Compressing Over-the-counter Markets

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Size of OTC derivatives markets

Source: BIS OTC derivatives statistics
Size of OTC CDS markets

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Size of OTC CDS markets

What drives this reduction in size?

Source: BIS OTC derivatives statistics
“Banks attempting to limit the impact of new requirements have turned to a tool known as **trade compression** [...]

The tool was a “key driver” of the fall in outstanding notional.”

Financial Times, May 5, 2016
“Outstanding notional amounts of credit default swap (CDS) contracts fell markedly, from $61.2 trillion at end 2007 to $9.4 trillion 10 years later.

During the Great Financial Crisis (GFC) and its aftermath this was driven by portfolio compression”
Portfolio compression

Post-trade technology that reduces gross positions while maintaining net balances

Gross

\[ v^g_A = 25 \]

\[ v^g_B = 15 \]

\[ v^g_C = 40 \]

\[ v^g_D = 10 \]

Net

\[ v^n_A = -15 \]

\[ v^n_B = +5 \]

\[ v^n_C = +20 \]

\[ v^n_D = -10 \]

\[ V^g = 45 \]

\[ V^n = 0 \]
Portfolio compression

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Post-trade technology that reduces gross positions while maintaining net balances

\[ V_g = \begin{cases} g_A = 15 \\ g_B = 5 \\ g_C = 30 \\ g_D = 10 \end{cases} \]

\[ V_n = \begin{cases} n_A = -15 \\ n_B = +5 \\ n_C = +20 \\ n_D = -10 \end{cases} \]
Portfolio compression

Post-trade technology that reduces gross positions while maintaining net balances

\[ v_g = 30 \]
\[ v_n = 0 \]

Reduction in aggregate gross notional: 15
**Portfolio compression**

Post-trade technology that reduces gross positions while maintaining net balances

\[ V^g = 30 \quad V^n = 0 \]

**Remark 1**
Over-the-counter markets exhibit some redundancy in notional
Portfolio compression

Post-trade technology that reduces gross positions while maintaining net balances

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\nu^g_A &= 15 \\
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Remark 2
Compression is a multilateral novation netting technique that does not require a Clearinghouse or Central Counterparty
Why compress?

2008 Crisis aftermath (1)

“Only now is the industry discovering the joys of compression”

The Economist, November 2008
Why compress?

2008 Crisis aftermath (2)

New Regulatory Framework

↓

Capital requirements      Leverage ratio      Collateral management

↓

Demand for new post-trade services

(Duffie, 2017),(FSB,2017)
Why compress?

2008 Crisis aftermath (2)

New Regulatory Framework
\[ \downarrow \]
Capital requirements  Leverage ratio  Collateral management
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Demand for new post-trade services

(Duffie, 2017), (FSB, 2017)

New role for compression

System wide multilateral deleveraging operation which does not entail asset sales or capital injection
Taking stock

How?

Bilateral level → Mutual agreement
Multilateral level → External service provider

TriOptima, LMRKTS, Quantile, Capitalab

How much?

TriOptima (TriReduce): $1,855 trillion (2003-2020)
ISDA: 67% reduction of IRD markets (2010-2016)

Regulation

Defined in MiFIR / Dodd-Franck
Supported adoption under EMIR and Dodd-Franck

However...

Limited literature and analytical research on the topic
(O’Kane, 2014 QF)


Today

1. Formalize key concepts related to portfolio compression
   - Excess
   - Tolerance
2. Identify the mechanics of compression
   - Condition: fungibility and intermediation
   - Efficiency: tolerance trade-off
   - Topological characterization
3. Apply the framework to CDS markets
   - Large notional levels eligible for compression
   - Large impact of a EU-wide adoption of compression services
   - Interaction with central clearing
4. Policy implications
OTC Networks
Dealers and customers

EMIR CDS on Government Reference (April 2016)
Total gross notional: 15.95 Bn euros
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Notional excess

$$\Delta = \sum_{i,j} e_{ij} - \frac{(\sum_i | \sum_j e_{ij} - \sum_j e_{ji} |)}{2}$$
Notional excess

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⇓

Gross notional
Minimum notional
Notional excess

\[ \Delta = \sum_{i,j} e_{ij} - \frac{(\sum_i | \sum_j e_{ij} - \sum_j e_{ji}|)}{2} \]

Theorem
In a market of fungible and outstanding trades: There is excess ⇔ there is \textit{intermediation} in the market
## Compression preferences

<table>
<thead>
<tr>
<th>Conservative</th>
<th>Non-conservative</th>
<th>Hybrid</th>
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</table>
| Relationship constraints | No constraints | *Intra-dealer* $\rightarrow$ *Non-conservative*  
*Dealer-customer* $\rightarrow$ *Conservative* |

**When?**  
(feasibility)

**How much?**  
(efficiency)
Compression preferences

**Conservative**
- Relationship constraints

**Non-conservative**
- No constraints

**Hybrid**
- Intra-dealer → Non-conservative
- Dealer-customer → Conservative

When? (feasibility)
How much? (efficiency)

Closed chains of intermediation
Chains of intermediation
Compression preferences

Conservative
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When? (feasibility)

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When?
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Intra-dealer → Non-conservative
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\[ \Delta > 0 \]

\[ \Delta = 0 \]
Application
Approach

Data
Trade state report under EMIR: EU-wide Credit Default Swaps (single name)
- 100 most traded instruments (ref. entity + maturity) ≈ 70 Bn euros

Implementation
- Design optimal solution for each benchmark

Analysis
1. Excess levels
2. Efficiency of market wide adoption
3. Interaction with Central Counterparties (CCPs)
Excess
Excess
Efficiency
Efficiency

Comparison of compression efficiency

Conservative compression  Hybrid compression
CCP and compression
CCP and compression

(a) Before Compression

(b) After Compression
CCP and compression

- Conservative compression
- Single CCP netting
- CCP netting

Graph showing efficiency over time.
CCP and compression

![Graph showing efficiency over time for different CCP and compression scenarios.]

- Conservative compression
- Single CCP netting
- CCP netting + cross CCP compression
- CCP netting
Conclusion

Over-the-counter markets generate large excess when

Fungibility   Intermediation
Conclusion

Over-the-counter markets generate large excess when

Fungibility  Intermediation

Excess can be removed by compression

- Coordinated mechanism leading to rapid reduction in aggregate notional
- Private demand driven by regulatory cost of excess
- This demand on its own can explain the large reduction in size in CDS

Tightly-knit structure of OTC markets
(even conservative)
Conclusion

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Fungibility  Intermediation

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Policy implications

- Distortion of aggregate assessments
  - Liquidity, leverage, etc.
- Monitor risk redistribution effects
  - Intra-dealer vs customers
- Utility beyond the private demand
  - Systemic risk management tool
Thank you!

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Working paper available here

↓

SCAN ME
Compression in practice

How?
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Post-trade technology that reduces gross positions while maintaining net balances

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