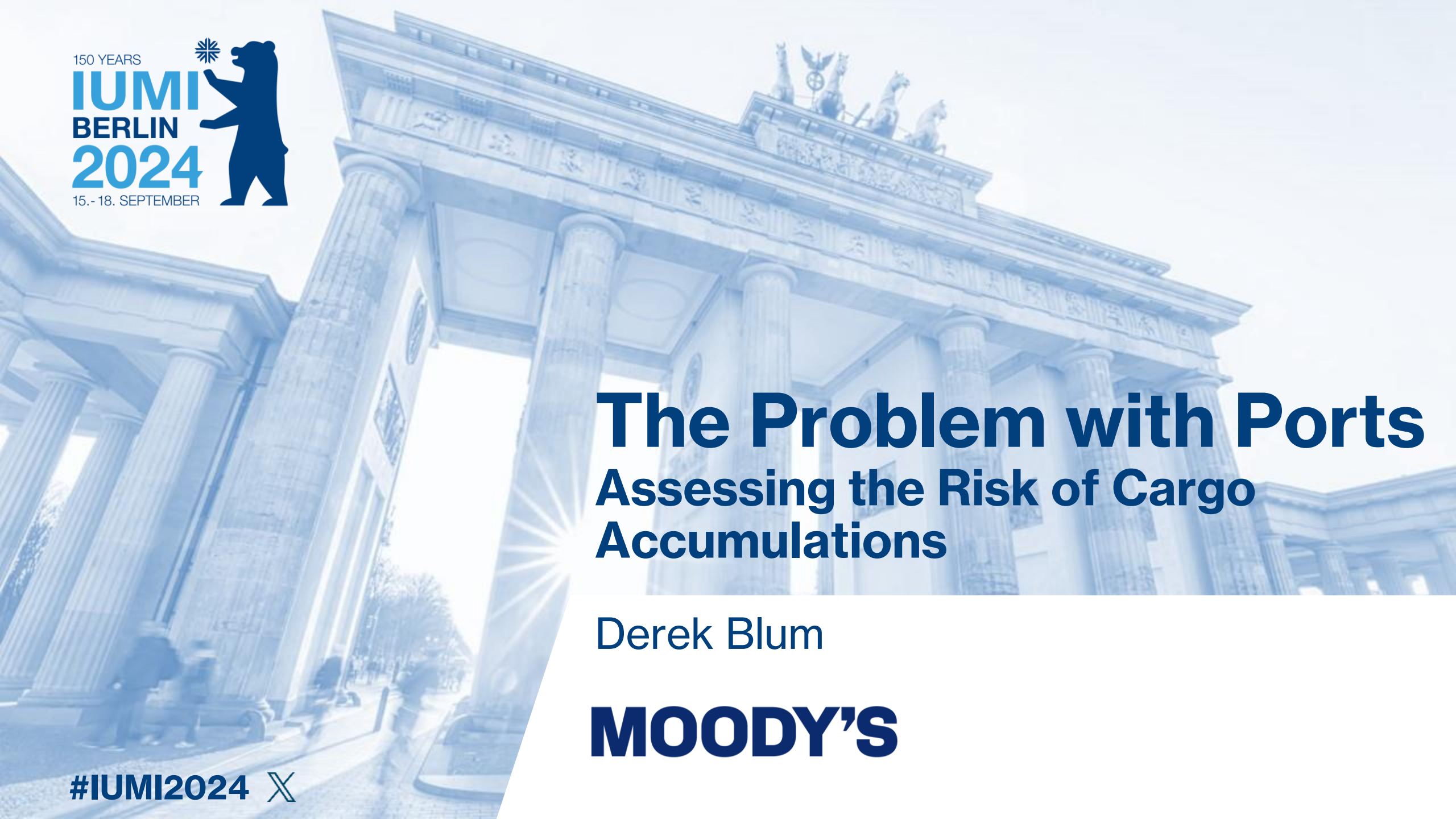


The Problem with Ports

Assessing the Risk of Cargo Accumulations

Derek Blum

MOODY'S

#IUMI2024

Marine Cargo Market

90% of world trade by sea via 100,000+ vessels
(OECD)

Over US$10 trillion transported every year through hundreds of ports
(Moody's estimate, 2023)

Over 11B tons of goods transported every year
(UNCTAD, 2023)

US$20B+ marine cargo premiums
(IUMI, 2023)

Importance of Knowing Port Cargo Accumulations

Tohoku Earthquake & Tsunami
Japan, 2011

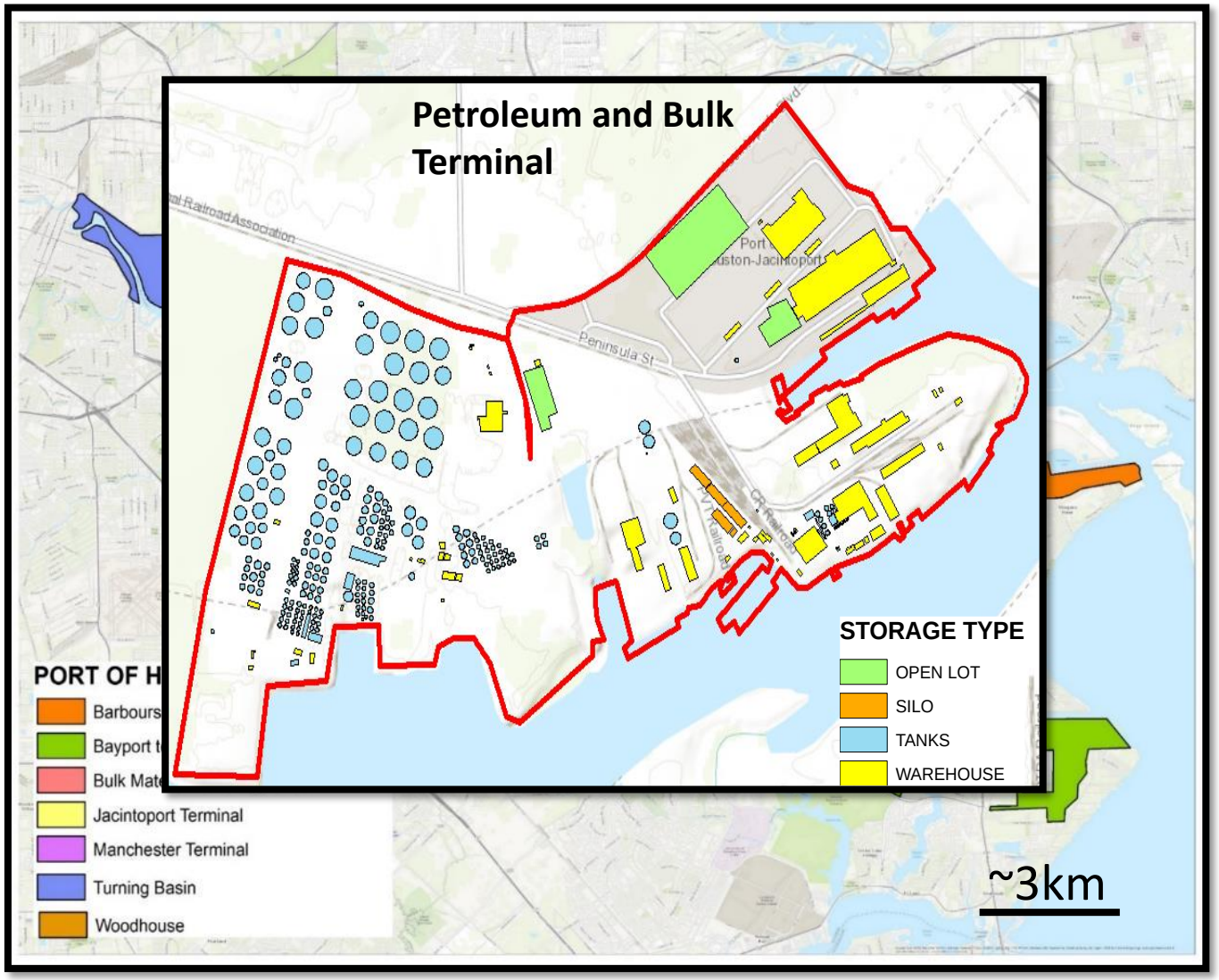
Superstorm Sandy
New Jersey, U.S., 2012

Port of Tianjin Explosion
China, 2015

Challenges for Marine Cargo Modeling

Dynamic Exposure

- Temporal variations of cargo types and accumulated value at port – seasonality, dwell times
- Fluctuation in commodity prices affecting exposure accumulations (e.g., crude oil and grains)
- Spatial distribution of cargo at ports
- Cargo storage configurations



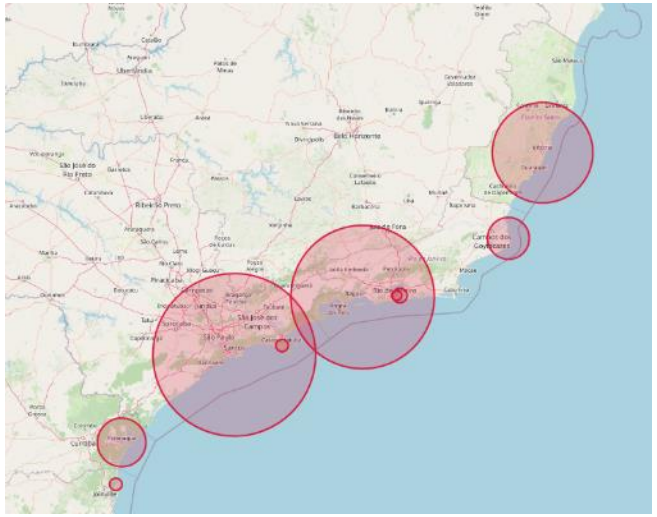
Port Cargo Exposure Framework

Trade data

Cargo model

Dwell time model

Cargo exposure at standard-definition (SD) ports

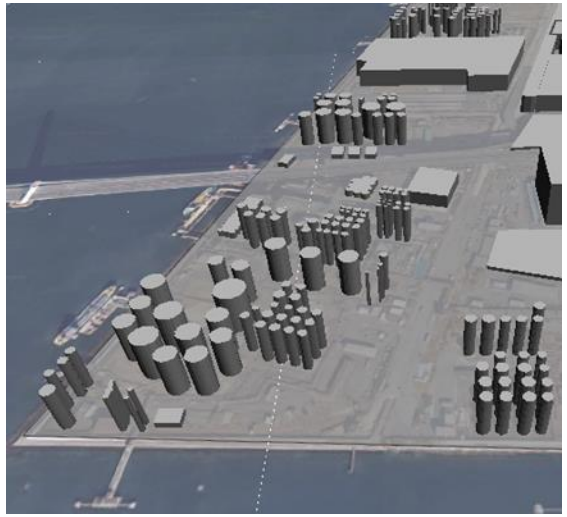


Value (USD) at the port centroid

- By Cargo Type

Storage model

Cargo exposure at high-definition (HD) ports



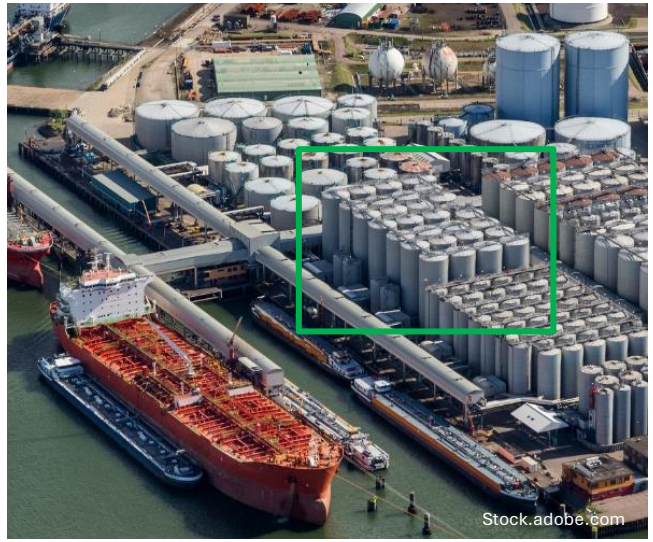
Value (USD) at the storage facility centroid

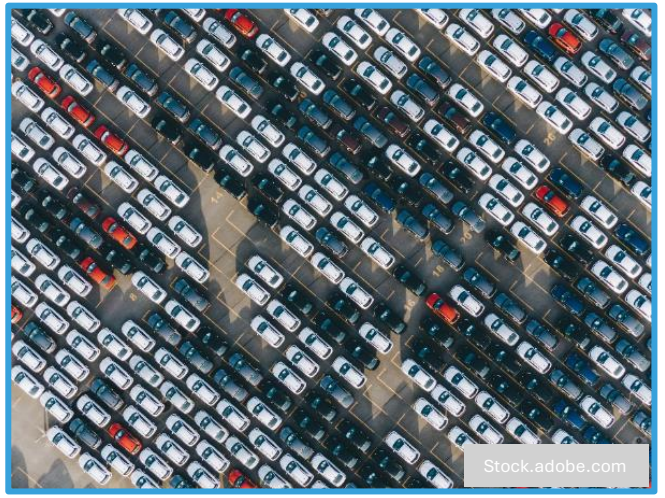
- By Cargo Type
- By Storage Class

Key Cargo Exposure Attributes

Cargo product types (RMSMARINE Occupancy)
Unknown
Automobiles
Break Bulk
Dry Bulk
Liquid Bulk
Consumables
Temperature Controlled
Electronics
Explosives
General Cargo
Heavy Industry
Petroleum Products
Pharmaceuticals
Project Cargo
Livestock
General Specie
Fine Art & Collectibles
Cash in Transit
Jewelers' Block

Cargo storage classes (RMSCGSPEC Construction)
Unknown
Special Design Facility
Silo
Liquid Tank
Gas Tank
Inside Warehouse at Port
Containerized - Inside Warehouse
Containerized - Stacked Outside
Open Lot or Stockpiled Outside
At Destination - Warehouse
At Destination - Retail
Museum or Institution
Retail or Private Building





Port Cargo Exposure Framework

Geographic location and orientation – Location, size and spread of ports

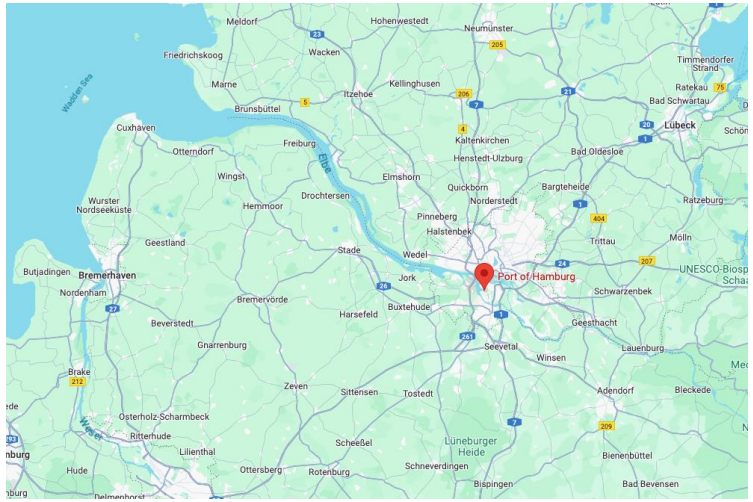
Trade Data – What type of cargo ends up where; unified trade database; valuation model that accounts for inflation, seasonality and volatility

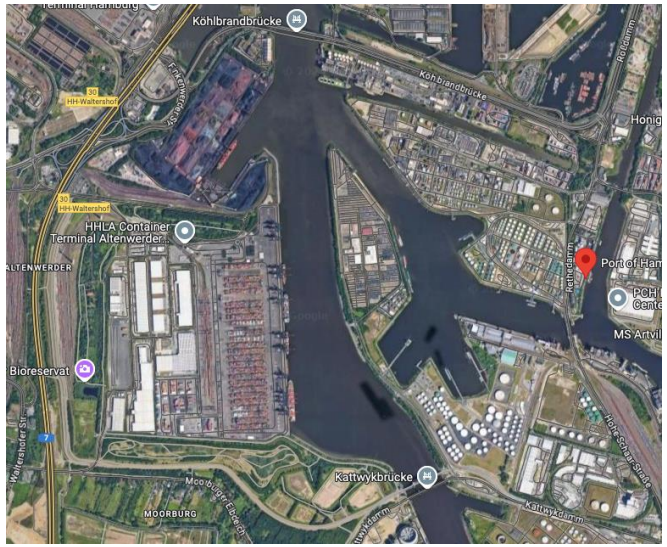
Cargo Model – Cargo type for each product for each port; Containerized/RoRo/Bulk; aggregation and harmonization of HS codes; mapping to proprietary cargo class

Dwell Time – Length of time cargo spends in port; consider global, region, country, and port-specific data; Exposure = Trade x Dwell Time

Storage Model – Distribute exposure to storage facilities; consider cargo type, weight, max storage capacity

Example: Port of Hamburg (DEHAM)

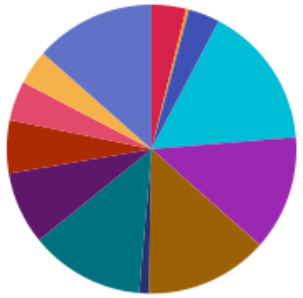
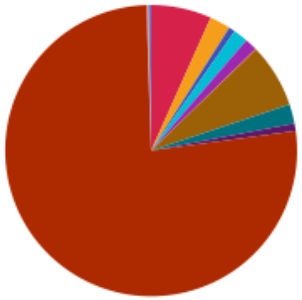




Cargo Type	Special Design Facility	Silo	Inside Warehouse at Port	Open Lot of Stockpiked outside	Liquid tank	Gas Tank	Containerized inside	Containerized outside
Automobiles				3%				
Break_bulk								
Consumables								3%
Dry_bulk		7%	1%	8%				
Electronics			1%					12%
Explosives								
Fine_art_collectibles								
General_cargo			4%					9%
General_specie			1%				1%	
Heavy_industry			4%	8%				1%
Liquid_bulk								8%
Petroleum_products					6%			
Pharmaceuticals			3%					2%
Project_cargo			1%	3%				
Temperature_controlled			10%					3%

Exposure ($) = $4.77 Billion
Exposure (kg) = 1.99 Billion

Port Comparison

Port	Exposure	Dist by Cargo Type	Dist by Storage Type
Hamburg (DEHAM)	$4.77 Billion 1.99 billion kg		
Houston (USHOU)	$4.84 Billion 12.70 billion kg		

Moody’s Ports Industry Exposure Database (IED)

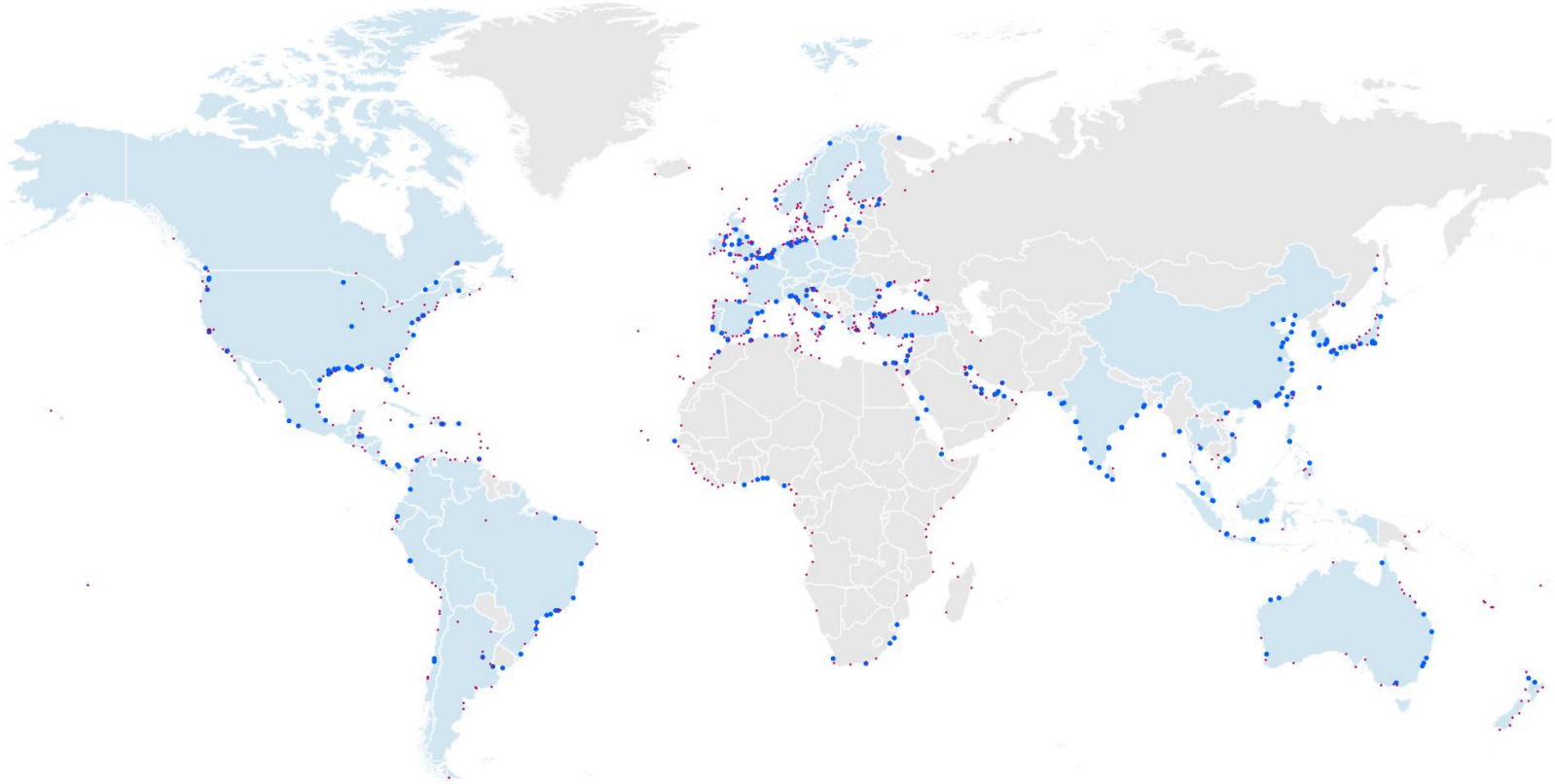
Over 800 ports in more than 100 countries

300 high-definition (HD) ports with shapefile capturing 300,000+ storage facilities

600 ports included in Moody’s RMS Marine Cargo Model

>90% of the global marine trade captured

Average daily and peak exposure values

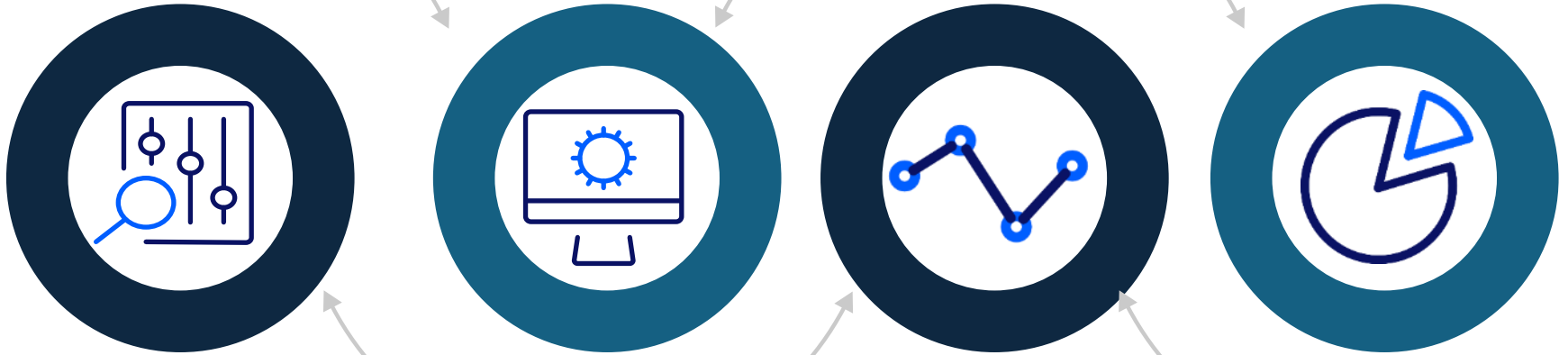


Marine Cargo Port Accumulation Analysis

1. Customize IED (quarterly/annual IED)

3. Apply peak factors (for worst case scenario)

START



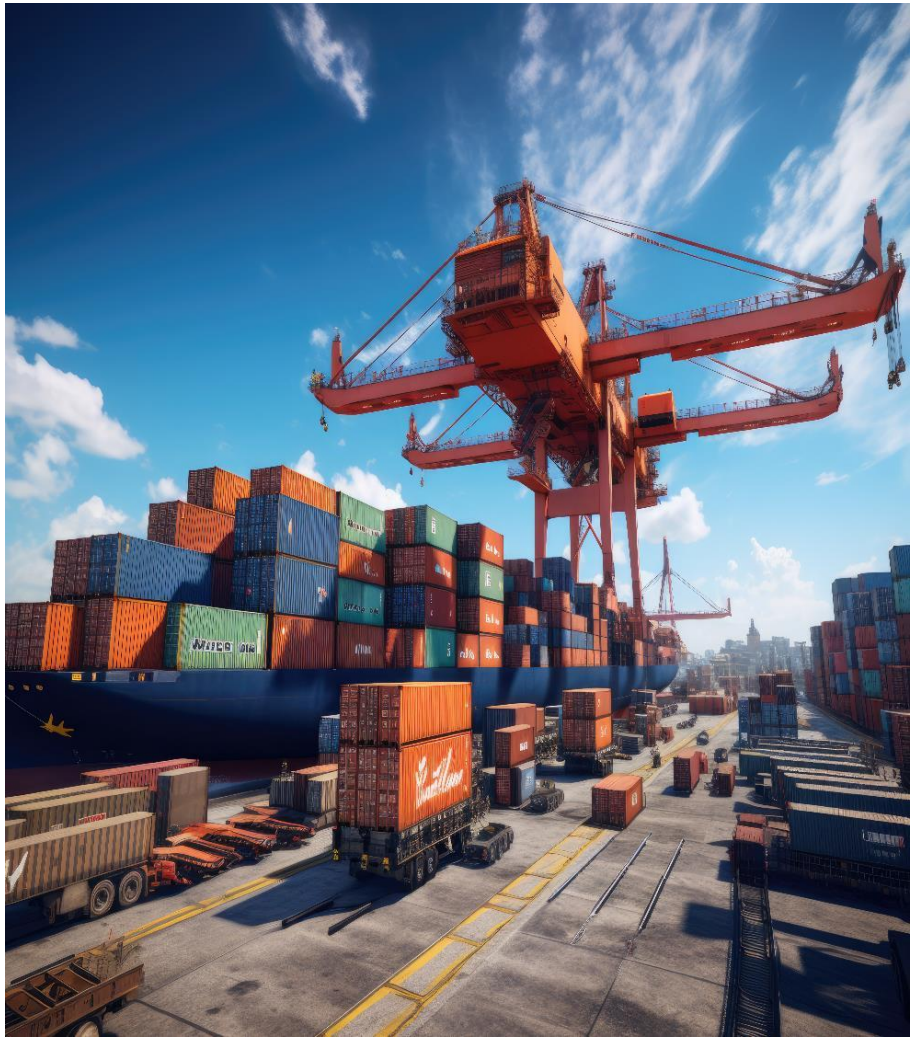
FINISH

2. Run the Marine Cargo Model for all applicable perils or geographic accumulation

4. Apply market share

Other Port IED Use Cases

- **Exposure Disaggregation** – Given coarse data, spread exposure within a country, or within a port
- **Event Response** – Damage, delays, and other impacts to ports when catastrophes occur
- **Supply Chain Impacts** – Connecting the port data to additional trade data can allow for assessment of supply chain and economic impacts



150 YEARS
IUMI
BERLIN
2024
15.- 18. SEPTEMBER

#IUMI2024

Thank you!

Derek Blum
Moody‘s
derek.blum@moodys.com

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