
IFC-ECB-Bank of Spain Conference: “External statistics in a fragmented and uncertain world”

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An ocean of data: the potential of data on vessel traffic¹

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¹ This contribution was prepared for the conference. The views expressed are those of the authors and do not necessarily reflect the views of the European Central Bank, the Bank of Spain, the BIS, the IFC or the other central banks and institutions represented at the event.



An Ocean of Data

The Potential of Data on Vessel Traffic

Graham Pilgrim, Head of Real-time Data Analytics

External Statistics After the Pandemic:

Addressing Novel Analytical Challenges

Future Forward Session



@OECD_Stat



OECD Statistics



www.oecd.org/sdd



www.stats.oecd.org



Motivation

WHAT is AIS?

Automatic Identification System (AIS) is a tracking system for vessels used for safety

- provides position, identification and other information about the vessel
- **Required** in all vessels above 300 gross tonnage used for international voyages, **highly recommended** in others.

AIS signals ('pings') **transmitted** every 2 secs to 6 mins

- each observation represents a ping **received**

Data accessed through the UN Global Platform

- global coverage, from January 2019 onwards
- Available to all NSOs and IOs

WHY use AIS?

Most international merchandise trade is carried by sea

- 80% of volume and 70% of value (UNCTAD, 2017)

Vessel traffic can be monitored in real time to provide policy-relevant insights

- timely: near to real time (database updated every 4 hours)
- Highly granular: By vessel type, ownership and geographic location
- **BUT: Ports corresponding to geographic locations are not defined. We need to derive this!**



Deriving Port Boundaries

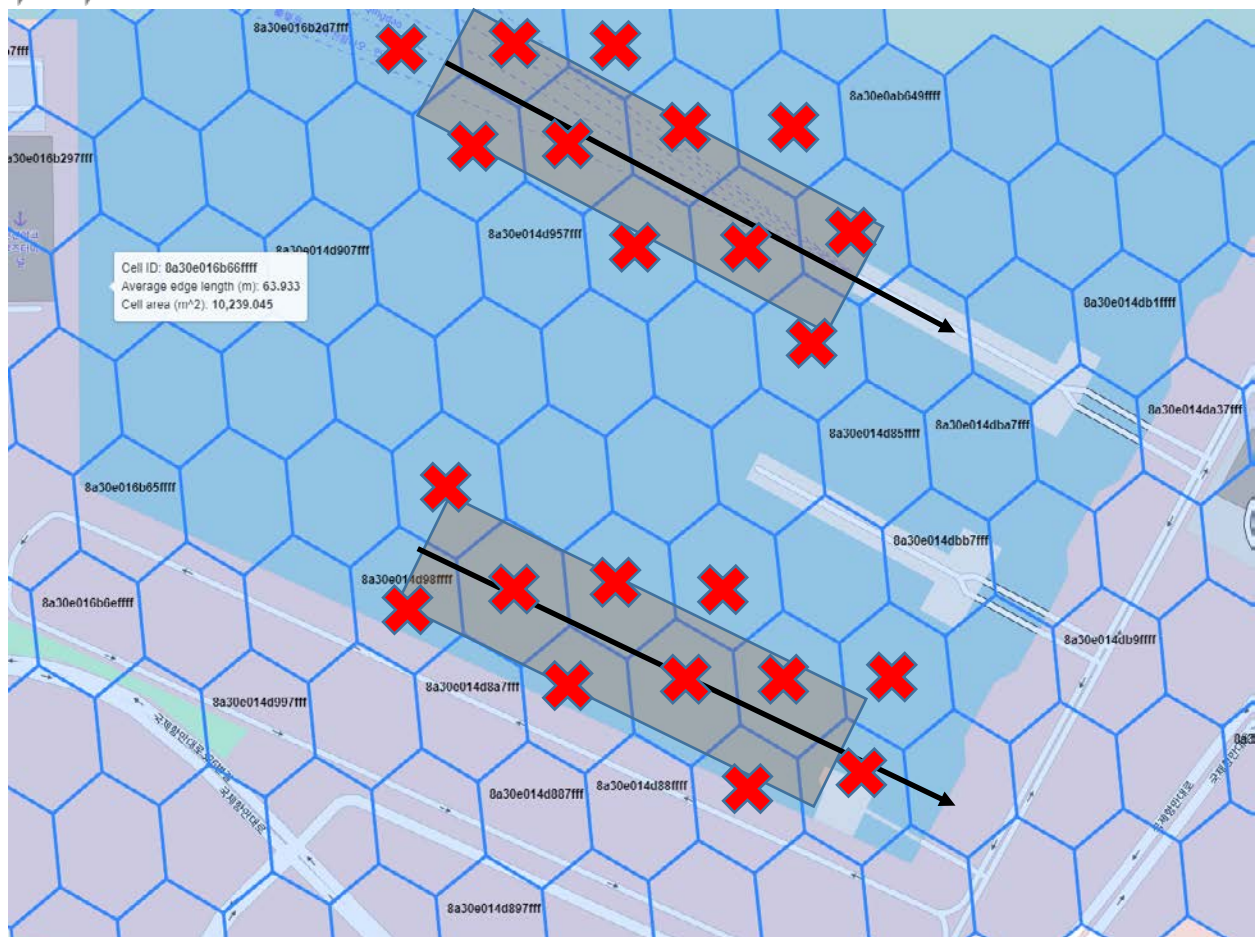
- A number of methods have been considered:
 - Draw a boundary around a known port location (eg. 1 km circle)
 - Use machine learning (DBSCAN) to cluster static vessels which look like ports
 - Manually define port locations
- OECD approach differs and combines some of the beauty of all methods



Determining ports

- Look for static vessels, which is defined as
 - Previous speed, current and next speed are zero
 - Heading change from previous to next message are less than 1degree
 - Movement change from previous to next are less than 10m
 - Wider location appears to be a port (ie. Large share of static vessels and mostly “moored” rather than “at anchor”)
- Using vessel characteristics determine the range of space the vessel occupies and create a range of “port hexagons”

Port Hexagons





Assigning Hexagons to port

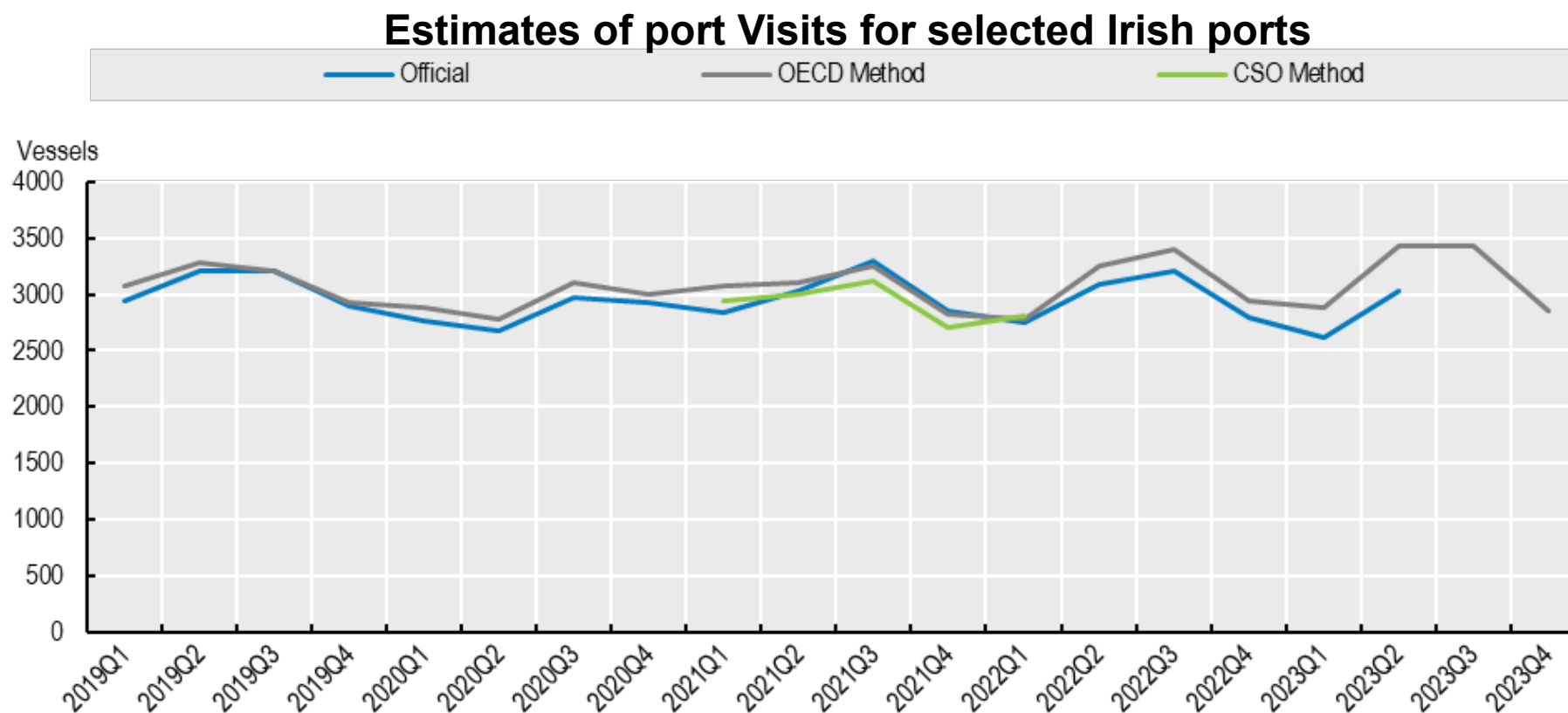
- Take UNLOCodes for ports
- When co-ordinate data doesn't exist attempt match with World Port Index
- If unsuccessful use 'fuzzy matching' with Geonames to determine the most appropriate location.
- Assign each hexagon to the closest port



Insights

Port Visits

- Calculate a port visit by an entry into a “port hexagon”

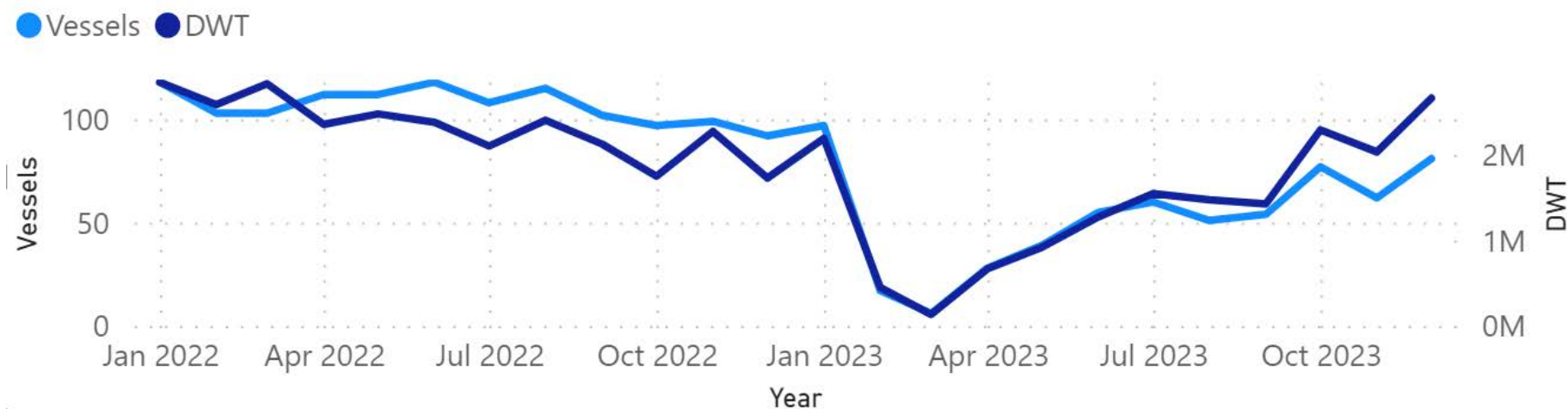


- Extends official stats by 2 quarters, provides framework for granularity

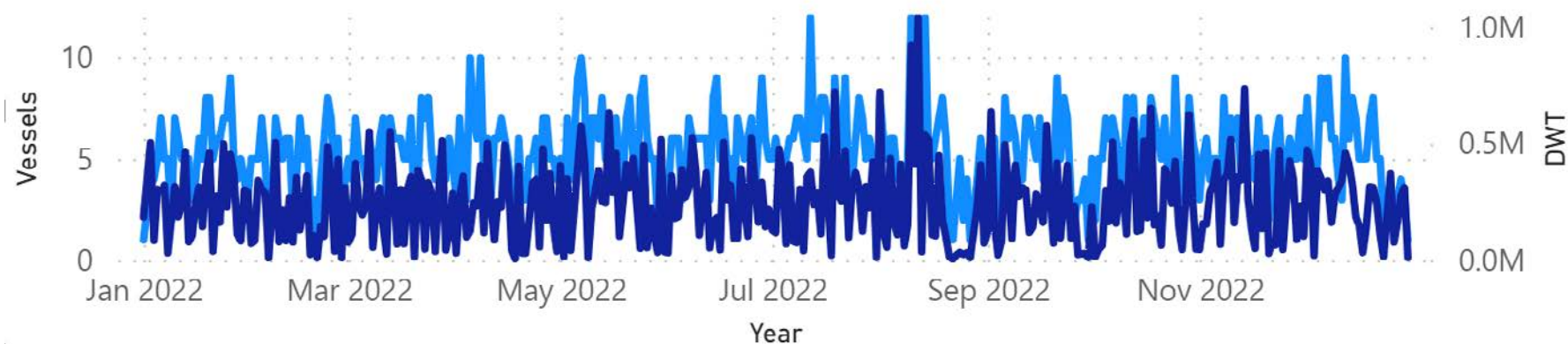


Port Visit Applications

Natural Disaster: Iskenderun (TUR) 2022-23



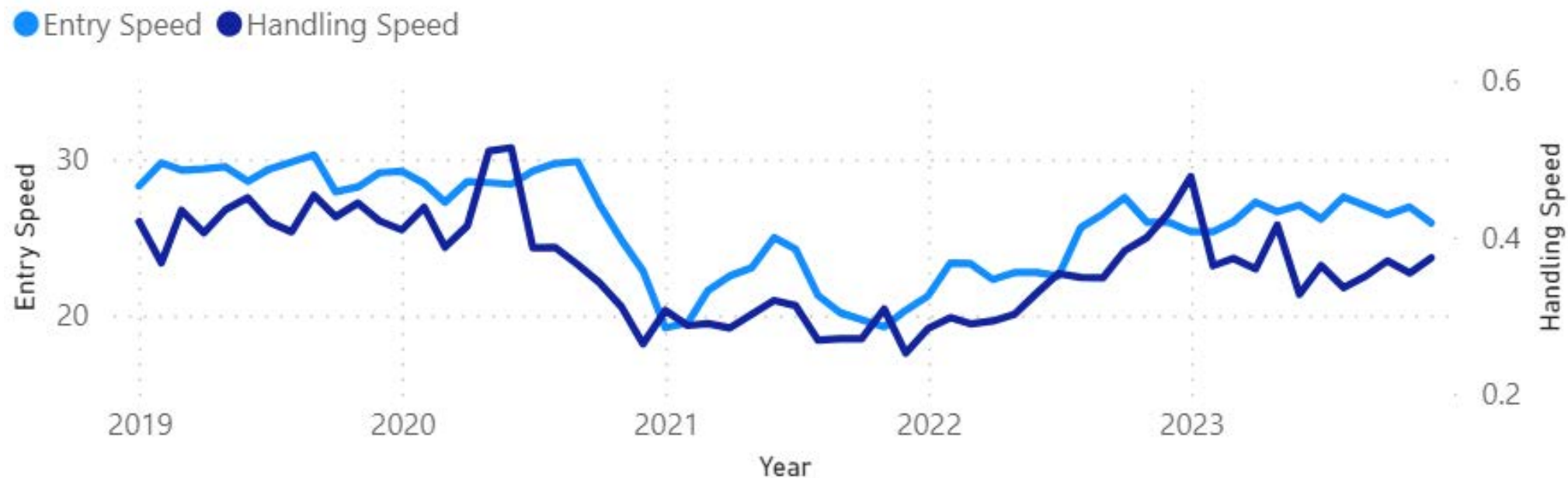
Impact of Strikes: Felixstowe (GBR) 2022





Trade Metrics: Efficiency

- Los Angeles and Long Beach had well documented issues during 2021 and 2022, and this reflects in our 2 efficiency metrics:



Next Steps

- Explore the data in our [Dashboard](#)
- Forthcoming paper and official release in next few months
- Contact: graham.pilgrim@oecd.org

