

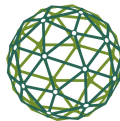
Using AIS data on the UN Global Platform

Assessing changes in Black Sea maritime traffic

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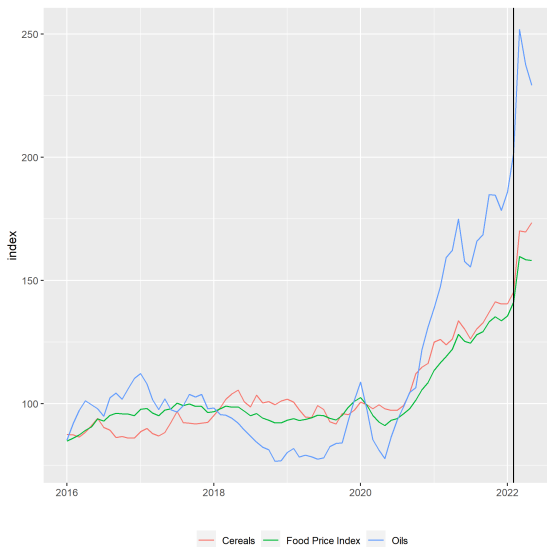
- 1 The Context
- 2 The Problem
- 3 The Solution
- 4 Conclusion

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Setting the scene

- Prior to the 2022 invasion of Ukraine, the country was a top exporter of many agricultural products
- In 2021, it was the fifth largest wheat exporter in the world, and third largest corn exporter
- Exports, largely shipped via bulkers out of Ukraine's Black Sea ports, were immediately threatened and cut off due to naval action and blockades in the sea
- This would have repercussions on global food security and food prices

FAO Food Price Index, 2016-01 to 2022-05



Setting the scene (cont.)

- Lack of Ukraine's supply and general uncertainty caused food prices to spike
- Added pressure to already high prices due to the aftermath of the COVID pandemic
- The UN-brokered Black Sea Initiative (BSI) reopened the flow of grain exports from Ukraine's Black Sea ports in August 2022 after months of low exports limited to land and river routes

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Needs and limitations

- Following the signing of the Initiative and the conflict's effect on global food prices, needed a way to monitor trade coming out of the Black Sea and from Ukraine
- Traditional approach would be to look at Ukraine's reported trade data, e.g., UN Comtrade
- Traditional data sources are slow to publish, with lags from three months to a year, depending on the country
- Publication delay issues were exacerbated by Ukraine's statistical capacity during wartime

Needs and limitations (cont.)

- Trade data was too slow for obtaining rapid, real-time assessments of the Initiative's impact on Ukrainian and Black Sea trade
- Of limited use for assessing where exports were coming from, as reported Ukrainian figures wouldn't have included ports of departure or type of transport used
- Increases in exports could be due to increases in rail or Danube river use

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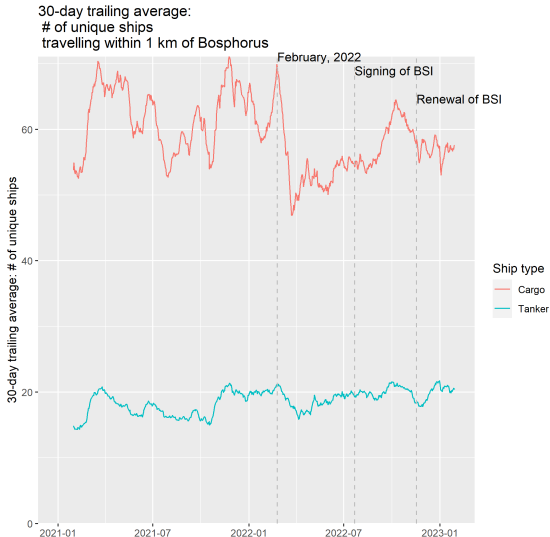
AIS data's benefits

- AIS data have none of these limitations:
 - **real-time:** AIS data are available every day, i.e., no publication lag
 - **disaggregated:** AIS data are available on an individual ship-level, allowing aggregation up to desired level. In this case, traffic at individual ports could be assessed
 - **global coverage:** AIS data are available for any ship, anywhere in the world, independent of local governments or conflicts. Even if a government is unable, unwilling, or slow to publish data, can always access AIS data from within and around the country

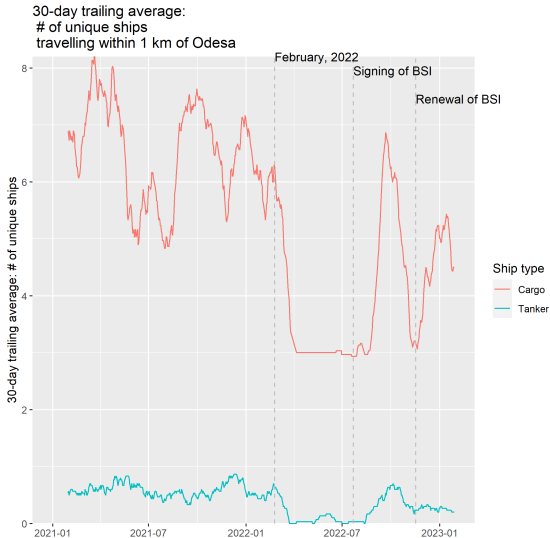
How did we use AIS data

- To transform the raw AIS data into more human-interpretable insights, we determined the coordinates of the three Ukrainian ports included in the Initiative along with the coordinates for the middle of the Bosphorus Strait, the area through which all Black Sea traffic must pass to reach the world's oceans
- We then calculated the number of unique ships coming within one kilometer of the ports on a given day
- These figures then provided us with real-time insights to the impacts of the Initiative on maritime traffic and trade by vessel type

Traffic through the Bosphorus



Traffic at Odesa



Insights from the data

- Helpful in quantifying the impacts of the Initiative as well as Ukraine's continued shortfalls in how many ships it was able to get out
- Helped identify a key trend that would not have been possible without real-time data: that vessel voyages already began to drop before the deal actually expired
- Given the amount of time and scheduling it took to actually get a ship out under the deal (due to inspections, etc.), operators already began scaling back shipments due to the uncertainty of whether the ships would get out in time before the deal's expiration
- Highlighted the importance of transparency and communication to markets around the negotiations, as uncertainty and deadline deals had real impacts on the amount of grain that was actually able to be shipped out

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Extensions and Conclusions

- AIS data is a unique resource that offers **extremely timely, flexible, completely disaggregated** data with **universal coverage**
- Additional uses in the context of the conflict:
 - Offer insights to Russian trade (stopped reporting in 2022) and the impacts of sanctions
 - Be analyzed more intricately to get insights to waiting times (e.g., how much longer did ships have to wait when exporting under the BSI than before?)
 - Quantify and map out shifting trade patterns and routes (e.g., rerouting of Russian exports through the Suez Canal to India rather than westward to Europe)
- AIS's properties make it a unique asset in analyzing our world, its potential just needs to be unlocked by users