropriations for the deficiency of its contribution to the RF. Please refer to the description under Principle 4: Credit Risk for further information.
Key Consideration 2 An FMI should be well prepared to implement its default rules and procedures, including any appropriate discretionary procedures provided for in its rules.	The default management framework as described in Key Consideration 1 forms the basis of the arrangement when default occurs. The HKCC performs annual default drill and validates the contact details to ensure all relevant information is up-to-date.
Key Consideration 3 An FMI should publicly disclose key aspects of its default rules and procedures.	The HKCC discloses key aspects of its default rules and procedures in its Clearing Rules 509 to 515A, which are available on its website.
Key Consideration 4 An FMI should involve its participants and other stakeholders in the testing and review of the FMI's default procedures, including any close-out procedures. Such testing and review should be conducted at least annually or following material changes to the rules and procedures to ensure that they are practical and effective.	The HKCC conducts default drill annually with authorized brokers for close-out and auction procedures and annually for DMG, which includes the HKEX senior management, aiming to familiarize with the default management process and testing the effectiveness of the procedures. The Default Management Manual, which provides guidance for the default management process, is subject to review annually and also after every major test, event or service change.
Key Conclusions for Principle 13	The HKCC rules clearly define the events of Default and the actions that can be taken when a default of a participant is declared. The HKCC has developed internal operating procedures, which clearly articulate the roles and responsibilities of various stakeholders and the procedures to handle the participant default. The default management procedures are reviewed and tested with relevant stakeholders regularly and on a need basis. These rules and procedures are properly in place to ensure that the HKCC can take timely action to deal with losses and liquidity requirements that may arise under default.
Assessment of Principle 13	Observed

Recommendations and comments	
Principle 14. Segregation and Portability A CCP should have rules and procedures that enable the segregation and portability of positions of a participant's customers and the collateral provided to the CCP with respect to those positions.	
Key Consideration 1 A CCP should, at a minimum, have segregation and portability 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 customer positions and collateral against the concurrent default of the participant and a fellow customer, the CCP should take steps to ensure that such protection is effective.	**Customer protection from participant default** The HKCC offers an account structure to the HKCC Participants that effectively segregates the trades, positions and collateral of the HKCC Participants and their clients. The HKCC provides different types of position accounts in DCASS ("Clearing Accounts"), including: (a) House Account to record the HKCC Participants' own trades and positions; (b) two types of Client Accounts, Omnibus Client Account and Individual Client Account, for the HKCC Participants to record their clients' trades and positions; and (c) Market Maker Account to record the trades and positions arising from market making activities conducted by the HKCC Participants or their clients. The HKCC also offers different types of collateral accounts in CCMS ("CCMS Collateral Accounts"), including House Collateral Account, Client Collateral Account and Market Maker Collateral Account, to facilitate the HKCC Participants to separately identify the collateral relating to their clients, market making activities and themselves. The HKCC posts all obligations arising from (i) positions of House Accounts to House Collateral Accounts; (ii) positions of Client Accounts to the applicable Client Collateral Accounts; and (iii) positions of Market Maker Accounts to the applicable Market Maker Collateral Accounts. Collateral in Client Accounts of an HKCC Participant will be used for covering obligations of client positions only. HKCC Rules 415 and 416 stipulate that any amount standing to the credit of the House Collateral Account of the defaulting HKCC Participant may be applied by the HKCC to set off liabilities in respect of its Client Collateral Accounts, but the amount standing to the credit of any Client Collateral Account cannot be used to set off liabilities of House Collateral Account. The HKCC offers facilities to support the HKCC Participants to transfer their clients' positions and, if necessary, the associated margin to other HKCC Participants subject to the consent of the recipient HKCC Participant. In the event of an HKCC Participant default, the HKCC has powers under its default procedures to facilitate the transfer of client positions of the defaulting HKCC

	Participant, at the request of the clients, to a nominated non-defaulting HKCC Participant together with the margin in respect of such positions, subject to the consent from the recipient HKCC Participant and other conditions.
	Customer protection from participant and fellow customer default As the CCP, the HKCC settles Market Contracts with the HKCC Participants as principal in respect of each derivatives contract registered in their Clearing Accounts. The HKCC provides the HKCC Participants with facilities to open various Clearing Accounts and CCMS Collateral Accounts to facilitate the recording of their clients' positions and associated collateral, and porting of these positions and collateral to another HKCC Participant subject to the consent of the recipient HKCC Participant. Associated collateral in client accounts of an HKCC Participant will be used for covering obligations of such client positions only which are registered in its Clearing Account.
	Legal basis The SFO lays out various requirements for recording client trades and segregating and safeguarding of client positions and collateral by all licensed corporations including the HKCC Participants. The SFO requires the HKCC Participants to identify each trade as being a house or client trade and whether it was executed as principal or agent and this information is recorded in contract notes provided to the clients and maintained as part of the HKCC Participant's records. The HKCC has also confirmed the legal soundness and enforceability of the segregation and portability arrangements provided by the HKCC under Hong Kong law based on the legal opinions procured from an independent law firm in Hong Kong.
Key Consideration 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 customer positions and collateral in individual customer accounts or in omnibus customer accounts.	As mentioned above, it is a statutory requirement to identify each transaction as house or client. The HKCC offers different types of Clearing Accounts to record the positions of the HKCC Participants and their clients. The HKCC provides a House Account to each HKCC Participant to record its house positions, Omnibus Client Accounts and Individual Client Accounts to record its clients' positions, and Market Maker Accounts to record positions arising from market making activities. Positions maintained in the House Account and Market Maker Account are margined on a net basis. Client positions maintained in an Omnibus Client Account are

	margined on a gross basis while those maintained in Individual Client Accounts are margined on a net basis. There is another net margined client account called Client Offset Claim Account. This account is used by an HKCC Participant to record positions which are of an offset nature (e.g. a calendar spread trade) of the same beneficial owner whose positions would otherwise be recorded in an Omnibus Client Account. Only positions owned by the same client are eligible to be maintained in an Individual Client Account. The HKCC provides different types of CCMS Collateral Account, including House Collateral Account, Client Collateral Account and Market Maker Collateral Account to the HKCC Participants to allow them to separately identify and handle collateral relating to their clients, market makers and themselves. The House Collateral Account is for recording an HKCC Participant's own collateral and collateral movement transactions. The HKCC posts all obligations arising from positions of an HKCC Participant's House Account to this House Collateral Account of the HKCC Participant and settles net with the HKCC Participant. The Client Collateral Account is for recording the collateral and collateral movement transactions of all clients of an HKCC Participant. The HKCC posts all obligations arising from positions of all client accounts of an HKCC Participant (i.e. Omnibus Client Account and Individual Client Accounts) to this Client Collateral Account of the HKCC Participant and settles net with the HKCC Participant. The Market Maker Collateral Account is for recording the collateral and collateral movement transactions arising from market making activities conducted by an HKCC Participant or its client. The HKCC posts all obligations arising from positions in the Market Maker Account of an HKCC Participant to the applicable Market Maker Collateral Account of the HKCC Participant and settles net with the HKCC Participant. As described in Key Consideration 1 above, collateral in client accounts of an HKCC Participant will be used for covering obligations of client positions only.
Key Consideration 3 A CCP should structure its portability 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.	As mentioned in Key Consideration 1 above, the HKCC offers facilities to support the HKCC Participants to transfer their clients' positions and, if necessary, the associated Margin to other HKCC Participants subject to the consent of the recipient HKCC Participant. In the event of an HKCC Participant default, the HKCC has powers under its default procedures to facilitate the transfer of client positions of the defaulting HKCC Participant, at the request of the clients, to a nominated non-defaulting HKCC Participant together with the Margin in respect of such positions, subject to the consent from the recipient HKCC Participant and other conditions.

Key Consideration 4 A CCP should disclose its rules, policies, and procedures relating to the segregation and portability of a participant's customers' positions and related collateral. In particular, the CCP should disclose whether customer 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 port a participant's customers' positions and related collateral.	As mentioned above, the HKCC rules offers facilities to support the HKCC Participants to manage their clients' positions and collateral on an individual or omnibus basis and discloses in its rules and procedures, published on its website, the segregation and portability arrangement. Collateral in client accounts of an HKCC Participant will be used for covering obligations of client positions only. HKCC Rules 415 and 416 stipulate that any amount standing to the credit of the House Collateral Account of the defaulting HKCC Participant may be applied by the HKCC to set off liabilities in respect of its Client Collateral Accounts, but the amount standing to the credit of any Client Collateral Account cannot be used to set off liabilities of House Collateral Account. Except for the transfer of positions in a client offset claim account of a defaulting HKCC Participant where the transfer must be for all but not part of the positions in that account, positions can be transferred from the defaulting HKCC Participant to another HKCC Participant in accordance with Section 1.4.3 of HKCC Procedures, subject to the consent from both the HKCC Participants and the HKCC. HKCC Rule 510(f) also empowers the HKCC to transfer positions of a defaulting HKCC Participant, together with the collateral in respect of such positions, to a non-defaulting HKCC Participant.
Key conclusions for Principle 14	The HKCC has rules and procedures to enable the segregation and portability of the positions and collaterals of a participant's clients. The SFO lays out various requirements for recording client trades and segregating and safeguarding of client positions and collateral by all licensed corporations, including the HKCC Participants. Compliance with these requirements is assessed as part of the routine market intermediaries' supervision programme conducted by the SFC. Accordingly, the HKCC has segregation and portability arrangements for participants to properly identify and segregate their clients' positions and collateral from their own by making use of different types of Clearing Accounts and CCMS Collateral Accounts.
Assessment of Principle 14	Observed
Recommendations and comments	
Principle 15. General Business Risk An FMI should identify, monitor, and manage its general business risk and hold sufficient liquid net assets funded by equity to cover potential general business losses so that it can continue operations	

and services as a going concern if those losses materialise. Further, liquid net assets should at all times be sufficient to ensure a recovery or orderly wind-down of critical operations and services.	
Key Consideration 1 An FMI should have robust management and control systems 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.	**Identification and monitoring of general business risks** The HKCC adopts the HKEX Group's Risk (GRM) Framework to identify, monitor and manage material risks, including its general business risk. The GRM framework requires the identification of internal and external factors that could impair the HKCC's financial position, evaluation of their impacts and the likelihood of occurrence. The BRC is delegated by the HKEX Board to oversee the overall GRM Framework and to advise the HKEX Board on risk-related matters. Details of the Group's risk governance structure are set out in the Risk Committee Report which is publicly available on the HKEX Group website: https://www.hkexgroup.com/-/media/HKEX-Group-Site/ssd/Corporate-Governance/Documents/riskreport_e.pdf The independent BRC receives a quarterly, and independent Group Risk Officer Report and Group Risk Management Report which includes the HKCC and includes a risk dashboard, risk heatmaps, emerging risks, audit findings, risk assurance activities and specific clearing risks. The HKEX Group operates a group-wide risk reporting IT system (Risk Register) and standardized risk classification methodology. All risks identified by the 1st line operations, 2nd line oversight functions (assurance activity conducted by Group Risk and Regulatory Compliance) and 3rd (or 4th line) audit activity is recorded through the group-wide system. This includes risk management decisions, ownership, remedial actions, target implementation dates amongst other key data fields. The Risk Register acts as the central repository for all risks across the business and feeds into the Risk Management Reports (risk dashboard, heat maps etc.) to drive risk management decisions from the Executive Management and Board as appropriate. External and internal factors that pose business risks to the HKCC include: (a) the pace and direction of legislative change in Hong Kong and in overseas jurisdictions and the impact this may have on user-participation in the services of the HKCC; (b) market conditions and the pace of development of offshore RMB-denominated products, a developing market segment in which the HKCC expects to have a competitive advantage;

	(c) the effectiveness of the HKCC's business strategy; (d) operational issues that may impact the HKCC's expenditure and investments; and (e) the investment risk in its own assets. Please refer to the description under Principle 16: Custody and Investment Risks. The HKCC establishes and implements key financial and internal controls, including annual financial planning and budgeting, and monthly reviews of financial results, cash flow forecasting and available resources.
Key Consideration 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 funded by equity an FMI should hold should be determined by its general business risk profile and the length of time required achieving a recovery or orderly wind-down, as appropriate, of its critical operations and services if such action is taken.	In its annual budget planning, the HKEX considers its three-year strategic plan to forecast the operating and capital budget under normal, low and high transaction volume scenarios. In addition, the HKEX monitors the impact of general business risk on its financial position through monthly reviews of profit and loss, actual and budget income and expenses, cash in and out flows, both at the HKEX and/or its subsidiary levels, including the HKCC, to ensure sufficient liquid net assets are maintained to meet general business obligations. In addition, the HKCC expects that the time required for default management and recovery process will be within six months and the liquid net assets maintained by the HKCC meet the related regulatory requirements for an RCH under the PFMI.
Key Consideration 3 An FMI should maintain a viable recovery or orderly wind-down 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 equal to at least six months of current operating expenses. These assets are in addition to resources held to cover participant defaults or other risks covered under the financial resources principles. However, equity held under	**Recovery or orderly wind-down plan** The HKCC's capital would be its main defense against various potential business losses. The recovery tool would be triggered in the event of potential capital inadequacy due to business losses. The HKCC would look to recapitalize to recover its operations. The HKEX, as a listed company, could inject additional capital into the HKCC and potentially raise capital via the capital markets if needed. In the event that the HKCC cannot continue as a viable entity and no other alternatives are available at the time, the HKEX would be responsible for ensuring a smooth wind-down of the HKCC. This would involve, among other things, pursuing amounts due from the defaulting HKCC Participants.

international risk-based capital standards can be included where relevant and appropriate to avoid duplicate capital requirements.	**Resources** As part of its ongoing compliance requirements as an RCH, including compliance with the PFMI, and with a going concern to ensure it can continue operations and services, the HKCC maintains at all times liquid net assets[11] funded by equity in an amount sufficient to cover its projected total operating expenditure for at least the next six months, and net current assets funded by equity or loans from the HKEX (not being short-term loans or loans that are repayable on demand) sufficient to cover its projected total operating expenditure for at least the next 12 months. Liquid net assets maintained by the HKCC meet the related regulatory requirements for an RCH under the PFMI.
Key Consideration 4 Assets held to cover general business risk should be of high quality and sufficiently liquid in order to allow the FMI to meet its current and projected operating expenses under a range of scenarios, including in adverse market conditions.	The HKCC maintains sufficient liquid net assets funded by equity, which are of high quality and sufficiently liquid (bank deposits with short term maturity (within 3 months)) to cover potential general business losses.
Key Consideration 5 An FMI should maintain a viable plan for raising additional equity should its equity fall close to or below the amount needed. This plan should be approved by the board of directors and updated regularly.	The HKEX maintains a strong capital base (routinely disclosed in the annual report) and is able to inject additional capital into the HKCC. The HKCC has in place a recovery plan which includes capital action to recapitalize the CCP when the HKCC's equity falls close to or below the amount needed. The plan is approved by the Board Risk Committee and is updated regularly. In the event that the HKCC's financial resources have been utilized or exhausted to cover the general business losses, the HKCC Board may seek additional funding from debt and/or equity from the HKEX subject to the HKEX Board's approval and an assessment of prevailing conditions and regulatory capital requirements applicable to the HKCC. [11] The calculation of the liquid net assets excludes those being set aside for risk management purposes, such as the HKCC's contribution to the RF.
Key Conclusions for Principle 15	The HKCC's risk framework identifies internal and external factors that could impair the HKCC's financial position and evaluates their impacts and the likelihood of occurrence. It establishes and implements key financial and internal controls and plans to mitigate, monitor, and manage the risks.

	The HKCC maintains at all times liquid net assets funded by equity in an amount sufficient to cover its projected total operating expenditure. Furthermore, should the HKCC's equity fall close to or below the amount needed, the HKEX would inject additional capital into the HKCC and potentially raise capital via the capital markets if needed.
Assessment of Principle 15	Observed
Recommendations and Comments	
Principle 16. Custody and Investment Risks An FMI should safeguard its own and its participants' assets and minimize the risk of loss on and delay in access to these assets. An FMI's investments should be in instruments with minimal credit, market, and liquidity risks.	
Key Consideration 1 An FMI should hold its own and its participants' assets at supervised and regulated entities that have robust accounting practices, safekeeping procedures, and internal controls that fully protect these assets.	As part of HKEX risk management framework, the HKCC has a comprehensive framework to manage its custody and investment risks. The HKEX Finance Division applies stringent criteria and procedures in selecting its custodians. The custodians must fulfil the regulatory requirement, including licensing by the HKMA and meeting the capital requirements, as specified by its relevant regulatory authority. The HKCC only appoints custodians with accounting practices, safekeeping procedures and internal controls that ensure optimal protection of the assets being placed with them. In addition, the criteria covers: a) operational history: minimum 3 years of operation and good track records; b) operational criteria: ability to process SWIFT message, settlement instruction adequately, well-trained staff, proper internal policies governing integrity, authenticity and confidentiality; c) creditworthiness: minimum rating of A3 (or equivalent); d) Risk management: has a system capable of ring-fencing HKEX assets under custody, robust internal control robust policy for monitoring sub-custodians; e) commercial terms: ability to conform with the terms and conditions of HKEX's Finance Division, competitive fees and charges; and f) FATCA compliance The HKCC invests its own assets under a conservative investment strategy described below. As of 30 June 2019, the total amount of HKCC's assets, such as margin fund, reserve fund and HKCC own fund, corresponded to approximately HKD 60 billion, deposited in approximately 20 banks.

Key Consideration 2 An FMI should have prompt access to its assets and the assets provided by participants, when required.	The HKCC holds its assets and the HKCC Participants' assets under its control in banks and securities accounts in the name of the HKCC. Currently, the HKCC holds: (a) cash assets with selected banks in Hong Kong; (b) EFBN as collateral with the CMU of the HKMA; (c) US Treasuries as collateral with Clearstream; and (d) debt securities with selected custodians in Hong Kong. The HKEX manages cash assets of the HKEX Group in Hong Kong centrally through the HKEX's treasury team ("HKEX Treasury"). However, a dedicated team manages separate sub-portfolio of each CCP, including the HKCC. The HKEX Treasury places a significant portion of cash assets as deposits in banks in Hong Kong. The HKCC can withdraw a significant portion of these deposits promptly and with same-day availability. The HKCC holds its and the HKCC Participants' non-cash assets in the name of the HKCC. The HKCC monitors the asset movement instructions processed by CMU and Clearstream. The HKCC ensures that it has received assets provided by the HKCC Participants to its accounts with the CMU or Clearstream before it credits the same to the relevant HKCC Participants' accounts in the CCMS.
Key Consideration 3 An FMI should evaluate and understand its exposures to its custodian banks, taking into account the full scope of its relationships with each.	As mentioned in Key Consideration 1 above, the HKCC applies stringent criteria in selecting its custodians. It also conducts on-going risk assessment on its exposure to each custodian bank. Moreover, to evaluate and understand its exposures to its custodian banks, the HKCC has conducted legal assessments to ensure the enforceability of the rights and interests of the HKCC, particularly in those assets kept in accounts with CMU and Clearstream.
Key Consideration 4 An FMI's investment strategy should be consistent with its overall risk-management strategy and fully disclosed to its participants, and investments should be secured by, or be claims on, high-quality obligors. These investments should allow for	**Investment strategy** The HKCC's investment strategy follows the Investment Policy set out by the IC and approved by the HKEX Board as follows: (a) Risk management – The principal risk types, namely liquidity risk, credit and concentration risk, market risk, FX risk and operational risk shall be considered when managing investments. All investments are subject to limits and appropriate risk controls;

quick liquidation with little, if any, adverse price effect.	(b) Preservation of capital – Risk taken on principal sums invested must be managed within limit as set out in the Credit Framework; (c) Liquidity – Investment portfolios shall remain sufficiently liquid at all times to meet expected cash outflows and regulatory requirements; (d) Return – Return on investments should be optimized within the Investment Policy, the regulatory constraints and the approved risk tolerance as prescribed by the Credit Framework, the HKEX IC and the HKEX Board; and (e) No conflict of public interest – no investment activity shall, directly or indirectly, in any way affect the role of the HKEX as a recognized exchange controller under the SFO, having particular regard to the interest of the public. The Investment Policy of the HKEX sets out restrictions to prevent it from taking advantage of any inside information it may obtain as a recognized exchange controller in making investment decisions. For instance, the HKEX is forbidden from investing in the securities of the HKEX. Investment strategy is disclosed to the public through the periodic financial statements of the HKEX, which are published on the HKEX Group website. https://www.hkexgroup.com/Investor-Relations/Financial-Results-and-Presentations?sc_lang=en. f
	Risk characteristics of investments At 31 December 2018, the investments in debt securities held by the HKEX Group (excluding those held by the collective investment schemes) were of investment grade and had a weighted average credit rating of Aa1 (Moody's). Deposits are placed only with the investment grade banks (licensed banks and restricted license banks regulated by the HKMA, and banks regulated by local banking regulators in the countries where the HKEX Group's subsidiaries operate). The HKEX Treasury places a significant portion of cash assets including margin fund and RF as deposits in banks in Hong Kong. The HKCC can withdraw these deposits promptly and with same-day availability. *The HKCC RF* The funds are placed in savings/current accounts with banks or as overnight time deposit. As the funds are held as cash, there are no liquidation concerns.

	The HKCC margin fund The HKEX Treasury maintains a significant portion of margin funds as cash in savings/current account and deposits with short term maturity. Time deposits are placed after the cutoff time of withdrawal requests to ensure that the withdrawal requirement is fulfilled on the same day. In case additional liquidity is needed, certain deposits can be terminated early with banks. Banks allow the terminated deposits to be settled on the same day or next day. As a significant portion of these funds are held as cash with short term maturity, there are no liquidation concerns.
Key Conclusions for Principle 16	The HKCC has a robust framework to manage its custody and investment risks. The HKCC safeguards its own and its participants' assets in supervised and regulated financial institutions with low credit risk. The HKCC's investment strategy is consistent with its overall risk-management strategy whereby Treasury has explicit limits for credit and market risks and fully disclosed to its participants. Furthermore, the HKCC has effective and sound procedures in place that can allow the HKCC to withdraw these deposits promptly and with same day availability.
Assessment of Principle 16	Observed
Recommendations and Comments	
Principle 17. Operational Risk An FMI should identify the plausible sources of operational risk, both internal and external, and mitigate their impact through the use of appropriate systems, policies, procedures, and controls. Systems should be designed to ensure a high degree of security and operational reliability and should have adequate, scalable capacity. Business continuity management should aim for timely recovery of operations and fulfillment of the FMI's obligations, including in the event of a wide-scale or major disruption.	
Key Consideration 1 An FMI should establish a robust operational risk-management framework with appropriate systems, policies, procedures, and controls to identify, monitor, and manage operational risks.	**Identification operational risk** The HKCC follows the HKEX's GRM framework to systematically identify, assess, monitor and control/mitigate material risks inherent in the business and operational processes, including operational risks from both internal and external sources, on an ongoing basis. Key sources of HKCC operational risks include: • changes in laws and regulations (external) • IT systems maintenance and changes (internal) • cyber attacks (external/internal) • physical security breaches (external/internal)

	• business continuity impacts from failed processes or external events (external/internal).
	Management of operational risk As described in Principle 15 Key Consideration 1, as integral part of HKEX Group, the HKCC follows the GRM framework which is based on the ISO 31000:2018 Risk Management standard and is required to monitor and record their identified risks in the HKEX Risk Register and as necessary implement mitigation plans to ensure risks remain within approved risk appetite. The GRM function undertakes frequent reviews of risks in the Risk Register, conducts specific Controls Assurance Review exercises and liaises with HKCC risk coordinators to ensure risks are accurately recorded, mitigation plans are adequate and follow up is undertaken as needed.
	Policies, processes and controls Key elements of the ERM framework include the HKEX Group Risk Management Policy, centralized risk recording, ongoing risk assessment and reporting. Risks are reported through the ERiC and BRC governance forums on a quarterly basis. Specific policies, frameworks and controls are in place for: • legal and compliance risk; • IT risk; • cyber security risk; • physical security risk; and • business continuity risk. Policies across risk domains are aligned to international standards as applicable and controls covering deterrent, detective, preventative, responsive and recovery considered where appropriate to ensure the resilience of the HKCC services. The HKCC follows the HKEX Human Resources polices to ensure qualified staff are recruited and retained. Retention arrangements and cross training is in place to minimize staff turnover and key person risk. The HKCC follows the HKEX New Product Policy and Group Project Management Framework to ensure change management activities are implemented without negatively impacting daily operations.
Key Consideration 2 An FMI's board of directors should clearly define the roles and responsibilities for addressing operational risk and should	**Roles, responsibilities and framework** The HKEX Board has approved the HKEX Group Risk Management Policy and framework, which assigns specific operational and other risk responsibilities across the HKEX Group and the HKCC, including to the HKEX Board, the BRC, the ERiC, managers of

endorse the FMI's operational risk-management framework. Systems, operational policies, procedures, and controls should be reviewed, audited, and tested periodically and after significant changes.	individual departments and staff. The GRM Policy is reviewed every 2 years. ERiC, comprising executives from across HKEX's key functions and activities, is responsible for GRM policy and reviewing controls, processes and procedures to identify and manage risks. Individual entities and business areas, including the HKCC, are responsible for: (a) identifying business-specific risks; (b) applying controls; (c) maintaining risk management systems; (d) reporting on the effectiveness of risk controls; and (e) implementing enhancements and taking remedial action as appropriate. Each department is required to maintain a record of its risks, reviewing this at least quarterly and updating as appropriate.
	Review, audit and testing Policies are formally reviewed internally every one or two years. More frequent reviews are undertaken where there are potential changes to technology, legal or regulatory requirements, or business drivers. Policies and procedures are the subject of internal and external reviews. The HKEX's IAD routinely monitors compliance with operational policy, reporting to the AC on a quarterly basis. Audit findings may prompt a review of policy, which would be conducted in consultation with key stakeholders. Significant changes to the HKCC's core operational activities are subject to testing prior to launch. Periodic testing of all controls is performed as part of the various HKEX assurance activities undertaken. Examples include business continuity and IT recovery tests; cyber-attack drills, physical security scenario exercises; and default management drills. Compliance controls are tested by the Regulatory Compliance function. Operational and other controls testing is also undertaken by Internal Audit review as part of its annual audit programme.

Key Consideration 3 An FMI should have clearly defined operational reliability objectives and should have policies in place that are designed to achieve those objectives.	The operational reliability objectives of the HKCC are defined in the service agreements with its third-party service providers, the HKCC's MCP, and its internal policies and procedures. Assessment of the outsourced services are conducted on an annual basis. Ad-hoc reviews will be initiated in case of regulatory changes or amendments to existing outsourcing arrangements. Quantitative objectives include system availability and resilience and performance targets. The HKCC core mission critical systems are designed to achieve at least 99.95% availability on a 12-month rolling basis. The primary resilience objective is to ensure that system recovery can be achieved within two hours. Arrangements and policies in place to ensure operational reliability objectives are met include: • Low latency, highly resilient IT service design; • Service delivery controls covering people, process and technology; • Performance alerting and regular reporting in place. • Site and data centre continuity arrangements which are regularly tested • A business continuity resilience objective of service recovery within two hours. • Third party service providers are subject to periodic independent capability reviews and regular performance assessments including Key Performance Indicator (KPI) reporting.
Key Consideration 4 An FMI should ensure that it has scalable capacity adequate to handle increasing stress volumes and to achieve its service-level objectives.	The system capacity of the DCASS/CCMS is scaled based on the projected transaction volumes and a capacity buffer has been put in place to handle potential stress volumes that sufficiently covers three times the historical peak. The Information Technology Function (ITF) of the HKEX measures the system capacity utilization on a daily basis and conducts a system capacity review at least semi-annually. The ITF performs capacity planning taking into consideration the peak volumes and business growth to ensure that sufficient system capacity is in place to meet the agreed business service-level requirements. The ITF also conducts ad hoc capacity reviews and planning for the launch of new services or unforeseeable business growth due to the changing business environment. The HKEX will perform system performance tests for any new system enhancement or upgrade, including those that relate to HKCC

	system, to ensure the adequacy of the system capacity to meet the business service level requirements.
Key Consideration 5 An FMI should have comprehensive physical and information security policies that address all potential vulnerabilities and threats.	**Physical Security** The HKCC follows the HKEX Group's physical security policies that identify, assess, and manage potential physical threats. The physical security measures have been established to guard against unauthorized access, attacks and intrusions, and to minimize the impact of potential natural disasters to physical sites, i.e. all business operations offices and data centres, both primary and secondary backup sites.
	Information Security The HKCC follows the HKEX Group's information security policies which identify, assess, and manage potential system vulnerabilities and threats. The HKEX's Information Security Department, which is independent of the ITD, oversees the information security strategy and policy for all application systems within the HKEX Group. The information security policy is designed with reference to international standards and sets out implementation safeguards in relation to user access and administration, infrastructure builds, default security requirements, firewalls, encryption, virus protection, passwords, removable media, email, internet and other risks.
Key Consideration 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) systems 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	**Objectives of business continuity plan** The HKEX Market Contingency Plans (MCP) sets out the actions to be undertaken to address critical market contingency situations with the objective of minimizing the impact of a major incident on markets, participants and investors, and the financial markets of Hong Kong as a whole. The MCP of individual entities, including the HKCC, describe in details incident response procedures and arrangements to recover services within 2 hours. However, on September 5, 2019, the HKEX suspended the trading of derivatives market for the afternoon and after-hours trading session due the malfunctioning of the derivatives trading system (software bug). The malfunction impact was determined to be significant once the afternoon trading session started (at 1pm) and the decision made to suspend trading (effective 2pm). The

case of extreme circumstances. The FMI should regularly test these arrangements.	cash market and clearing operations continued to operate as normal. During the same day, a cyber incident occurred by impacting the HKEX corporate website. The attacks resulted in a period of intermittent access to the sites and was defended through typical industry practice of utilizing a traffic scrubbing service provided by a third party – effectively removing 'bad traffic' before it's directed to HKEX sites.
	Design of business continuity plan When designing the MCP, the HKCC considers interdependencies and external links with the HKCC Participants, other FMI and third-party service providers, such as settlement banks and communications network suppliers. The MCP addresses an extensive range of disruptive event scenarios, such as: • loss of access to workplace premises; • system failures (both internal and external); • vendor failure; • unavailability of staff; and • extreme market movements. The MCP is designed to ensure the HKCC's business operations, including end-of-the-day settlement, continue even in the case of extreme circumstances by facilitating resumption at the secondary backup site within two hours. The MCP also sets out escalation and reporting procedures with various stakeholders, including the HKEX Board, RMC, the HKCC Board, regulators, HKCC Participants, third-party service providers and market participants where appropriate.
	Secondary site As an integral part of HKEX, the HKCC maintains secondary backup sites for business operations and system data centres in different districts of Hong Kong that have different power and telecommunication exchanges from the HKCC's primary production sites, in order to minimize any impact to the HKCC Participants and the market in case of contingency. Production data of the DCASS/CCMS is replicated to the system in the secondary backup site for business operations in real-time. In case of an emergency situation, the DCASS/CCMS in the secondary data centre would become operational, and business operations would resume at the secondary backup site within two hours.

	Review and testing The HKEX reviews its MCPs on an annual basis or more frequently as required. As part of this annual MCP review exercise, the HKCC conducts business impact analysis to identify critical business processes, internal and external resources and dependencies to support those business processes. The HKEX then assesses the impact in case of disruptions and develops measures to manage the disruptions. The HKCC also agrees with other FMI and third-party service providers, such as settlement banks, the contingency procedures in case of failure of the DCASS or their systems. These are included in the agreements with them. The HKCC performs contingency drills on selective scenarios annually and after significant changes to systems and/or services to ensure the effectiveness of operational procedures and control measures. The HKCC Participants are invited to participate in the drills, depending on the changes. The HKCC also provides continuous operational training to the HKCC Participants and conducts market rehearsals with the HKCC Participants to test the operational flows, contingency and fallback plans before the rollout of major system changes. In addition, the HKCC Participates in the Market Wide Rehearsal coordinated by the FSTB which provides an opportunity to rehearse its response to high impact issues with cross-market implications. The HKCC also participates in drills of other FMIs and service providers when necessary.
Key Consideration 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.	**Risks to the FMI's own operations** The quarterly risk reviews conducted by the HKCC include consideration of the risks posed by external parties. When designing the MCP, the HKCC takes into account interdependencies and external links with the HKCC Participants, other FMI and third-party service providers, such as Settlement Banks and communications network suppliers. **Risks posed to other FMI** The HKCC has a CSD link with the CMU of the HKMA for the settlement of EBFN but not to other FMI. Please refer to Principle 20 Financial Market Infrastructure Links for more details. The HKCC considered the risks it might pose to other FMI and took into account interdependencies and external links with another FMI when designing the MCP. The HKCC MCP sets out the contingency procedures to address operational risks that may affect the HKCC's critical operations and services, and to ensure

	that the operational risk event does not have a systemic impact on another FMI. In addition to conducting its own business impact analysis, the HKCC cooperates and participates in reciprocal due diligence exercises with relevant external parties. For example, the HKCC Participates in the Market Wide Rehearsal coordinated by the FSTB which provides an opportunity to rehearse its response to high impact issues with cross-market implications. The HKCC also participates in drills of other FMI and service providers when necessary.
Key Conclusions for Principle 17	The HKCC has a well-established operational risk management framework under which both internal and external plausible risk sources are identified and addressed by appropriate mitigation through the use of appropriate systems, policies, procedures, and controls. Moreover, the business continuity management of the HKCC also addresses events posing significant risk of operational disruption with an aim for timely recovery of operations and fulfilment of its obligations.
Assessment of Principle 17	Observed
Recommendations and Comments	Due to its critical function for the Hong Kong derivatives market, the HKCC should consider strengthening its business continuity practices with appropriate staffing arrangements, sufficient resources, capabilities and functionalities, which would allow swaps of operations between the primary and secondary sites on a business-as-usual basis. In light of the serious impacts of recent operational disruption and cyber-attacks, the HKCC should further strengthen its Cyber resilience by enhancing its procedures and testing methodologies.
Principle 18. Access and Participation Requirements An FMI should have objective, risk-based, and publicly disclosed criteria for participation, which permit fair and open access.	
Key Consideration 1 An FMI should allow for fair and open access to its services, including by direct and, where relevant, indirect participants and other FMIs, based on reasonable risk-related participation requirements.	**Participation criteria and requirements** The HKCC has established a set of objectives, risk-based and transparent eligibility requirements for two categories of the HKCC Participants, namely CP and GCP, to access its services fairly and openly. The HKCC Participants should have sufficient financial resources and operational capacity to meet their obligations and minimize the risk towards the HKCC. In particular, a participant must: (a) be an HKFE Exchange participant; and

	(b) have a minimum liquid capital of the higher of its required liquid capital under the FRR, or HK$5 million for CP and HK$20 million for GCP, respectively. The HKCC will admit banking entities, i.e. registered institutions (RIs) under the SFO, as GCPs starting from October 2019. The RI GCP will be subject to a higher capital requirement.
	Access to trade repositories Not applicable
Key Consideration 2 An FMI's participation requirements should be justified in terms of the safety and efficiency of the FMI and the markets it serves, be tailored to and commensurate with the FMI's specific risks, and be publicly disclosed. Subject to maintaining acceptable risk control standards, an FMI should endeavour to set requirements that have the least-restrictive impact on access that circumstances permit.	**Justification and rationale of participation criteria** The HKCC applies different financial requirements to different categories of HKCC Participants based on the services received from and the potential risks posed to the HKCC. The HKCC sets a higher RF Fixed Contribution level for a GCP as compared to a CP. In addition to good financial standing, the HKCC considers key operational and internal control aspects of the applicant including the experience of its key personnel and the quality of its compliance and risk management policies and systems.
	Least restrictive access The HKCC allows for fair and open access to its services. Its participants access HKCC's services provided that they meet the transparent eligibility and admission criteria as published on the HKEX website: https://www.hkex.com.hk/Services/Clearing/Listed-Derivatives/Getting-Started/Becoming-a-HKCC-Participant?sc_lang=en The eligibility and criteria include, but are not limited, to IT capability, operational capabilities, risk management, minimum capital and other requirements to perform the required clearing and settlement processes. The HKCC reviews participant admission, access restrictions and eligibility requirements as a result of the changing market environment and regulatory requirements on a need basis. The HKCC also seeks market feedback on membership requirements via various channels such as RWG, consultative panels, industry associations and bilateral meetings with HKCC Participants. Any change in the admission requirements as detailed in the HKCC Rules is subject to the approvals of the HKCC Board and the SFC. Each application to participate in the HKCC is decided by the HKCC Board. Any appeal against the decision of the HKCC Board to refuse an application may be made within 14 business days of

	being notified of the HKCC Board's decision to the participant. Admission Appeals Committee, which has been established to deal with such appeal requests in an independent and impartial manner.
	Disclosure of criteria The admission criteria applicable to each category of the HKCC Participants are stipulated in the HKCC Rules, which are publicly available on the HKEX Group website. The HKCC Participants must comply with the HKCC Rules and the HKCC Procedures in force from time to time, and must continue to comply on an ongoing basis with the criteria for admission.
Key Consideration 3 An FMI should monitor compliance with its participation requirements on an ongoing basis and have clearly defined and publicly disclosed procedures for facilitating the suspension and orderly exit of a participant that breaches, or no longer meets, the participation requirements.	**Monitoring compliance** The HKCC monitors the ongoing compliance of the HKCC Participants with their participation requirements and the HKCC Participants' ongoing financial standing through periodic reviews of regulatory reports submitted, such as the FRR reports and annual reports, etc. Please refer to the description under Principle 4: Credit Risk for the Counterparty risk monitoring process. To ensure the credit quality of individual counterparties are monitored at near real time where possible and relevant actions are taken. Moreover, an Early Warning Indicators (EWI) system was calibrated consisting of market indicators such as Credit Default Swaps and Equity Prices. Balance sheet and financial wherewithal is continuous monitored with internal credit ratings where the HKCC can (and has) requested daily and intraday updates for any material operational or financial concerns with counterparties. Together, the monitoring tools provide a comprehensive and proactive default risk tools for the HKCC. When the EWI system produces an alert or material issues arise (e.g. late payment), they are immediately escalated to the Group Head of Credit Risk and the Head of Clearing Risk. All credit issues are reviewed by the credit committee and where appropriate Clearing Risk Committee. A change in the counterparties' credit rating will trigger immediate risk mitigation actions, such as reduction of credit limits, increase margin requirement, upfront collateral or suspension of clearing activities.
	Suspension and orderly exit The HKCC has defined and publicly disclosed the HKCC Rules and Procedures for facilitating the suspension and orderly exit of an HKCC Participant that breaches or no longer meets the participation requirements. Where an HKCC Participant breaches or no longer meets the participation requirements, the HKCC may

	take disciplinary action against that participant, including restricting its access to and/or using the HKCC's facilities. The HKCC may revoke the participation of a participant forthwith by notice under certain circumstances, such as upon the liquidation or winding-up of a participant. The revocation of the participation of a participant does not affect any of its rights or obligations arising out of matters which occurred prior to the revocation and for the purpose of settlement of any contracts held by the HKCC Participant before the revocation. Where an HKCC Participant's right to access the HKCC's facilities has been restricted or participation has been suspended or revoked, the HKCC will as soon as practicable notify other HKCC Participants, the SFC, and HKFE of the restriction, suspension or revocation.
Key Conclusions for Principle 18	The HKCC has a set of objectives, risk-based and transparent criteria for participation, and allows for fair and open access to its services. The HKCC monitors on-going compliance of its participants with its requirements. Furthermore, it has clearly defined and publicly disclosed the HKCC Rules and the HKCC Procedures for facilitating the suspension and orderly exit of a participant that breaches or no longer meets the participation requirements.
Assessment of Principle 18	Observed
Recommendations and Comments	
Principle 19. Tiered Participation Requirements An FMI should identify, monitor, and manage the material risks to the FMI arising from tiered participation arrangements.	
Key Consideration 1 An FMI should ensure that its rules, procedures, 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.	**Tiered participation arrangements** The HKCC supports tiered participation arrangements through the offering of a third-party clearing service. A GCP can clear on behalf of an Exchange Participant, which is not a participant of the HKCC, i.e. Non-clearing participant (NCP). The GCP is required to inform the HKCC after signing a clearing agreement with the NCP. The GCP shall also give prior written notice to the HKCC if it or any of its NCP intends to terminate the clearing agreement between them.
	Risks to the FMI The HKCC deals with the GCP as a principal and not as an agent, and has no contractual relationship with the NCPs. Trades of the NCP will be registered in the name of the GCP that clears for the NCP. Positions of an NCP are maintained and margined according

	to the different Clearing Account types as described under Principle 6: Margin. Chapter III of the HKCC Rules governs the clearing arrangement between a GCP and an NCP. A GCP can clear and settle trades of an NCP on the condition that there is in place a valid, binding and effective clearing agreement between the GCP and NCP. According to HKCC Rules 204, 308A(a), and 314, The GCP is responsible for the registration and clearing of NCP. In particular, when the NCP is not entitled to record, register, or clear contracts in accordance with the HKCC Rules but must procure that all Contracts entered into by it are recorded, registered, and cleared on its behalf in accordance with the HKCC Rules by a GCP. Furthermore, where an original party to a contract is a NCP, that contract will be registered in the name of the GCP with which that NCP has executed a clearing agreement and the GCP will be treated for all purposes as the party to the contract for registration and novation purposes. The HKCC has established internal operating procedures to facilitate the switching of its NCPs to a new GCP during a GCP default. HKCC Rule 510(f) empowers the HKCC to transfer NCP's positions of a GCP together with the collateral to a new GCP that agrees to accept such transfer. NCPs of the defaulting GCP, without appointing a new GCP, will not be able to clear their trades in the HKCC and the procedures in handling the default as described in Principle 13 on Participant-default Rules and Procedures will apply. For the financial requirements, please refer to Principle 4, KC2. In brief, HKCC requires participants that clear transactions on behalf of their clients to have the necessary additional financial resources and operational capacity in place.
Key Consideration 2 An FMI should identify material dependencies between direct and indirect participants that might affect the FMI.	As licensed corporations under the SFO, NCPs are required to comply with the FRR under the SFO and file with the SFC a monthly financial return reflecting their liquid capital levels for review and monitoring. The SFC, as the front-line regulator that monitors and supervises the financial and operational capability of NCPs, is responsible for the regulatory oversight and monitoring the risk management activities of the NCPs, including sending to the HKEX relevant risk monitoring information on the NCPs such as a risky broker list where applicable. In addition, NCPs being Exchange participants are required to comply with the rules of HKFE. The HKCC manages the risk arising from an NCP through active monitoring and assessment of the risk of the GCP, who is primarily responsible for the risk of that NCP. The HKCC sets higher

	admission requirements for GCPs in terms of minimum liquid capital level and Fixed Contribution to the RF (please refer to the description under Principle 4: Credit Risk) and requires a GCP, in conjunction with HKFE, to impose additional risk management measures and procedures on its NCP's positions where appropriate. In addition, the HKCC performs regular risk scoring analysis to monitor the exposure and credit risk of the GCPs based on the Counterparty Risk Exposure Scoring Toolkit described under Principle 4: Credit Risk. The HKCC has also implemented necessary processes to generate timely information from its systems to identify, monitor and manage the risk of NCPs. Reports are generated by the DCASS on a daily basis to list the breakdowns of the positions, CH Margin and VA of each of the NCPs of a GCP so as to identify material dependencies between the NCP and GCP.
Key consideration 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 large relative to the capacity of the direct participants through which they access the FMI in order to manage the risks arising from these transactions.	As mentioned in Key Consideration 2 above, the HKCC generates daily reports to identify, monitor and manage the risk of the NCPs. In addition, for the HKCC's risk assessment purposes, the HKCC may require a GCP to provide further information of its NCPs, such as their financial resources in meeting their payment obligations. Based on the assessment results, the HKCC may impose additional risk management measures on a GCP including, but not limited to, applying a more stringent position limit and/or requiring and collecting additional CH Margin from the GCP, when necessary.
Key consideration 4 An FMI should regularly review risks arising from tiered participation arrangements and should take mitigating action when appropriate.	As mentioned in Key Consideration 3 above, the HKCC monitors the risk arising from NCPs on a daily basis and imposes additional risk management measures if deemed necessary. Rules and procedures in place to mitigate the HKCC's risks arising from the NCP arrangement will be reviewed when there are new businesses or operational changes.
Key conclusions for Principle 19	The HKCC supports tiered participation arrangements through offering the third-party clearing service. A GCP can clear on behalf of a non-clearing participant (NCP). The HKCC has robust risk management framework to identify, monitor, and manage the material risks to the HKCC arising from NCP. An important tool to monitor the risks in relation to undisclosed clients of HKCC Participants is the obligation to record transactions related to undisclosed clients on a dedicated account.

Assessment of Principle 19	Observed
Recommendations and Comments	
Principle 20. Financial Market Infrastructure Links An FMI that establishes a link with one or more FMIs should identify, monitor, and manage link-related risks.	
Key Consideration 1 Before entering into a link arrangement and on an ongoing basis once the link is established, an FMI should identify, monitor, and manage all potential sources of risk arising from the link arrangement. Link arrangements should be designed such that each FMI is able to observe the other principles in this report.	The HKCC does not have any link with other CCPs. At present, the HKCC has a link to the CMU, which is a central securities depository (CSD) to safe-keep EFBN as collateral on behalf of the HKCC Participants. The CMU is owned and operated by the HKMA. The HKCC has assessed the relevant risks, such as legal, credit, custody and operational risks, and put in place appropriate procedures and controls to manage those risks as needed. For example, the HKEX MCP sets out the contingency and recovery procedures to address operational risks that may affect the HKCC's critical operations and services under specific scenarios. The HKCC reviews the link arrangements when necessary and if there are changes to the operational flows or risk management policies to ensure the link arrangements continue to meet regulatory standards and are consistent with the HKCC's policies and standards.
Key Consideration 2 A link 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 link.	In establishing the link with the CMU, the HKCC has conducted legal assessments to ensure the enforceability of the rights and interests of the HKCC, particularly in those assets kept in the accounts with the CMU. Moreover, the HKCC has signed an agreement with the CMU to define the rights, obligations and liabilities of each party. The CMU is the issuer CSD for EFBN. All operations of the CMU are governed by the rules and procedures of the CMU, and the laws of Hong Kong. The CMU is under the oversight of the HKMA. The HKCC is a recognized dealer appointed by the HKMA and is a CMU member to operate the custody accounts with the CMU in accordance with the rules and procedures of the CMU. The securities held as collateral in Clearstream International is operated by Clearstream banking.
Key consideration 3 Linked CSDs should measure, monitor, and manage the credit	Not applicable.

and liquidity risks arising from each other. Any credit extensions between CSDs should be covered fully with high quality collateral and be subject to limits.	
Key Consideration 4 Provisional transfers of securities between linked CSDs should be prohibited or, at a minimum, the retransfer of provisionally transferred securities should be prohibited prior to the transfer becoming final.	Not applicable.
Key Consideration 5 An investor CSD should only establish a link with an issuer CSD if the arrangement provides a high level of protection for the rights of the investor CSD's participants.	Not applicable.
Key Consideration 6 An investor CSD that uses an intermediary to operate a link with an issuer CSD should measure, monitor, and manage the additional risks (including custody, credit, legal, and operational risks) arising from the use of the intermediary.	Not applicable.
Key Consideration 7 Before entering into a link with another CCP, a CCP should identify and manage the potential spill-over effects from the default of the linked CCP. If a link has three or more CCPs, each CCP should identify, assess, and manage the risks of the collective link arrangement.	**Linked CCP default** Not applicable. The HKCC has not established link with another CCP. **Collective link arrangements (three or more CCPs)** Not applicable. The HKCC has not established link with another CCP.
Key Consideration 8 Each CCP in a CCP link 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	**Exposures and coverage of exposures** Not applicable. The HKCC has not established link with another CCP. **Management of risks** Not applicable. The HKCC has not established link with another CCP.

high degree of confidence without reducing the CCP's ability to fulfill its obligations to its own participants at any time.	**Information provided to participants** Not applicable. The HKCC has not established link with another CCP.
Key Consideration 9 A TR should carefully assess the additional operational risks related to its links to ensure the scalability and reliability of IT and related resources.	Not applicable. The HKCC is not a TR.
Key Conclusions for Principle 20	The HKCC has put in place appropriate measures to manage link-related risks in the established link with the CMU of the HKMA. The HKCC has entered into an agreement with the CMU to clearly define the rights, obligations and liabilities of each party.
Assessment of Principle 20	Observed
Recommendations and Comments	
Principle 21. Efficiency and Effectiveness An FMI should be efficient and effective in meeting the requirements of its participants and the markets it serves.	
Key Consideration 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 procedures.	The HKCC has implemented mechanisms to seek input and feedback, through consultation process, from relevant stakeholders, including participants, to assess the efficiency and effectiveness of its services, operations and arrangements. The HKCC also benchmarks its efficiency and effectiveness, including, prices, fees, cost, service level to other CCPs in the region and internationally. In determining its operational arrangements, the HKCC considers: (a) the needs of the local market and environment; (b) the needs of the many overseas users of the derivatives market in Hong Kong; and (c) the requirements of international standards and practices. The HKCC conducts "soft" consultations on less material issues with relevant market participants and industry groups and solicits the views of the Clearing Consultative Panel on the HKCC's proposals before they are finalized. For major changes to the policies, clearing and settlement arrangement, operating structure, and regime that would affect the HKCC and the HKCC Participants, the HKCC also conducts public consultations to seek views directly from the stakeholders.

Key Consideration 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.	As an RCH, the HKCC is assigned specific statutory duties and responsibilities as stipulated in the SFO. In summary, the objectives of the HKCC are to ensure, so far as is reasonably practicable, that there are orderly, fair and expeditious clearing and settlement arrangements for any transactions cleared or settled through its facilities; that risks associated with its business and operations are managed prudently; that it operates its facilities in accordance with HKCC Rules and HKCC Procedures, as approved by the SFC; and that it can at all times provide and maintain facilities to meet contingencies for the conduct of its business. As described in Principle 2, the HKCC is also subject to an integrated HKEX Group governance approach. The HKEX Board and the HKCC Board, through their internal governance process, create and maintain well-defined strategic and financial plans for the HKCC.
Key Consideration 3 An FMI should have established mechanisms for the regular review of its efficiency and effectiveness.	The SFC supervises the HKCC's ongoing compliance with the statutory duties and objectives and other obligations of an RCH, including with the PFMI. The HKEX meets regularly with the RMC and Clearing Consultative Panel to discuss their views and feedback on the HKEX's proposals, initiatives and clearing businesses, including that of the HKCC. The HKEX also periodically meets with market participants and industry groups to collect their views and feedback. Moreover, the HKCC Participants can submit suggestions and feedback to the HKCC via various channels such as soft and public consultations, participants briefing and seminar, participant. The HKEX has adopted a three-year strategic plan which lays down the corporate strategies, and provides guidance on business priorities, including the business of the HKCC, for the preparation of the annual operating plan. The HKEX Board approves the plans and assesses the achievements against the plans at least annually. Furthermore, the HKEX has established mechanisms to evaluate HKCC's efficiency and effectiveness, including: (a) achievements are subject to quarterly review by the HKEX's senior management; and (b) progress of all major initiatives is monitored by the Project Portfolio Review Committee. The committee, consisting of senior business heads, will identify, priorities, authorize, monitor and control the initiatives in order to achieve the

	strategic business objectives and align them to the strategy. It assesses and evaluates progress, identifies problems, and where appropriate escalates matters to the Management Committee and the HKEX Board; and c) benchmark its service level of key operating processes with relevant regulatory requirements and ensure the service level that agreed with relevant stakeholders can be met.
Key Conclusions for Principle 21	The HKCC provides efficient and effective services, which serve the needs of the HKCC Participants and the derivatives market of Hong Kong. The HKCC has implemented mechanisms to seek input and feedback from relevant stakeholders to assess the efficiency and effectiveness of its services, operations and arrangements.
Assessment of Principle 21	Observed
Recommendations and Comments	While significant improvements have been noticed by market participants since the introduction of OTC Clear, the HKCC could enhance its consultation process by further involving and considering participants' views and concerns, when appropriate, into the HKCC's decision-making process for new changes and service developments.
Principle 22. Communication Procedures and Standards An FMI should use, or at a minimum accommodate, relevant internationally accepted communication procedures and standards in order to facilitate efficient payment, clearing, settlement, and recording.	
Key Consideration 1 An FMI should use, or at a minimum accommodate, internationally accepted communication procedures and standards.	**Communication procedures** The HKCC uses internationally accepted communication procedures and protocols for exchanging messages across systems to facilitate efficient clearing and settlement arrangements. The HKCC communicates with its Settlement Banks, the CMU and Clearstream via SWIFT. The HKCC Participants can access the DCASS/CCMS via the Securities and Derivatives Network (SDNet) using TCP/IP protocol. The HKCC Participants can access the DCASS through (a) terminal connection with dedicated personal computers with supported configuration and installed with the standardized Window-based software; and/or (b) host-to-host connection with straight-through-processing via Application Programme Interface (API). The API is widely used in global markets. Any personal computer with supported versions of Microsoft Windows and Internet Explorer browser is able to access all CCMS functions.

	Communication standards The HKCC adopts international communication standards on reference data and messaging format, including: (a) SWIFT standard message types complying with ISO 15022 standard are adopted as the payment, clearing and settlement instruction standards; (b) risk parameter files generated for Margin calculation are in PC-SPAN compatible format; and (c) three-byte ISO currency codes are used to represent currencies in DCASS/CCMS.
Key Conclusions for Principle 22	The HKCC uses internationally accepted communication procedures and standards to communicate with its Settlement Banks, the CMU and Clearstream for efficient payment, clearing, settlement, and recording.
Assessment of Principle 22	Observed
Recommendations and comments	
Principle 23. Disclosure of Rules, Key Procedures and Market Data An FMI should have clear and comprehensive rules and procedures and should provide sufficient information to enable participants to have an accurate understanding of the risks and fees and other material costs they incur by participant in the FMI. All relevant rules and key procedures should be publicly disclosed.	
Key Consideration 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.	**Rules and procedures** The HKCC Rules and HKCC Procedures contain the necessary and appropriate details of clearing and settlement, risk management, default and contingency arrangements, rights and obligations of the HKCC and the HKCC Participants, etc. Service fees, charges and other material costs incurred by the HKCC Participants are also set out in the HKCC Rules and HKCC Procedures, including the rates, calculation methods, timing of debit and any concession where applicable, etc. The HKCC Rules and HKCC Procedures are written in plain English, and are available to the HKCC Participants and the public via the HKEX Group website. Chinese version of the HKCC Rules and the HKCC Procedures are also publicly available on the HKEX Group website. Any amendment to the HKCC Rules and the HKCC Procedures is subject to the approval of the SFC. The HKCC notifies the HKCC Participants of proposed changes to the HKCC Rules and HKCC Procedures and the effective dates of the approved amendments via circulars which are also publicly available on the HKEX Group website.

	Disclosure The HKCC provides all necessary information for the HKCC Participants and other interested parties to identify and evaluate the risks associated with using the HKCC's services and facilities. The HKCC makes the following information publicly available on the HKEX Group website: (a) the HKCC Rules and the HKCC Procedures, including fees and upcoming amendments; (b) risk management arrangements, including high level summaries of the back-testing and sensitivity analysis results; (c) clearing and settlement arrangements during typhoons and rainstorms; (d) DCASS/CCMS Terminal User Guides, including details of DCASS/CCMS design and operations, description of DCASS/CCMS reports, data files and report data file formats; (e) PRiME Margining Guide, providing details of PRiME calculation algorithm; (f) margin table, listing the estimated amount of client margin; and (g) circulars and briefing materials for major projects.
Key Consideration 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.	Please refer to the descriptions in Key Consideration 2 above.
Key Consideration 3 An FMI should provide all necessary and appropriate documentation and training to facilitate participants' understanding of the FMI's rules and procedures and the risks they face from participating in the FMI.	The HKCC organizes regular training classes to help the HKCC Participants and potential applicants understand the DCASS/CCMS operations and risk management arrangements. Where appropriate, the HKCC holds briefing sessions, seminars and informal meetings with the HKCC Participants to facilitate their understanding of new initiatives (e.g. physically settled CNH and USD gold futures contracts, system infrastructure enhancements such as extension of AHT and clearing) and the associated risk management measures. The HKCC Participants and other interested parties can also call dedicated hotlines and send emails to the HKCC if they have any question.

Key Consideration 4 An FMI should publicly disclose its fees at the level of individual services it offers as well as its policies on any available discounts. The FMI should provide clear descriptions of priced services for comparability purposes.	The HKCC sets out its service fees and charges in the HKCC Rules and the HKCC Procedures, including the rate and calculation basis. The fee schedules by contract and services types are also publicly available on the HKEX website. Any amendment to the fees and charges is subject to the approval of the SFC. The HKCC informs the HKCC Participants of the changes in advance and effective dates of the approved amendments via circulars. All the HKCC Rules, HKCC Procedures and circulars are publicly available on the HKEX website. HKCC fee schedule: https://www.hkex.com.hk/Services/Rules-and-Forms-and-Fees/Fees/Listed-Derivatives/Clearing-and-Settlement/Operational?sc lang=en
Key Consideration 5 An FMI should complete regularly and disclose publicly responses to the CPSS-IOSCO Disclosure framework for FMIs. An FMI also should, at a minimum, disclose basic data on transaction volumes and values.	The HKCC publishes the PFMI disclosure document in accordance with the guidelines set forth in the "Disclosure framework and Assessment methodology" published by CPSS-IOSCO in December 2012. The HKCC updates this disclosure document following material changes and, at a minimum, at least every two years in accordance with the disclosure framework. The HKCC publishes quantitative disclosure documents in accordance with the guidelines set forth in the "Public quantitative disclosure standards for central counterparties" released by CPMI-IOSCO in February 2015. Currently, the HKCC publishes extensive periodic transaction data, including contract volume and open interest by derivatives products, through the HKEX Group website.
Key Conclusions for Principle 23	The HKCC has clear and comprehensive rules and procedures which provide sufficient information to enable participants to have an accurate understanding of the risks and fees and other material costs. All relevant rules and key procedures are publicly disclosed. To ensure the relevance of its documentation, the HKCC has procedures in place to update its disclosure document following any material change and, at a minimum, at least every two years in accordance with the PFMI Disclosure Framework.
Assessment of Principle 23	Observed
Recommendations and Comments	
Principle 24. Disclosure of Market Data by Trade Repositories A TR should provide timely and accurate data to relevant authorities and the public in line with their respective needs.	

Key Consideration 1 A TR should provide data in line with regulatory and industry expectations to relevant authorities and the public, respectively, that is comprehensive and at a level of detail sufficient to enhance market transparency and support other public policy objectives.	Not applicable as the HKCC is not a TR
Key Consideration 2 A TR should have effective processes and procedures to provide data to relevant authorities in a timely and appropriate manner to enable them to meet their respective regulatory mandates and legal responsibilities.	Not applicable as the HKCC is not a TR
Key Consideration 3 A TR should have robust information systems that provide accurate current and historical data. Data should be provided in a timely manner and in a format that permits it to be easily analyzed.	Not applicable as the HKCC is not a TR
Key Conclusions for Principle 24	Not applicable as the HKCC is not a TR
Assessment of Principle 24	Not applicable
Recommendations and Comments	