SEMINAR ON STRESS TESTING
AND
DEFAULT FUND SIZING
AGENDA

1. Background
2. Stress Testing Framework
3. Default Fund Sizing and Allocation
Evolution of Global Regulation and HKSCC Risk Management

**Background**
- Adopt pragmatic yet effective measures to strengthen risk management in response to the 2008 global financial crisis.
- Amongst the foremost CCPs in Asia to implement initial margin in the cash equity market.

**Framework**
- Single rate margin model.
- Introduction of dynamic Default Fund component.

**Interim Enhancement**
- Introduction of margin multiplier.

**HKSCC NG Risk Models**
- **Background**
  - Meet evolving international regulatory standards.
  - Improves safety, integrity and efficiency of HK securities market.
- **Framework**
  - More “risk-based” approach i.e. margin requirements and Default Fund (DF) better reflect the risk exposure of CP’s portfolio.

**A continuous effort to improve the compliance of international regulatory standards and protection in HK securities market**

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Note 1: International Organization of Securities Commissions  
Note 2: Principles for Financial Market Infrastructures
**HKSCC NG Risk Model Framework**

**Key Enhancements**

<table>
<thead>
<tr>
<th>Current HKSCC Model</th>
<th>Next Generation Risk Models</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Initial Margin</strong></td>
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</tr>
<tr>
<td>▶ Single margin rate based on Hang Seng Index (HSI) applied to <strong>all</strong> securities</td>
<td></td>
</tr>
<tr>
<td>▶ No risk offset among securities</td>
<td></td>
</tr>
<tr>
<td><strong>Stress Testing</strong></td>
<td><strong>Stress Testing</strong></td>
</tr>
<tr>
<td>▶ Up and down scenario applied to <strong>all</strong> securities to generally cover systemic risk</td>
<td></td>
</tr>
<tr>
<td>▶ Margin requirement based on individual stocks volatility</td>
<td></td>
</tr>
<tr>
<td>▶ Allow risk offset among selected securities (see HKSCC NG IM model framework for details)</td>
<td></td>
</tr>
<tr>
<td>▶ Multiple product-specific scenarios applied to <strong>each</strong> security</td>
<td></td>
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</tbody>
</table>

*Enhancements are methodology-centric and most existing settlement and operation arrangements remain unchanged*

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**Drivers for Change**

1. **Robustness & Resilience**
   - Enhances robustness and resilience of CCP and markets
   - Improves safety, integrity and efficiency of HK securities market

2. **Risk-based Approach**
   - DF better reflects the portfolio tail risk of each CP
   - Higher DF contribution for portfolios that carry higher tail risk
   - Reinforces the “defaulter-pays” principle

3. **International Best Practices**
   - Consistent with best practices at global and peer CCPs
   - Meets the requirements of the evolving international standards

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Current vs Next Generation Risk Models

Stress Testing and Default Fund

Current Model

1. Events / Scenarios
   - 2 systemic risk scenarios (proxy of HSI movement) applied to all securities

2. Methodology
   - Hypothetical Stress Test:
     - Market up scenario
     - Market down scenario

3. Position Risk Aggregation
   - Higher of long / short CNS positions

Next Generation Risk Model

1. Events / Scenarios
   - > 200 product-specific scenarios applied to each security

2. Methodology
   - Historical scenarios
   - Hypothetical scenarios
   - Theoretical scenarios
   - Idiosyncratic stress scenario(s)

3. Position Risk Aggregation
   - Portfolio offset

4. Default Fund Sizing
   - 1st + 5th largest CP exposure
   - 60-days look-back period

5. CP Allocation
   - CNS based

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## Current vs Next Generation Risk Models

### Operational flow

<table>
<thead>
<tr>
<th>Operation</th>
<th>Current Model</th>
<th>Next Generation Risk Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>6. Review Frequency</td>
<td>Monthly begin / Ad hoc</td>
<td>Monthly begin / Ad hoc</td>
</tr>
<tr>
<td>7. Collection</td>
<td>1st business day after review</td>
<td>1st business day after review</td>
</tr>
<tr>
<td>8. Default Fund credit</td>
<td>$1 million DF credit</td>
<td>$1 million DF credit</td>
</tr>
<tr>
<td>9. Report</td>
<td>Available for DCP and GCP after review</td>
<td>Available for DCP and GCP after review</td>
</tr>
</tbody>
</table>

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**Existing operation arrangements will remain unchanged**
STRESS TESTING FRAMEWORK
**Stress Testing Scenarios**

<table>
<thead>
<tr>
<th>Scenario Types</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1</strong> Historical</td>
<td>• Historical stress events that consist of peak historical volatilities (e.g. Lehman default)</td>
</tr>
<tr>
<td><strong>2</strong> Hypothetical</td>
<td>• Potential “extreme but plausible” Macro-economic conditions which might drive extreme price changes among sectors</td>
</tr>
<tr>
<td><strong>3</strong> Theoretical</td>
<td>• Theoretical price changes of a portfolio due to break or boost in correlation between underlying securities</td>
</tr>
<tr>
<td><strong>4</strong> Idiosyncratic</td>
<td>• Sudden price collapse (surge) of position(s) in a portfolio</td>
</tr>
</tbody>
</table>

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Historical Stress Events

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Global and regional events that have major impact on the Hong Kong market

- Asian Financial Crisis
- Long-Term Capital Management (LTCM) Collapse
- Dot Com Collapse
- Start of Credit Crunch
- EU Credit Crisis
- Russian Financial Crisis
- Twin Towers Attack
- Lehman Default / Global Financial Crisis
- Chinese Stock Market Crash

Timeline:

1989...1997  1998  ...2000  2001  ...2007  2008  ...2011  ...2015  Onwards

- Tiananmen Square Protests
- Dot Com Collapse
- Start of Credit Crunch
- Lehman Default / Global Financial Crisis
- Chinese Stock Market Crash

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Hypothetical Stress Events

Simulate extreme but plausible events

Financial Sector Shock
Depend heavily on real economy performance and sentiment
- Financials
- Properties & Construction

Telecom Sector Shock
Dominated by a few players with complex business models
- Telecommunication & IT

Energy Sector Shock
Energy crisis leads to price rise of resources
- Energy, Industrials and Utilities
- Transportation
- International Trading

Consumer Sector Shock
Political and economical factors impact consumer expenditure
- Consumer goods and services

Chinese Manufacturing Sector Shock
Shift from industrial to service sector in China
- Manufacturing, material and industrials
- Shanghai Composite Index

Brexit
'Hard' or 'soft' Brexit, no agreement on trade, borders and travels yet
- Multinational corporations (especially conglomerates and financial institutions) with operations in the UK

China Debt Crisis
Risky and poorly collateralised shadow banking sector and high local government debt
- Financials
- Property and construction

Decoupling of China-Hong Kong equity market
HSI and SCI move independently due to Chinese regulatory changes
- Hang Seng Index

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Theoretical Stress Events

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Idiosyncratic Stress Events

Potential price collapse / surge of individual position(s) in a portfolio

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Daily Stress Testing

CP(s) Stress Testing Values - CP(s) Collateral = Expected Uncollateralized Loss (EUL)

Daily Stressed EUL

- Largest CP EUL
- 5th Largest CP EUL

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Default Fund size determination

The Highest Daily Stressed EUL from past 60 days + 10% buffer

Required DF Size

Skin in the Game

HKSCC Appropriations and DF accumulated Income

CPs’ Dynamic Contributions ($1 million credit available)

CPs’ Basic Contributions*

* Total minimum Basic contribution is $100m
* Subject to finalization with SFC
Allocation of DF contributions

Risk-based allocation

CP Basic Contribution* =
~HK$100 million
x
% Average 60 days EUL
(% Risk contribution)

* Subject to minimum requirement of trading rights

CP Dynamic Contribution# =
Overall Dynamic Contribution
x
% Average 60 days EUL
(% Risk contribution)

# HK$1 million credit available for each CP

* CP’s contributions are in HKD cash
* Subject to finalization with SFC
# Collection / Refund of DF Contributions - Schedule

<table>
<thead>
<tr>
<th>Monthly Review</th>
<th>1&lt;sup&gt;st&lt;/sup&gt; business day of every month</th>
</tr>
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<tbody>
<tr>
<td>Ad hoc Review</td>
<td>When market condition warrants</td>
</tr>
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</table>

## 1<sup>st</sup> Business Day
- **Determination of**
  - DF size
  - Each CP’s DF Basic and Dynamic Contributions requirements
- **Circular for DF Review**
- **Notification / Reports**
  - Statement of Default Fund
  - NCP(s) Default Fund Contribution Projection By Position

## 2<sup>nd</sup> Business Day
- **Due Date of Collection/Refund of DF Contributions**

* Subject to finalization with SFC
Contact us at margin_modelling@hkex.com.hk for further questions/feedback