



HONG KONG MONETARY AUTHORITY

香港金融管理局



12th Biennial IFC Conference 22-23 Aug 2024

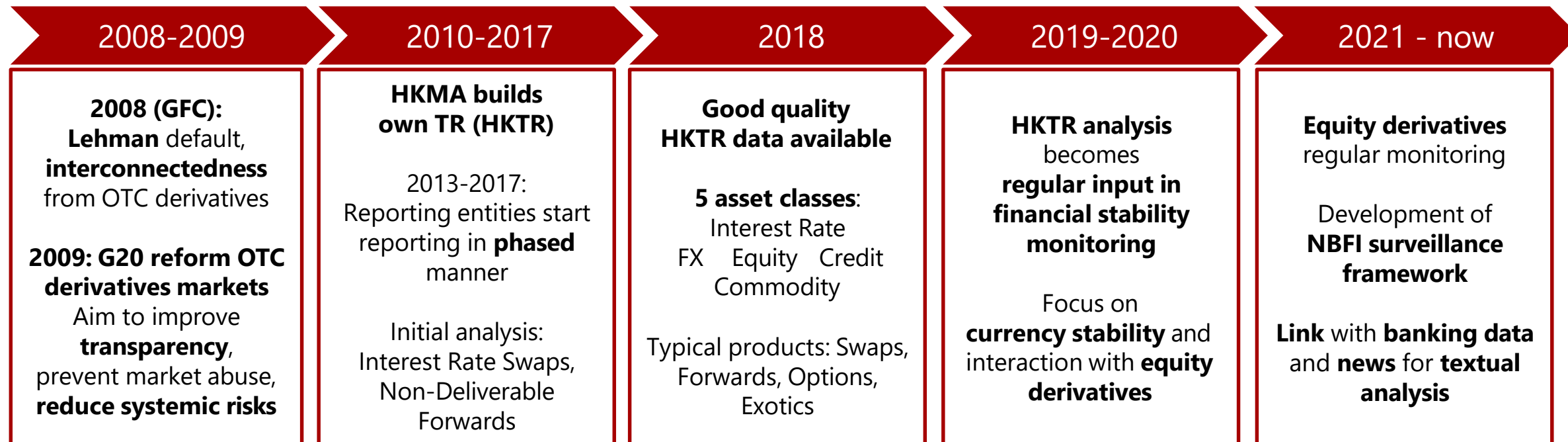
“Statistics and Beyond: New Data for Decision Making in Central Banks”

**How to use Trade Repository data on OTC derivatives for analysis –
A practical framework**

Silvia Pezzini and Henry Chan

Development and scope of Hong Kong Trade Repository (HKTR) data

- **HKTR data:** Trade-level data on OTC derivatives traded in HK reported to HKTR, ~**4.8 mn trades outstanding**.
- **Reportable by banks and CCPs** if the trade is: (i) **Booked on HK balance sheet**, or (ii) **Conducted in HK** (but not booked on HK b/s), or (iii) **Cleared** by CCPs with HK-incorporated counterparties.
- **Timely: Next-day availability for most trades.** 90%+ within T+1, latest T+2.
- **Comprehensive coverage:** Five asset classes, typical products, 250+ key data attributes (incl. valuation).
- **Timeline of HKMA use of TR data:**



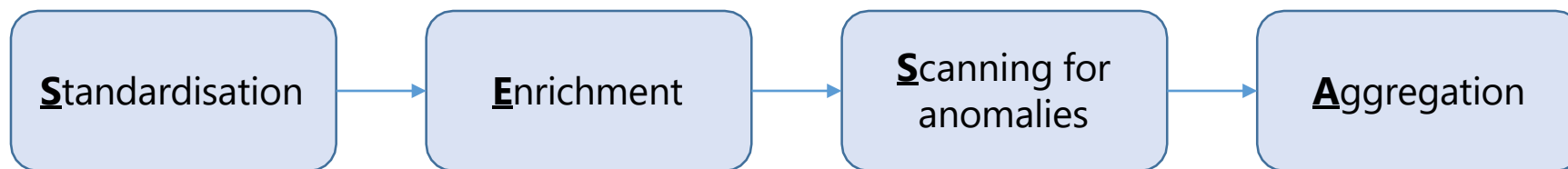
Benefits and pain points of using HKTR data

HKTR data has been used intensively by the HKMA for financial stability surveillance for its benefits in **timeliness, detail** and **standardisation**.

However, the size and complexity of HKTR data often pose **challenges**.

- **Identifier standardisation is not complete** (e.g. use of LEIs for counterparties, use of ISIN for equity derivatives underlying stocks or indices).
- **Limited standardised information on how entities with different LEIs belong to the same financial group** (Level 2 data under LEI framework which show the direct and ultimate parents of legal entities are in progress).
- **Reporting errors** may occasionally **create false alarms** (e.g. exceptionally large notional amounts or strike prices).
- **Double-sided reporting** needs to be handled carefully to avoid double-counting of trades.

At the HKMA, we have developed a practical framework called “SESA” for using HKTR data for analysis.



"SESA" framework - Standardisation

To enable **computation of consolidated exposure** of an entity or its parent and allow **combining** TR data with **other data sources** for further analysis.

1. **Standardise entity names** by mapping different identifiers (e.g. LEIs, CICR*), using an **entity database** with ~29,000 entity identifiers.

- Regular update by adding new entries and further enriching existing entries.

2. **Standardise equity derivative underlying names** by mapping relevant identifiers (e.g. ISIN, FIGI), using an **equity security database**.

- Update using APIs and web scraping to take into account new equity securities.

Sample of the HKMA's In-house Entity Database

ID Type	LEI	Other Identifier	Entity Name	Entity Sector	Entity SubSector	Parent Name	Parent Sector	Parent Country	Entity Country
LEI	EHWNDI2 G5WXXXX XXXXXX	NA	ABC CAPITAL MASTER FUND LP	Non-bank financial	Hedge Fund	ABC CAPITAL MANAGEMENT LP	Non-bank financial	USA	USA
CICR	NA	C12345	ABC CAPITAL MASTER FUND LP	Non-bank financial	Hedge Fund	ABC CAPITAL MANAGEMENT LP	Non-bank financial	USA	CYM
BRN	NA	B45678	ABC CAPITAL MASTER FUND LP	Non-bank financial	Hedge Fund	ABC CAPITAL MANAGEMENT LP	Non-bank financial	USA	CYM
LEI	5493000AL K11111111 11	NA	XYZ CHINA OPPORTUNITIE S FUND LP	Non-bank financial	Hedge Fund	XYZ CAPITAL MANAGEMENT LP	Non-bank financial	USA	USA
LEI	54930058A 22222222 22	NA	XYZ HK OPPORTUNITIE S FUND LP	Non-bank financial	Hedge Fund	XYZ CAPITAL MANAGEMENT LP	Non-bank financial	USA	CYM
LEI	I4BOGE0V4 Y3333333 33	NA	XYZ JAPAN OPPORTUNITIE S FUND LP	Non-bank financial	Hedge Fund	XYZ CAPITAL MANAGEMENT LP	Non-bank financial	USA	CYM

☐ Different types of identifiers of ABC Capital will be mapped to the same entity name to enable aggregation of trades related to the same entity.

☐ XYZ Capital manages three individual funds with their own LEIs. All the trades reported under these LEIs can be grouped under the same parent for analysis.

*Certificate of Incorporation, Certificate of Registration number

“SESA” framework - Enrichment

To enrich HKTR data with more detailed **dimensions for meaningful analysis**.

1. General enrichment:

- **Additional entity-level** (e.g. sector and country of incorporation) and **parent-level information** (e.g. name of parent group, parent sector and parent country of incorporation) based on the in-house entity database.
- **Derive new data fields** for analysis (e.g. USD equivalent notional amount, original and remaining maturity, intra-group indicator) based on existing data fields.
- **Define** the position of an entity as **long or short** for computation of **gross** and **net positions**.

2. Asset-class specific enrichment:

- FX: Clean and extract **currency pairs** for market monitoring and topical research analysis.
- Equity: Derive the underlying country of exchange to analyse the **equity positions in a particular jurisdiction**.
- Commodity: Compute the **notional amount based on product features** (e.g. unit price \times number of tons).



“SESA” framework – Scanning for anomalies

To **identify anomalies** and potential **data quality issues**.

- Exceptionally large notional amounts and exceptional strike prices.
- E.g. FX: some reporting entities may report 780 as the strike price for USD/HKD options, which looks abnormal given the range of USD/HKD FX rate (7.75 – 7.85).

Well-established follow-up actions in place to deal with data quality issues.

- A designated operational team at the HKMA reaches out to the reporting entities for clarification such that they can rectify any reporting errors if necessary.
- Simultaneously, data users at the HKMA may make necessary adjustments for timely analysis (e.g. outlier removal pending rectification by reporting entities).



“SESA” framework – Aggregation of exposures

- To **deal with potential duplication** of trades due to double-sided reporting* and to **transform the data** for entity-level exposure analysis.
- Identify duplicate trades using **UTI** and **adjust** the notional amount by applying a **linking factor (0.5)** to avoid overstating total notional amounts.

Trade Reference	Unique Transaction Identifier	Reporting Entity	Counter-party	Base Product	Notional Amount (USD bn) (i)	Linking Factor (j)	Adjusted Notional Amount (USD bn) (=i x j)
T1	X12345	A	B	Option	2	0.5	1
T2	X12345	B	A	Option	2	0.5	1
T3	X54321	A	C	Option	1	1	1

- By summing up “Adjusted Notional Amount”, total outstanding option position is equal to USD 3 bn without double counting notional amount of Trade 1 and Trade 2.

*Double-sided reporting regime: Both sides of the trade need to report the trade to the HKTR if they fall under the reporting requirement. So an entity can be the reporting entity in one trade and the counterparty in another trade.

"SESA" framework – Aggregation of exposures

Trade Reference	Unique Transaction Identifier	Reporting Entity	Counterparty	Adjusted Notional Amount (USD bn)	Option Buyer	Option Seller
T1	X12345	A	B	1	A	B
T2	X12345	B	A	1	A	B
T3	X54321	A	C	1	C	A



Trade Reference	Unique Transaction Identifier	Reporting Entity	Counterparty	Adjusted Notional Amount (USD bn)	Role	Entity
T1	X12345	A	B	1	Option buyer	A
T1	X12345	A	B	1	Option seller	B
T2	X12345	B	A	1	Option buyer	A
T2	X12345	B	A	1	Option seller	B
T3	X54321	A	C	1	Option buyer	C
T3	X54321	A	C	1	Option seller	A



Base product	Entity	Role	Adjusted Notional Amount (USD bn)	Long/Short HKD Position (USD bn)
Option	A	Option buyer	2	-2
Option	A	Option seller	1	+1
Total				-1

- **Restructure the data** to facilitate the computation of an entity's total position by **pivoting "Option Buyer" and "Option Seller" into "Role" and "Entity"**.
- Compute the **entity-level net exposures** by determining the **long vs short** positions based on the role of the entities.

By summing up "Adjusted Notional Amount" by "Entity", we can compute the gross positions of Entity A, B and C (USD 3 bn, USD 2 bn, USD 1 bn respectively).

Note: Negative value refers to a short HKD position.

Entity A's net position: Apply a negative sign to its short position. The sum gives us its net short position of USD 1 bn.

Conclusion and looking ahead

Three developments have enabled the HKMA to make best use of the HKTR data:

- **SESA** framework: (i) **Standardisation** of entity and securities names by LEI and other identifiers; (ii) **Enrichment** of entity and trade information with market data; (iii) **Scanning** for anomalies; and (iv) **Aggregation** of exposures.
- **Timely follow-up with reporting entities** for clarification and rectification if needed.
- **Development of use cases** with useful insights for financial stability surveillance.

The HKMA and the SFC intend to implement the new derivative reporting regime for **Critical Data Elements** (CDE) in Sep 2025, providing several key benefits for HKTR analysis:

- Standardising the definitions, formats and allowable values of data elements, to streamline the reporting process and reduce reporting burden.
- Aligning Hong Kong's OTC derivative reporting regime with international reporting frameworks and extending it to important data elements that are not under Hong Kong's current reporting requirements.
- Harmonising Hong Kong's reporting regime with international reporting standards.



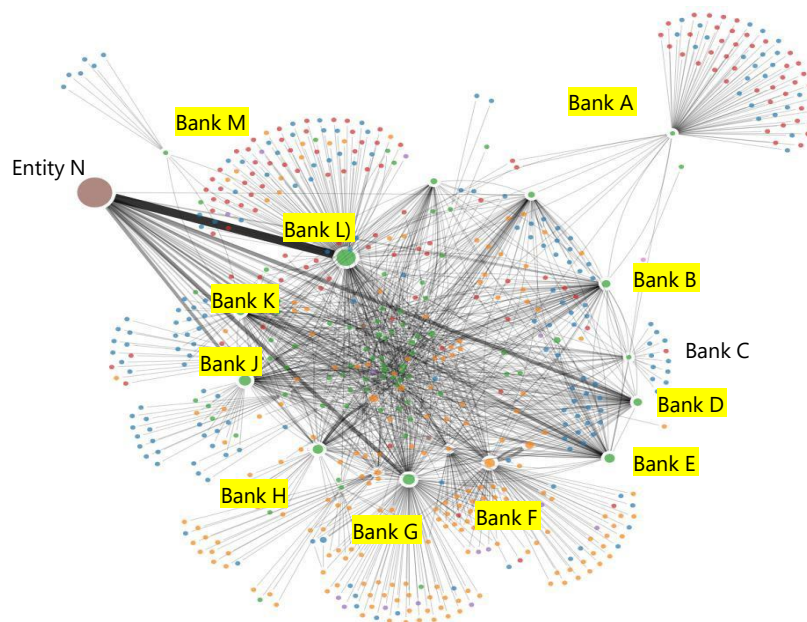
Annex 1: Development of use cases – Interconnectedness during stress events

Gauging **exposures** and **interconnectedness** of target entities during **stress events** (e.g. Credit Suisse failure)

Network analysis with HKTR data

- Analysis of concentration, interconnectedness, channels of financial contagion, and network structure (concentrated, core vs periphery)
- Risk assessment: how shocks propagate through the network

Structure of HKD interest rate swap market



Network map:

nodes = financial institutions

links between them = trading relationships

Annex 2: Development of use cases – Non-bank financial institutions (NBFI) surveillance framework

- The NBFI framework incorporates diverse data sets from HKTR and granular banking data to news, to compute a set of **risk indicators** to quantify potential **impact** and **vulnerability** of an NBFI.
- Risk indicators are standardised and aggregated to produce impact and vulnerability scores for each NBFI.
- Output is a watchlist, ranking the top NBFIs based on their scores.
- **Red-amber-green illustrate the NBFIs' riskiness** (high-medium-low).

